Characteristics of studies

Characteristics of included studies

Abascal Junquera 2006

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** Spain
Participants	● **Total participants enrolled:** 45; (A) = 24, (B) = 21 ● **Inclusion criteria:** clinical diagnosis of symptomatic BPH with USS prostate volume between 30 and 70 grams ● **Exclusion criteria:** anticoagulant therapy, neurogenic bladder, de-obstructive surgery for prostate adenocarcinoma or suspected adenocarcinoma, indwelling bladder catheter **Baseline characteristics:** No significant differences between arms reported Age, years (SD): (A) = 69.5 (9.5), (B) = 67.3 (9.2) Mean preoperative prostate volume, grams (SD): (A) = 39.5 (9.8), (B) = 42.5 (11.6) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (Olympus SurgMaster) ● **Intervention B:** monopolar TURP (Storz, irrigation fluid = glycine)
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 24), (B) = 0 (n = 21) **Secondary outcomes:** Blood transfusion: (A) = 0 (n = 24), (B) = 0 (n = 21) Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Acute urinary retention Mean duration of resection time Mean duration of catheterisation Mean duration of hospital stay Mean duration of irrigation Mean reduction in serum sodium Mean reduction in haematocrit
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeons were blinded to interventions
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	These objective outcomes are not likely affected by blinding of outcome assessment
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not assessed by this trial
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol could not be identified to allow for full judgement on selective reporting

Acuña Lopez 2010

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** Mexico
Participants	● **Total participants enrolled:** 30; (A) = 15, (B) = 15 ● **Inclusion criteria:** diagnosis of BPH, presenting with ultrasound prostate volume between 20 and 80 mL ● **Exclusion criteria:** anticoagulant therapy with neurogenic bladder suspected or diagnosed prostate adenocarcinoma **Baseline characteristics:** No significant differences between arms reported Age, years: (A) = 68.1, (B) = 67.4 Mean preoperative prostate volume, grams (SD): (A) = 49.6 (17.1), (B) = 58.8 (14.6) Preoperative catheterisation state: not reported

Interventions	● **Intervention A:** bipolar TURP (Gyrus ACMI Bipolar Resector) ● **Intervention B:** monopolar TURP; monopolar resector, irrigation fluid = glycine
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 15), (B) = 0 (n = 15) **Secondary outcomes:** Blood transfusion: (A) = 0 (n = 15), (B) = 0 (n = 15) Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Clot retention Acute urinary retention Mean duration of resection Mean duration of catheterisation Mean duration of hospital stay Mean duration of irrigation Mean decrease in serum sodium % change in haematocrit Incidence of postoperative clot evacuation Trial also provided subjective assessment of cutting capacity, intraoperative visibility, degree of fragment adherence to blade, bleeding during cutting
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeons were blinded to interventions
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	These objective outcomes are not likely affected by blinding of outcome assessment

Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not assessed by this trial
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol could not be identified to allow for full judgement on selective reporting

Ahmad 2016

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** Pakistan
Participants	● **Total participants enrolled:** 220; (A) = 110, (B) = 110 ● **Inclusion criteria:** symptomatic enlarged prostate based on IPSS ● **Exclusion criteria:** bladder stone, urethral stricture, previous prostatic surgery, neurogenic bladder, any urological malignancy **Baseline characteristics:** Mean age, years (SD): (A) = 69.5 (10.93), n = 110, (B) = 69.1 (11.72), n = 110 Mean preoperative prostate volume, mL (SD): (A) = 50.4 (26.34), n = 110, (B) = 48.9 (18.6), n = 110 Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (specific technology not reported) ● **Intervention B:** monopolar TURP (specific technology not reported, irrigation fluid = glycine 1.5%)
Outcomes	**Primary outcomes:** IPSS at 12 months: not reported HRQoL at 12 months: not reported TUR syndrome: (A) = 0 (n = 110), (B) = 0 (n = 110) **Secondary outcomes:** Blood transfusion: (A) = 1 (n = 110), (B) = 0 (n = 110) Urinary incontinence at 12 months: not reported IIEF-5 at 12 months: not reported Need for re-TURP: not reported **Other reported outcomes:** Q_{max} (mL/s) Duration of resection (minutes) Amount of tissue resected (grams) Hospital stay (days) Duration of catheterisation (days)
Source of funding	Not reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeons were blinded to interventions
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but these objective outcomes are not likely affected by blinding of outcome assessment
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Low risk	This study reports that all participants (n = 220) were included in the analyses for these outcomes: "at follow-up 110 patients appeared in the bipolar group and 110 patients appeared in the monopolar group"
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not assessed by this trial
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol could not be identified to allow for full judgement on selective reporting

Akman 2013

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** Turkey
Participants	● **Total participants enrolled:** 286; (A) = 143, (B) = 143 ● **Inclusion criteria:** moderate or severe LUTS (IPSS > 16) with failed medical therapy (at least 2 weeks), recurrent urinary retention, able to give fully informed consent ● **Exclusion criteria:** neurogenic bladder dysfunction, previous prostatic or urethral surgery, prostate cancer, bladder calculus, bladder tumour and coagulopathy, suspicion of prostate cancer (abnormal DRE findings, higher serum PSA levels), urethral stricture **Baseline characteristics:** No significant differences between arms reported Mean age, years (SD): (A) = 67.4 (9.3), (B) = 67.7 (7.7)

	Mean preoperative prostate volume, mL (SD): (A) = 59.7 (24.9), (B) = 55.9 (23.9) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (Olympus UES 40 SurgMasterSystem) ● **Intervention B:** monopolar TURP (Martine ME 411 Electrosurgical Generator, irrigation fluid = glycine)
Outcomes	**Primary outcomes:** IPSS (12 months): mean IPSS (SD) (12 months): (A) = 10.3 (3.0) (n = 127), (B) = 10.8 (2.9) (n = 130) HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 143), (B) = 2 (n = 143) **Secondary outcomes:** Blood transfusion: (A) = 3 (n = 143), (B) = 8 (n = 143) Urinary incontinence (12 months): (A) = 0 (n = 127), (B) = 0 (n = 130) Erectile dysfunction (IIEF-5) (12 months): results represented only in graphical format with no specific data reported Need for repeat TURP (i.e. re-TURP): (A) = 6 (n = 34), (B) = 4 (n = 33) (2012 BJUI paper) **Other reported outcomes:** Q_{max} Clot retention Urethral stricture Bladder neck contracture Operation duration Catheterisation duration Hospitalisation duration Postoperative haemoglobin drop Postoperative serum sodium drop
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeons were blinded to interventions
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported

Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but these objective outcomes are not likely affected by blinding of outcome assessment
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	Study states: "in the monopolar TURP group 130/143 (90.1%) were followed for at least one year, and in the bipolar TURP group, 127/143 were followed for the same period" This study provides specific reasons for all patient dropouts and losses to follow-up for these outcomes. It is considered unclear how such incomplete outcome data would impact observed differences in reported outcomes
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol could not be identified to allow for full judgement on selective reporting

Akçayöz 2006

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** Turkey
Participants	● **Total participants enrolled:** 42; (A) = 21, (B) = 21 ● **Inclusion criteria:** clinical BPH ● **Exclusion criteria:** suspicion of prostatic adenocarcinoma, urethral stricture, bladder stones, neurological disorders, respiratory problems, previous prostatic urethral or bladder surgery **Baseline characteristics:** No statistically significant differences between arms reported Mean age, years (SD): (A) = 67 (7), (B) = 66 (9) Mean preoperative prostate volume, mL (SD): (A) = 40 (13), (B) = 47 (15) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (Gyrus Plasmakinetic) ● **Intervention B:** monopolar TURP, irrigation fluid = 1.5% glycine
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 21), (B) = 0 (n = 21) **Secondary outcomes:** Blood transfusion: (A) = 0 (n = 21), (B) = 0 (n = 21) Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported

	Other reported outcomes: Operation time Resected prostate weight Postoperative serum sodium Intraoperative fluid absorption
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeons were blinded to interventions
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but these objective outcomes are not likely affected by blinding of outcome assessment
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not assessed by this trial
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full decision on selective reporting

Al-Rawashdah 2017

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** Italy
Participants	● **Total participants enrolled:** 497; (A) = 246, (B) = 251 ● **Inclusion criteria:** BPH scheduled to undergo TURP ● **Exclusion criteria:** bleeding disorders, prostate cancer, neurogenic bladder, previous urethral or prostatic surgery

	Baseline characteristics: Mean age, years (SD): (A) = 67.7 (0.6) (n = 246), (B) = 67.0 (0.7) (n = 251) Mean preoperative prostate volume, mL (SD): (A) = 53.95 (0.16), (B) = 54.11 (0.17) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (specific technology = Gyrus PK Super-Pulse Olympus) ● **Intervention B:** monopolar TURP (specific technology = Karl Storz and ERBE Generator, irrigation fluid = sorbitol/mannitol irrigation fluid)
Outcomes	**Primary outcomes:** IPSS at 12 months: (A) = 7.75 (0.10) (n = 251), (B) = 7.89 (0.10) (n = 246) HRQoL at 12 months: (A) = 0.81 (0.05) (n = 251), (B) = 0.84 (0.05) (n = 246) TUR syndrome: (A) = 0 (n = 251), (B) = 7 (n = 246) **Secondary outcomes:** Blood transfusion: (A) = 0 (n = 251), (B) = 5 (n = 246) Urinary incontinence at 12 months: not reported IIEF-5 at 12 months: not reported Need for re-TURP: not reported **Other reported outcomes:** Q_{max} PVR Operative time PSA level drop Length of hospitalisation Time of catheterisation Urinary retention Postoperative haemoglobin drop Postoperative sodium drop Urethral stricture Bladder neck contracture
Source of funding	None
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Low risk	"All 497 patients..enrolled in this study were computer randomized (simple randomization 1:1)"
Allocation concealment (selection bias): All outcomes	Unclear risk	Specific method used to conceal allocation sequence not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeons were blinded

Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to be affected by blinding of outcome assessment
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes specifically
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Low risk	Study states: "all patients completed the follow-up visits at 3, 12, 24, and 36 months"
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol could not be identified for full judgement on selective reporting

Bahadzor 2006

Methods	● **Study type:** single-centre randomised controlled trial (1:1); **conference abstract only available for data extraction** ● **Setting:** Malaysia
Participants	● **Total number enrolled:** 103; (A) = 52, (B) = 51 ● **Included:** benign prostatic hyperplasia (BPH) ● **Exclusion criteria:** not reported ● **Age:** not reported ● **Baseline characteristics:** not reported
Interventions	● **Intervention A:** bipolar TURP (Plasma Kinetic Resection of Prostate) ● **Intervention B:** monopolar TURP, irrigation fluid = not reported
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: not reported **Secondary outcomes:** Blood transfusion: not reported Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Acute urinary retention Abstract states that data recorded for mean operative time, haemoglobin drop, serum sodium level, duration of catheterisation, hospital stay, IPSS, QoL, and PVR at 1 month but no specific data reported in abstract

Source of funding	None reported
Notes	This is a conference abstract with limited information

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeons were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Unclear risk	These outcomes were not reported by this trial
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	These outcomes were not reported
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full judgement

Bertolotto 2007

Methods	● **Study type:** multi-centre (3-centre) randomised controlled trial (1:1); only published abstract available for data extraction ● **Setting:** Italy
Participants	● **Total number enrolled:** 100; (A) = 52, (B) = 48 ● **Inclusion criteria:** candidates for surgery for obstructive symptoms, prostate estimated volume < 100 mL, $Q_{max} \leq$ 15 mL/s, IPSS ≥ 13, PSA ≤ 4 ng/L ● **Exclusion criteria:** not reported **Baseline characteristics:** reported only for overall cohort and not individual arms Age, years: **n**ot reported for both arms (median age overall = 71)
Interventions	● **Intervention A:** bipolar TURP (TURis; Olympus Surgmaster) ● **Intervention B:** monopolar TURP, irrigation fluid = glycine

Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 52), (B) = 0 (n = 48) **Secondary outcomes:** Blood transfusion: not reported Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Urethral stricture Bladder neck contracture Operation duration Q_{max} at 6 months IPSS at 6 months
Source of funding	None reported
Notes	This is a conference abstract with limited information. Patient population identical to that reported in a previously published abstract by the same authors (Bertolotto 2006)

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeons were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Unclear risk	These outcomes were not assessed by this trial
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes specifically
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full judgement

Bhansali 2009

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** India
Participants	● **Total participants enrolled:** 70; data on number of participants allocated to each arm unclear at baseline ● **Inclusion criteria:** BPH-related LUTS requiring surgical intervention, prostate gland > 60 grams on 3D transrectal USS ● **Exclusion criteria:** AUA Symptom Score (AUASS) < 18, Q_{max} > 12 mL/s, gland < 60 g (3D-TRUS), neurological illness, renal insufficiency, bladder stone, urethral stricture, evidence of prostate carcinoma, patients receiving 5-a reductase inhibitors **Baseline characteristics:** No significant differences between groups for reported characteristics Age: not reported Mean preoperative prostate gland size, grams (SD): (A) = 82.38 (17.965), (B) = 82.61 (19.157) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (Plasmakinetic Superpulse System – 24 Gyrus) ● **Intervention B:** monopolar TURP (ValleyLab, irrigation fluid = glycine)
Outcomes	**Primary outcomes:** IPSS (12 months): not reported specifically, only AUA scores HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 34), (B) = 4 (n = 33) **Secondary outcomes:** Blood transfusion: not reported Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Q_{max} (3, 9, 12 months) Urethral stricture Bladder neck contracture Mean blood loss (mL) Hospitalisation duration Catheterisation duration
Source of funding	Study states "no financial conflict of interest" but does not report funding for study specifically
Notes	Study authors contacted regarding absence of specific data on postoperative AUASS and QoL scores

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Low risk	Study states: "patients were randomised 1:1 using envelopes into two groups"
Allocation concealment (selection bias): All outcomes	Unclear risk	Unclear whether the envelopes were sequentially numbered, opaque, and sealed
Blinding of participants and personnel (performance bias): All outcomes	High risk	Participants were blinded but considered unlikely that operating surgeons were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Low risk	"In the study, participants were blinded regarding the treatment modality they were receiving, as were the staff members who had done the outcome assessment of the patient's treatment, including decision to remove the catheter in post-operative period"
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Unclear risk	These outcomes were not reported by this trial
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes specifically
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported by the trial
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol could not be identified to allow for full assessment of selective reporting. However, no outcome data on the incidence of blood transfusion or QoL were reported even though the study reports capturing these data elsewhere in the manuscript

Chen 2009

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** China
Participants	● **Total participants enrolled:** 40; (A) = 21, (B) = 19 ● **Inclusion criteria:** older than 55 years and fit for anaesthesia, symptomatic BPH, prostate volume > 50 mL, IPSS ≥ 18, Q_{max} < 15 mL/s, failed medical therapy with alpha blockers or 5-alpha reductase inhibitors ● **Exclusion criteria:** suspected prostate cancer, bladder calculus, neurogenic bladder, previous prostate surgery, previous urethral stricture

	Baseline characteristics: No significant differences between arms reported Mean age, years (SD): (A) = 72.6 (6.5), (B) = 71.8 (6.3) Mean preoperative prostate volume, mL (SD): (A) = 78.4 (16.4), (B) = 76.8 (17.5) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (TURIS, Olympus) ● **Intervention B:** monopolar TURP (Olympus, irrigation fluid = mannitol 4%)
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 21), (B) = 1 (n = 19) **Secondary outcomes:** Blood transfusion: (A) = 1 (n = 21), (B) = 3 (n = 19) Urinary Incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** IPSS at 3 months and 6 months Q_{max} at 3 months and 6 months Acute urinary retention Duration of operation Duration of catheterisation Duration of hospital stay Decrease in postop serum sodium Decrease in postop haemoglobin
Source of funding	None reported
Notes	This RCT is based on a different population than a subsequent publication by the authors (Chen 2010) - this has been confirmed by study authors

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	"In our study, patients were blinded to the operation equipment, but not to surgeons"
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported for outcome assessors, but patients were blinded as per above: "in our study, patients were blinded to the operation equipment, but not to surgeons"

Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to have been affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes specifically
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported by the trial
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment of selective reporting However, study seems to suggest that data on complications such as urinary incontinence were recorded, but no data were reported within the manuscript

Chen 2010

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** China
Participants	● **Total number enrolled:** 100; (A) = 50, (B) = 50 ● **Inclusion criteria:** failure of medical therapy, all indications for surgical treatment of BPH ● **Exclusion criteria:** severe pulmonary disease, allergic response to alcohol, prostate cancer, bladder calculus, neurogenic bladder dysfunction, previous prostate surgery, urethral stricture, coagulopathy **Baseline characteristics:** No significant differences between groups reported Mean age, years (SD): (A) = 69.7 (7.6), (B) = 71.2 (6.3) Mean preoperative prostate volume, mL (SD): (A) = 60.2 (18.7), (B) = 59.1 (17.3) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP; TURis Olympus SurgMasterSystem ● **Intervention B:** monopolar TURP; irrigation fluid = 4% mannitol, 1% ethanol
Outcomes	**Primary outcomes:** IPSS (12 months): (A) = 4.2 (2.6) (n = 50), (B) = 4.1 (2.3) (n = 50) HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 50), (B) = 0 (n = 50) **Secondary outcomes:** Blood transfusion: (A) = 1 (n = 50), (B) = 3 (n = 50) Urinary incontinence (12 months): (A) = 0 (n = 50), (B) = 2 (n = 50) Erectile dysfunction (IIEF-5) (12 months), mean IIEF-5 (SD): (A) = 19.5 (6.1) (n = 24), (B) = 19.3 (4.0) (n = 28)

	Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** IPSS at 6, 24 months Q_{max} at 6, 12, and 24 months IIEF-5 at 6 and 24 months Urethral stricture Bladder neck contracture Acute urinary retention Duration of operation Mean operation duration Mean resected weight Mean serum sodium decrease Mean Hb decrease Frequency of retrograde ejaculation
Source of funding	"Supported by Shanghai Shenkang Hospital Development Centre and Science and Technology Fund of Shanghai JiaoTong University School of Medicine"
Notes	This RCT is based on a different population than a previous publication by the study authors (Chen 2009) - this has been confirmed by the authors

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Low risk	"The stratified permuted randomization algorithm was performed to implement the randomisation"
Allocation concealment (selection bias): All outcomes	Unclear risk	Specific method used to conceal allocation sequence not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Study states: "only patients were blinded to the different treatments while the surgeons and supervisors were not"
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	High risk	Study states: "only patients were blinded to the different treatments while the surgeons and supervisors were not"
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	These objective outcomes are unlikely to have been affected by blinding of outcome assessment
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes specifically
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	Study states: "all 100 patients completed the two year follow-up", but unclear if this also applies to the 12-month time point

Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for judgement

Choi 2006

Methods	● **Study type:** multi-centre randomised controlled trial; only published abstract available for data extraction. Note number of involved centres not reported in abstract ● **Setting:** South Korea
Participants	● **Total number enrolled:** 200; number of patients in each arm of the trial not reported ● **Inclusion criteria:** “BPH patients” ● **Exclusion criteria:** not reported ● **Baseline characteristics:** not reported
Interventions	● **Intervention A:** bipolar TURP; Plasma Kinetic (PK) Tissue Management System (Gyrus) ● **Intervention B:** monopolar TURP; irrigation fluid = not reported
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: not reported **Secondary outcomes:** Blood transfusion: not reported Urinary Incontinence (12 months): not reported (no time of follow-up provided for urinary incontinence data) Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Acute urinary retention Postoperative drop in serum sodium Postoperative drop in haemoglobin Abstract states data collected for resected tissue amount, operative time, changes in haemoglobin, hospital stay, duration of catheter, IPSS, Q_{max}, but no specific data provided
Source of funding	None reported
Notes	This is a conference abstract with limited information

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported

Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeons were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Unclear risk	These outcomes were not reported by this trial
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	These outcomes were not reported by this trial
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported by this trial
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment of selective reporting

D'Elia 2004

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** Italy
Participants	● **Total participants enrolled:** 85; (A) = 43, (B) = 42 ● **Inclusion criteria:** not reported ● **Exclusion criteria:** not reported ● **Baseline characteristics:** no specific data reported
Interventions	● **Intervention A:** bipolar TURP (Gyrus) ● **Intervention B:** monopolar TURP (irrigation fluid = not reported)
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: not reported **Secondary outcomes:** Blood transfusion: not reported Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Catheterisation time Hospitalisation time Abstract states data collected on operative time, resected weight, blood loss and irrigation fluid absorption, IPSS, peak flow rates, and postvoid residual volumes, but no specific data provided

Source of funding	None reported
Notes	This is a conference abstract with limited information

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Unclear risk	These outcomes were not reported by the trial
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	These outcomes were not reported by the trial
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported by the trial
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full judgement; however abstract states that data were collected on operative time, resected weight, blood loss, irrigation fluid absorption, IPSS, peak flow rates, and postvoid residual volumes, but no specific data outcome data were provided

De Sio 2006

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** Italy
Participants	● **Total participants enrolled:** 70; (A) = 35, (B) = 35 ● **Inclusion criteria:** symptomatic BPH, age > 50 years, good performance status, acute urinary retention if catheter removal failed after therapy with alpha-blockers or chronic urinary retention unresponsive to medical treatment, IPSS ≥ 18, maximal flow rate (Q_{max}) < 15 mL/s ● **Exclusion criteria:** prostate volume < 30 cm^3, documented or suspected

	prostate cancer, neurogenic bladder, bladder stone or diverticula, urethral stricture, maximal bladder capacity > 500 mL **Baseline characteristics:** No significant differences between arms reported Mean age, years (SD): (A) = 59 (5.9), (B) = 61 (5.9) Mean preoperative prostate volume, cm^3 (SD): (A) = 51.6 (3.9), (B) = 47.5 (5.1) Preoperative catheterisation status: not reported
Interventions	● **Intervention A:** bipolar TURP (Gyrus Plasmakinetic System) ● **Intervention B:** monopolar TURP (ValleyLab Force FX); irrigation fluid = not reported
Outcomes	**Primary outcomes:** IPSS (12 months): (A) = 3.9 (n = 35), (B) = 3.8 (n = 35) HRQoL (12 months): (A) = 1.0 (n = 35), (B) = 0.8 (n = 35) TUR syndrome: (A) = 0 (n = 35), (B) = 0 (n = 35) **Secondary outcomes:** Blood transfusion: (A) = 1 (n = 35), (B) = 0 (n = 35) Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): (A) = 1 (n = 32), (B) = 1 (n = 31) **Other reported outcomes:** IPSS at 3, 6, and > 12 months HRQoL at 24/36/48 months Q_{nax} (mL/s) (12 months) Urethral stricture Bladder neck contracture (48 months) Mean duration of operation (minutes) Mean decrease in postoperative haemoglobin Mean decrease in postoperative sodium Mean duration of catheterisation Mean duration of hospital stay Clot retention Acute urinary retention Death
Source of funding	Study reports that no financial support was received
Notes	Patient population identical to that reported in 2 abstracts (De Sio 2005; Autorino 2007) and another paper (Autorino 2009) published by the same authors Four relevant commentaries have been detected and taken into account for potential inclusion of additional information (Autrorino 2007a; Kaplan 2010; Rassweiler 2009; Seitz 2009)

Risk of bias table

Bias	Authors' judgement	Support for judgement

Random sequence generation (selection bias): All outcomes	Low risk	Study states: "randomisation was performed using a stratified permuted randomisation algorithm"
Allocation concealment (selection bias): All outcomes	Unclear risk	Specific method of allocation concealment not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Study states: "outcome assessors were blinded to treatments patients had received" (Autorino 2009). However, not reported explicitly if patients involved in recording self-assessed outcomes were blinded
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	These objective outcomes are unlikely to have been affected by blinding of outcome assessment
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	Study accounts for all patients in analyses: "ninety percent of the patients completed the 4-yr assessments: 32 (of 35) in the PK group and 31 (of 35) in the standard TURP group. There was no statistically significant difference in the number of dropouts in the two groups (p = 0.2). Reasons for dropout were the following: refused follow-up (3 patients), moved away (2 patients), and death from other causes (2 patients)" (Autorino 2009) Impact of incomplete outcome data on reported differences in outcomes between intervention arms considered unclear
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	Study accounts for all patients in analyses: "ninety percent of the patients completed the 4-yr assessments: 32 (of 35) in the PK group and 31 (of 35) in the standard TURP group. There was no statistically significant difference in the number of dropouts in the two groups (p = 0.2). Reasons for dropout were the following: refused follow-up (3 patients), moved away (2 patients), and death from other causes (2 patients)" (Autorino 2009) Impact of incomplete outcome data on reported differences in outcomes between intervention arms considered unclear
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol could not be identified to allow for full judgement of selective reporting

Demirdag 2016

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** Turkey
Participants	● **Total participants enrolled:** 118; (A) = 59, (B) = 59 ● **Inclusion criteria:** prostate glands larger than 60 mL, moderate to severe lower urinary tract symptoms and significant postmicturition residual (PMR) urine volume (> 100 mL) in spite of medical treatment with alpha blockers and 5-alpha reductase inhibitors ● **Exclusion criteria:** history or suspicion of prostate cancer, bladder stone, neurogenic bladder, previous prostatic surgery, previous urethral stricture **Baseline characteristics:** Mean age, years (SD): (A) = 65 (9.0), n = 36, (B) = 66.87 (10.1), n = 45 Mean preoperative prostate volume, mL (SD): (A) = 71.8 (12.93), n = 36, (B) = 73.9 (14.13), n = 45 Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (Olympus Gyrus PK SuperPulse Generator) ● **Intervention B:** monopolar TURP (ValleyLab Force FX Electrocautery, irrigation fluid = glycine 5%)
Outcomes	**Primary outcomes:** IPSS (12 months): not reported at 12 months HRQoL (12 months): not reported at 12 months TUR syndrome: (A) = 0 (n = 36), (B) = 2 (n = 45) **Secondary outcomes:** Blood transfusion: (A) = 4 (n = 36), (B) = 8 (n = 45) Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported at 12 months Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Operation duration Postoperative haemoglobin Postoperative sodium Catheterisation time Clot retention Postoperative IIEF-5 (not explicitly at 12 months)
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Study states: "randomised into MTURP or BTURP arms via software program with a 1:1 ratio"; limited detail reported regarding specific randomisation sequence
Allocation concealment (selection bias): All outcomes	Unclear risk	Specific method of allocation concealment not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to be affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	High risk	Study states: "total of 37 patients have been excluded because of loss of follow-up or missing data" This resulted in significant differential loss to follow-up between arms: n = 23/59 in BTURP vs 14/59. No specific details provided to explain loss to follow-up or missing data
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	High risk	Study states: "total of 37 patients have been excluded because of loss of follow-up or missing data" This resulted in significant differential loss to follow-up between arms: n = 23/59 in BTURP vs 14/59. No specific details provided to explain loss to follow-up or missing data
Selective reporting (reporting bias): All outcomes	Unclear risk	No RCT protocol available to allow for full judgement on selective reporting

Eaton 2004

Methods	● **Study type:** single-centre randomised controlled trial (1:1); only published abstract available for data extraction ● **Setting:** United Kingdom
Participants	● **Total participants enrolled:** 100; (A) = 50, (B) = 50 ● **Inclusion criteria:** urodynamically obstructed men ● **Exclusion criteria:** not reported **Baseline characteristics:** All were ASA 1/2 Preoperative catheterisation, n: (A) = 15, (B) = 15

Interventions	● **Intervention A:** bipolar TURP; technology reported as both Plasmakinetic and Karl Storz (unclear if both Gyrus and Karl Storz instruments were used) ● **Intervention B:** monopolar TURP; irrigation fluid = glycine
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: not reported **Secondary outcomes:** Blood transfusion: not reported Urinary Incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Urethral stricture Bladder neck contracture UTI Bladder neck contracture Acute urinary retention Mean duration of catheterisation Mean duration of hospital stay Secondary haemorrhage requiring re-admission PVR change
Source of funding	None reported
Notes	This is a conference abstract with limited information

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that surgeons were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Unclear risk	These outcomes were not reported by the trial
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	These outcomes were not reported by the trial

Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported by the trial
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment on selective reporting. However, study states that IPSS at 12 months was recorded, but no specific outcome data provided - abstract only with no full manuscript identified

Egui Rojo 2017

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** Spain
Participants	● **Total participants enrolled:** 77; (A) = 35, (B) = 42 ● **Inclusion criteria:** not reported ● **Exclusion criteria:** not reported **Baseline characteristics:** Mean age, years (SD): not reported for individual arms, for both arms: 66 (50 to 82) Mean preoperative prostate volume, mL (SD): not reported for individual arms, for both arms: 39 (10 to 69) Preoperative catheterisation state: not reported
Interventions	**Intervention A:** bipolar TURP (specific technology = not reported) **Intervention B:** monopolar TURP (specific technology = not reported, irrigation fluid = not reported)
Outcomes	**Primary outcomes:** IPSS at 12 months: not reported HRQoL at 12 months: not reported TUR syndrome: not reported **Secondary outcomes:** Blood transfusion: not reported Urinary incontinence at 12 months: not reported IIEF-5 at 12 months: not reported Need for re-TURP: not reported **Other reported outcomes:** Retrograde ejaculation IPSS at IIEF-5 at 1 and 3 months
Source of funding	None reported
Notes	Only abstract available

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	These outcomes were not reported by this trial
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Unclear risk	These outcomes were not reported by this trial
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	These outcomes were not reported by this trial
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported by this trial
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment of selective reporting

El-Assmy 2018

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** Egypt
Participants	● **Total participants enrolled:** 294; (A) = 145, (B) = 149 ● **Inclusion criteria:** presenting for BPH surgery; 50 years or older at the time of intervention; married, sexually interested, and having a continuous relationship with the same partner ● **Exclusion criteria:** indwelling catheter for longer than 1 month before intervention to avoid recall bias in filling out questionnaires **Baseline characteristics:** Mean age, years (SD): (A) = 62 (6.3), (B) = 64 (7.7) Mean preoperative prostate volume, mL (SD): (A) = 68 (22), (B) = 63 (23) Preoperative catheterisation state: not reported explicitly, although patients were excluded if catheterised for > 1 month before intervention
Interventions	● **Intervention A:** bipolar TURP (specific technology = TUR in Saline-TURis, Olympus SurgMaster UES-40 Bipolar Generator) ● **Intervention B:** monopolar TURP (specific technology = ValleyLab Force FX Electrosurgical Unit, irrigation fluid = glycine)

Outcomes	**Primary outcomes:** IPSS at 12 months: appears to be reported but data not clearly attributable to 1 arm of the trial HRQoL at 12 months: appears to be reported but data not clearly attributable to 1 arm of the trial TUR syndrome: not reported **Secondary outcomes:** Blood transfusion: not reported Urinary incontinence at 12 months: not reported IIEF-5 at 12 months: not reported Need for re-TURP: not reported **Other reported outcomes:** IIEF-5 (erectile function) scores Orgasmic function Mean operation time Mean resection weight Capsular perforation Mean catheter time Intercourse satisfaction Ejaculatory function (Ej-MSHQ score)
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Low risk	Study states: "randomization process was carried out using a computer based software in a 1:1 ratio"
Allocation concealment (selection bias): All outcomes	Unclear risk	Method of allocation concealment not reported specifically
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded. Study reports blinding of patients
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Reported data for IPSS and QoL could not be attributed to 1 individual arm of the trial; therefore judgement cannot clearly be made
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Unclear risk	These outcomes were not reported
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	These outcomes were not reported

Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	Reported data for IPSS and QoL could not be attributed to 1 individual arm of the trial; therefore judgement cannot clearly be made
Selective reporting (reporting bias): All outcomes	Low risk	This study was registered with ClinicalTrials.gov (NCT01810068), with no clear discrepancies between outcomes in protocol and reported study

Erturhan 2007

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** Turkey
Participants	● **Total number enrolled:** 240; (A) = 120, (B) = 120 ● **Inclusion criteria:** BPE with moderate or severe LUTS (IPSS ≥ 18), significant postvoid residual volume (> 50 mL) ● **Exclusion criteria:** documented/suspected prostate cancer, previous prostatic surgery, urethral stricture, neurogenic bladder disorder **Baseline characteristics:** Unclear if significant differences between arms at baseline (no P values provided) Mean age, years (range): (A) = 68.5 (52 to 90), (B) = 67.4 (68 to 74) Mean prostate volume, mL (SD): (A) = 43 (9), (B) = 42 (11) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (Gyrus Plasmakinetic Resection, Medicalm UK) ● **Intervention B:** monopolar TURP (ValleyLab Force EX, glycine 5%)
Outcomes	**Primary outcomes:** IPSS (12 months): (A) = 4 (2) (n = 120), (B) = 4 (2) (n = 120) HRQoL (12 months): (A) = 2 (1) (n = 120), (B) = 2 (1) (n = 120) TUR syndrome: (A) = 0 (n = 120), (B) = 2 (n = 120) **Secondary outcomes:** Blood transfusion: (A) = 1 (0.83) (n = 120), (B) = 7 (5.83) (n = 120) Urinary incontinence (12 months): (A) = 0 (n = 120), (B) = 0 (n = 120) Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** IPPSS at 1 month HRQoL at 1 and 12 months Q_{max} (mL/s) at 1, 12 months Clot retention Urethral stricture Bladder neck contracture Acute urinary retention Death due to TURP Mean duration of operation (minutes) Mean duration of catheterisation (days)

	Mean duration of hospital stay (days) Duration of operation Perioperative and postoperative irrigation volume Irrigation duration Catheterisation duration Hospitalisation duration
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to be affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes specifically
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes specifically
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol could not be identified to allow for full assessment of selective reporting. However, no data were reported for erectile dysfunction outcomes although this is described in the methods section as captured data

Fagerström 2011

Methods	● **Study type:** randomised controlled trial (ratio of randomisation not reported) ● **Setting:** Sweden

Participants	● **Total number enrolled: not specifically reported:** 185; (A) = 98, (B) = 87 ● **Inclusion criteria:** symptomatic BPH requiring surgery due to failed medical therapy or urinary retention, TRUS estimated prostatic volume 30 to 100 mL ● **Exclusion criteria:** evident prostate or bladder cancer, core biopsy of prostate within 3 months before scheduled surgery, neurogenic bladder dysfunction, urethral stricture **Baseline characteristics:** Not all characteristics comparable at baseline: MTURP patients significantly older (P = 0.007) Mean age, years (SD): (A) = 69.5 (7.2), (B) = 72.7 (8.4) Mean preoperative prostate volume, mL (SD); (A) = 55.6 (18.2), (B) = 58.2 (17.6) Preoperative catheterisation state: (A) = 33, (B) = 34
Interventions	● **Intervention A:** bipolar TURP (Olympus TURis, Tokyo, Japan) ● **Intervention B:** monopolar TURP (irrigation fluid = mannitol 3% and ethanol 1%)
Outcomes	**Primary outcomes:** IPSS (3, 6, 12, > 12 months): no specific data available − graphical format only HRQoL (validated questionnaire): not reported TUR syndrome: (A) = 0 (n = 98), (B) = 3 (n = 87) **Secondary outcomes:** Blood transfusion: (A) = 4 (n = 98), (B) = 10 (n = 87) Urinary incontinence 12 months: not reported IIEF-5 at 12 months: not reported Need for re-TURP: (A) = 0 (n = 98), (B) = 3 (n = 87) **Other reported outcomes:** Urethral stricture Bladder neck contracture UTI Acute urinary retention Mean duration of operation Mean Hb decrease (%) Mean duration of catheterisation (hours) Mean duration of hospital stay (hours) Re-admission rate
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement

Random sequence generation (selection bias): All outcomes	Low risk	Study states: "202 patients were allocated, using a random numbers table, to either TURP using a bipolar system or conventional monopolar technique"
Allocation concealment (selection bias): All outcomes	Unclear risk	Method of allocation concealment not reported specifically
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) was blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to be affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	The number of patients that underwent analysis in each arm is not clearly reported to allow for this assessment
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	The number of patients that underwent analysis in each arm is not clearly reported to allow for this assessment
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full judgement on selective reporting

Geavlete 2011

Methods	● **Study type:** single-centre randomised controlled trial (1:1:1) ● **Setting:** Romania
Participants	● **Total number enrolled:** 340; (A) = 170, (B) = 170 ● **Inclusion criteria:** BPH and severe LUTS; inclusion criteria consisted of Q_{max} < 10 mL/s, IPSS > 19, prostate volume between 30 and 80 mL ● **Exclusion criteria:** severe comorbidities, previous prostate surgery, history of prostate cancer, abnormal DRE, increased PSA **Baseline characteristics:** No statistically significant differences between arms reported Age: not reported Mean preoperative prostate volume (mL) (range): (A) = 53.7 (30 to 79), (B) = 54.8 (32 to 80) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (TURis Olympus SurgMaster, saline) ● **Intervention B:** MTURP (sterile water for irrigation) ● **Intervention C:** Plasmakinetic Vaporisation of the Prostate (no data collected)

Outcomes	**Primary outcomes:** IPSS (12 months): (A) = 7.5 (2 to 15) (n = 170), (B) = 8.0 (3 to 16) (n = 170) HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 170), (B) = 3 (n = 170) **Secondary outcomes:** Blood transfusion: (A) = 3 (n = 170), (B) = 11 (n = 170) Urinary incontinence (12 months): data not reported explicitly at 12 months Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): incidence of re-TURP not reported explicitly, only overall re-treatment rates **Other reported outcomes:** IPSS at 1, 3, 6, 18 months Q_{max} Clot retention Urinary incontinence (unclear timing of assessment) Urethral stricture Bladder neck contracture UTI Acute urinary retention Mean duration of operation (minutes) Mean duration of catheterisation period (hours) Mean duration of hospital stay (days) Mean haemoglobin drop (g/dL) Capsular perforation rate Rehospitalisation rate
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Low risk	Study states: "randomised by means of sealed envelopes"
Allocation concealment (selection bias): All outcomes	Unclear risk	Unclear whether the sealed envelopes were sequentially numbered and opaque
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Low risk	Study states: "during follow-up, both patients as well as the urologists performing the investigations were unaware of treatment modality"
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Study states: "during follow-up, both patients as well as the urologists performing the investigations were unaware of treatment modality"

Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes specifically
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes specifically
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment on selective reporting

Ghozzi 2014

Methods	● **Study type:** prospective randomised controlled trial ● **Setting:** hospital, France
Participants	● **Total number enrolled:** 60; (A) = 31, (B) = 29 ● **Inclusion criteria:** benign prostatic hyperplasia, age over 50 years, PSA < 4 ng/mL, no suspicious finding on DRE ● **Exclusion criteria:** documented prostate cancer, bladder tumour, urethral stricture, bladder stone, neurogenic bladder, previous TURP **Baseline characteristics:** No statistically significant differences between arms reported Mean age, years (SD): (A) = 70.25 (7.23), (B) = 68.71 (7.63) Mean preoperative prostate volume, mL (SD): (A) = 49.5 (6.33), (B) = 49.5 (5.48) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP using 0.9% saline irrigation. 27 Fr OLYMPUS Active Bipolar Resectoscope utilising TURis technology ● **Intervention B:** monopolar TURP (1.5% glycine irrigation). 27 Fr OLYMPUS Active Monopolar Resectoscope
Outcomes	**Primary outcomes:** IPSS (12 months) (SD): (A) = 2.6 (0.59) (n = 31), 3.1 (1.06) (n = 29) HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 31), (B) = 2 (n = 29) **Secondary outcomes:** Blood transfusion: (A) = 1 (n = 31), (B) = 2 (n = 29) Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Operation duration Resected tissue amount Serum sodium change Haemoglobin change Haematocrit change

	Q_{max} change Irrigation duration Catheterisation duration Hospitalisation duration Urethral stricture rate Bladdder contracture
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported, but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to have been affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Low risk	All participants in bipolar (n = 31/31) and monopolar (29/29) arms appear to be accounted for in analyses
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Low risk	All participants in bipolar (n = 31/31) and monopolar (29/29) arms appear to be accounted for in analyses
Selective reporting (reporting bias): All outcomes	Unclear risk	No RCT protocol available to allow for full assessment of selective reporting

Giulianelli 2013

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** Italy
Participants	● **Total number enrolled:** 160; (A) = 80, (B) = 80 ● **Inclusion criteria:** LUTS of BPH ● **Exclusion criteria:** documented or suspected prostate surgery, renal impairment, associated hydronephrosis and urethral stricture

	Baseline characteristics: No significant differences between arms reported Mean age, years (SD): (A) = 62.5 (6.9), (B) = 64.18 (7.2) Mean prostate volume, mL (SD): (A) = 47.8 (14.6), (B) = 50 (9.8)
Interventions	● **Intervention A:** bipolar TURP; Gyrus Plasmakinetic (PKTURP) ● **Intervention B:** monopolar TURP; irrigation fluid = mannitol/sorbitol solution
Outcomes	**Primary outcomes:** IPSS (12 months): (A) = 4.5 (n = 80), (B) = 5.3 (n = 80) HRQoL (12 months): (A) = 0.9 (n = 80), (B) = 1.5 (n = 80) TUR syndrome: (A) = 0 (n = 80), (B) = 2 (n = 80) **Secondary outcomes:** Blood transfusion: (A) = 0 (n = 80), (B) = 3 (n = 80) Urinary incontinence (12 months): (A) = 0 (n = 79), (B) = 0 (n = 75) Erectile dysfunction (IIEF-5) (12 months): (A) = 24 (n = 80), (B) = 22 (n = 80) Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** IPSS at 1, 3, 6, 18, 24, 30, 36 months HRQoL at 1, 3, 6, 18, 24, 30, 36 months Q_{max} Clot retention IIEF-5 at 1, 3, 6, 18, 24, 30, 36 months Bladder neck contracture UTI Re-treatment rate (not explicitly re-TURP) Acute urinary retention Median duration of operation (minutes) Median duration of catheterisation (hours) Median duration of hospital stay (hours)
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Specific method of randomisation not clearly reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Specific method of allocation concealment not clearly reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported

Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to have been affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes specifically
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	Study states: "one year after TURP, 154 patients (75 in the monopolar and 79 in the bipolar group) were assessed for urinary continence and number of retreatments" This suggests that 6 patients were lost to follow-up with no reported reason for loss to follow-up. Impact of incomplete outcome data on reported differences in outcomes between intervention arms considered unclear
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Goh 2009

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** United Kingdom
Participants	● **Total participants enrolled:** 210; (A) = 110, (B) = 100 ● **Inclusion criteria:** not reported ● **Exclusion criteria:** not reported **Baseline characteristics:** No significant differences between arms reported Mean age, years (SD)**:** (A) = 72, (B) = 73 Mean preoperative prostate volume, mL: (A) = 68.9, (B) = 69.8 Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP; Olympus SurgMaster TURis, irrigation fluid = saline ● **Intervention B:** monopolar TURP (glycine), irrigation fluid = glycine
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 110), (B) = 3 (n = 100) **Secondary outcomes:** Blood transfusion: not reported Urinary Incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Mean duration of resection (minutes)

	Mean postoperative sodium Capsular perforation rate Comparison of resectoscopes in terms of 15 parameters scored by the operating surgeon on a scale of 1 to 10, with higher scores indicating better performance
Source of funding	None reported
Notes	This is a conference abstract with limited information. Data for many outcomes are reported as significant or not significant without numerical values. Protocol is available at http://www.isrctn.com/ISRCTN49628875?q=bipolar%20AND%20prostate%20AND%20Goh&filters=&sort=&offset=1&totalResults=1&page=1&pageSize=10&searchType=basic-search "A comparison between the use of transurethral resection of the prostate (TURP) with bipolar cutting loop diathermy for the treatment of benign prostatic hypertrophy (Goh; Southmead Hospital, Bristol, UK)"

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Unclear risk	These outcomes were not reported by this study
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes specifically
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported by the trial
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment. However, abstract states that IPSS was recorded at 12 months, but these data are not reported, and it does not appear that they have been published

He 2010

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** China
Participants	● **Total participants enrolled:** 300; (A) = 150, (B) = 150 ● **Inclusion criteria:** symptomatic BPH that required surgery owing to urinary retention or failed medical therapy ● **Exclusion criteria:** severe medical disease, previous prostatic or urethral surgery, prostate cancer, acontractile detrusor **Baseline characteristics:** No significant differences between arms reported Mean age, years (SD): (A) = 72.5 (4.0), (B) = 71.9 (3.1) Mean preoperative prostate volume, mL (SD): (A) = 45.0 (5.5), (B) = 46.1 (6.3) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (Gyrus Transurethral Bipolar Electrosurgical System) ● **Intervention B:** monopolar TURP (Wolf 26 F Storz Electrosurgical Generator), irrigation fluid = 5% mannitol
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 142), (B) = 5 (n = 139) **Secondary outcomes:** Blood transfusion: (A) = 1 (n = 142), (B) = 3 (n = 139) Urinary incontinence (12 months): not reported (only data at 3 months available) Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): Not reported **Other reported outcomes:** IPSS at 3 months, no specific data available for 6 and 12 months Mean QoL at 3 months Q_{max} (mL/s) Clot retention Incontinence (3 months) Urethral stricture Bladder neck contracture Duration of operation (minutes) Duration of catheterisation (days) Duration of hospital stay (days) Change in postoperative serum sodium (Na+)
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to be affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	All participants in bipolar (n = 142/142) and monopolar (139/139) arms appear to be accounted for in analyses, with no reported loss to follow-up for these outcomes
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported by trial authors
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Ho 2007

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** Singapore
Participants	● **Total number enrolled:** 100; (A) = 48, (B) = 52 ● **Inclusion criteria:** > 50 years, fit for anaesthesia, failed medical therapy with alpha-blockers or 5-alpha reductase inhibitors, IPSS > 18, Q_{max} < 15 mL/s, acute urinary retention, failed trial of void without urinary catheter ● **Exclusion criteria:** documented or suspected prostate cancer, bladder calculus, neurogenic bladder, previous prostate surgery, renal impairment, associated hydronephrosis, urethral stricture **Baseline characteristics** No significant differences between arms reported Mean age, years (SD): (A) = 66.6 (6.8), (B) = 66.5 (7.2) Mean preoperative prostate volume, mL: (A) = 56.5 (17.9), (B) = 54.8 (19.2) Preoperative catheterisation status: (A) = 24 (n = 48), (B) = 21 (n = 52)

Interventions	● **Intervention A:** bipolar TURP (Olympus TURIS System) ● **Intervention B:** monopolar TURP (irrigation fluid = glycine 5%)
Outcomes	**Primary outcomes:** IPSS (12 months): specific data not provided, in graphical format only HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 48), (B) = 2 (n = 52) **Secondary outcomes:** Blood transfusion: (A) = 1 (n = 48), (B) = 1 (n = 52) Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Q_{max} Clot retention Urethral stricture UTI Acute urinary retention Mean resection time Mean reduction in postoperative serum Na+ Mean reduction in postoperative haemoglobin
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Low risk	Study states: "patients included in the study were computer randomized in a 1:1 ratio into two groups"
Allocation concealment (selection bias): All outcomes	Unclear risk	Specific methods to ensure allocation concealment not clearly reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to be affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Low risk	Study states: "all patients had at least one year follow-up"; all patients (n = 48 for bipolar, n = 52 for monopolar TURP) appear to have been included in the final analyses for these outcomes

Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	Study states: "all patients had at least one year follow-up"; however, data for IPSS at 12 months are provided only in graphical format with no specific data provided; therefore, full interpretation of data is not possible
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Huang 2012

Methods	● **Study type:** single-centre, RCT (1:1) ● **Setting:** China
Participants	● **Total number enrolled:** 136; (A) = 71, (B) = 65 ● **Inclusion criteria:** symptomatic BPH, > 50 years, medication failure, International Prostate Symptom Score (IPSS) > 16, maximum flow rate (Q_{max}) < 15 mL/s, prostate volume of 30 to 80 mL estimated on transrectal ultrasound (TRUS) ● **Exclusion criteria:** documented or suspected prostate cancer, neurogenic bladder, bladder calculus or tumour, previous prostate surgery, urethral stricture, parafunction of blood coagulability **Baseline characteristics:** No significant differences between arms reported. Mean age, years (SD): (A) 65.08 (4.19) (n = 71), (B) 64.55 (3.67) (n = 65) (P = 0.613) Mean preoperative prostate volume, mL (SD): (A) = 52.92 (10.60), (B) = 50.08 (10.84) (P = 0.101) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (Gyrus), irrigation fluid = 0.9% saline ● **Intervention B:** monopolar TURP (Storz), irrigation fluid = mannitol 5% solution
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: not reported **Secondary outcomes:** Blood transfusion: not reported Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Clot retention Drop in sodium (mmol/L) Drop in haemoglobin (g/dL) Duration of operation (minutes) Operation duration

	Capsular perforation Postoperative bleeding
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Low risk	Study states: "randomization was done by the opaque envelope method"
Allocation concealment (selection bias): All outcomes	Low risk	Study reports use of opaque envelopes to ensure allocation concealment
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	These outcomes were not reported by the trial
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Unclear risk	These outcomes were not reported by the trial
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	These outcomes were not reported by the trial
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported by the trial
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for assessment

Iori 2008

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** Italy
Participants	● **Total number enrolled:** 53; (A) = 27, (B) = 26 ● **Included:** LUTS secondary to BPO ● **Exclusion criteria:** neurological illness, renal insufficiency, bladder stone, urethral stricture, taking finasteride **Baseline characteristics** No significant differences between arms reported Mean age, years (SD): (A) = 65 (5), (B) = 63 (5) Mean prostate volume, cm^3 (SD): (A) = 49 (11), (B) = 48 (9)

Interventions	● **Intervention A:** bipolar TURP (Gyrus PlasmaKinetic); irrigation fluid = 0.9% saline ● **Intervention B:** monopolar TURP; irrigation fluid = mannitol
Outcomes	**Primary outcomes:** IPSS (12 months): mean IPSS at 12 months (SD): (A) = 7.0 (1.7) (n = 27), (B) = 6.7 (4) (n = 26) HRQoL (12 months): (A) = 1 (1) (n = 27), (B) = 1 (1) (n = 26) TUR syndrome: (A) = 0 (n = 27), (B) = 0 (n = 26) **Secondary outcomes:** Blood transfusion: (A) = 0 (n = 27), (B) = 0 (n = 26) Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Mean Q_{max} (mL/s) Clot retention Acute urinary retention Mean resection time (minutes) Mean catheterisation time (hours) Mean postoperative hospital stay (hours) Mean reduction in Hb at 24 hours postop (g/dL)
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Low risk	Study states: "the patients were randomized 1:1, using envelopes, into two groups"
Allocation concealment (selection bias): All outcomes	Unclear risk	Study states: "the patients were randomized 1:1, using envelopes, into two groups" Unclear whether the envelopes were sealed, sequentially numbered, and opaque
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to be affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these

		outcomes
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes specifically
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Kadyan 2014

Methods	● **Study type:** single-centre randomised controlled trial (1:1); only published abstract available for data extraction ● **Setting:** India
Participants	● **Total participants enrolled:** 110; (A) = not reported, (B) = not reported ● **Inclusion criteria:** > 50 years, DRE benign gland, gland volume > 50 mL, PSA < 4 ng/mL, LUTS with BEP, urine culture -ve ● **Exclusion criteria:** suspected prostate cancer, neurogenic bladder, bladder malignancy, previous prostate surgery, stricture urethra, vesical calculus, renal impairment **Baseline characteristics:** specific data not provided in abstract **Preoperative catheterisation, n:** (A) = and (B) = not reported
Interventions	● **Intervention A:** bipolar TURP; specific technology used not reported ● **Intervention B:** monopolar TURP; irrigation fluid not reported
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: not reported **Secondary outcomes:** Blood transfusion: not reported Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Resection duration Serum sodium level change IPSS change Q_{max} change
Source of funding	None reported
Notes	This is a conference abstract with limited information

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeons were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Unclear risk	These outcomes were not reported by the trial
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	These outcomes were not reported by the trial
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported by the trial
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Kim 2006

Methods	● **Study type:** parallel RCT ● **Setting**: inpatient/single centre/South Korea ● **Ethnicity:** not reported ● **Study duration:** August 2003 to October 2004
Participants	● **Total participants enrolled:** 50 (Intervention A = 25/Intervention B = 25) ● **Inclusion criteria:** aged 50 or over with IPSS score higher than 8, Q_{max} lower than 15 mL/s, prostate volume 30 to 120 mL on the basis of the TRUS test ● **Exclusion criteria:** younger than 50 years of age, neurogenic bladder disorder, bladder cancer, prostate cancer, history of prostate surgery, medications taken that may have influenced functioning of the bladder, suspected to have a bladder abnormality and a disease in the lower part of the ureter without BPH in urodynamic study **Baseline characteristics:** no significant differences between interventions in IPSS, Q_{max}, and prostate volume, but no report on differences in age Mean age, years (SD): (A) = 68.1 (8.9), (B) = 70.6 (7.5) Mean prostate volume, mL: (A) = 53.2 (14.9), (B) = 51.7 (19.1)

Interventions	● **Intervention A:** bipolar TURP; Gyrus Plasma Kinetic Resectoscope ● **Intervention B:** monopolar TURP; for irrigating fluid, Urion liquid was used
Outcomes	**Primary outcomes:** IPSS (12 months): not reported (only at 1 and 6 months) HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 25), (B) = 0 (n = 25) **Secondary outcomes:** Blood transfusion: (A) = 0 (n = 25), (B) = 2 (n = 25) Urinary incontinence (12 months): not reported explicitly at 12 months Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Resection duration Serum sodium level change Haemoglobin level change Catheterisation duration Hospitalisation duration IPSS change Resection volume Q_{max} change
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to be affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes

Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol could not be identified to allow for full assessment

Komura 2015

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** Japan
Participants	● **Total number enrolled:** 136; (A) = 69, (B) = 67 ● **Inclusion criteria:** age > 50 years, Eastern Cooperative Oncology Group performance status ≤ 2; acute urinary retention if catheter removal failed after therapy with alpha-blockers, chronic urinary retention unresponsive to medical therapies, IPSS ≥ 15 ● **Exclusion criteria:** suspected prostate cancer, bladder calculus, previous prostate surgery, men taking 5-alpha reductase inhibitor preoperative medication **Baseline characteristics** No significant differences between arms reported Mean age, years (SD): (A) = 69.8 (5.8), (B) = 68.0 (5.4) Mean preoperative prostate volume, mL (SD): (A) = 50.9 (17.2), (B) = 53.0 (20.1) Preoperative indwelling catheter: (A) = 6, (B) = 7
Interventions	● **Intervention A:** bipolar TURP; TURis (Olympus, Tokyo, Japan); irrigation fluid = 0.9% saline ● **Intervention B:** monopolar TURP; irrigation fluid = 4% mannitol solution, 1% ethanol
Outcomes	**Primary outcomes:** IPSS (12 months): (A) = 7.6 (3.5) (n = 52), (B) = 8.3 (2.3) (n = 58) HRQoL (12 months): 12 months: (A) = 4.4 (3.9) (n = 52), (B) = 4.1 (5.4) (n = 58) TUR syndrome: (A) = 0 (n = 63), (B) = 0 (n = 61) **Secondary outcomes:** Blood transfusion: (A) = 1 (n = 63), (B) = 4 (n = 61) Urinary incontinence (12 months): not reported (data available only at 3 months) Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** IPSS at 24 and 36 months HRQoL at 24 and 36 months Mean Q_{max} Clot retention Urinary incontinence at 3 months Urethral stricture and bladder neck contracture UTI

	Acute urinary retention Mean reduction in postoperative Na (mEq/L) Mean reduction in postoperative Hb (g/dL) Incidence of epididymitis Mean duration of catheterisation time (hours) Mean hospitalisation duration (days) Mean duration of operation (minutes)
Source of funding	None reported
Notes	Protocol is available at https://upload.umin.ac.jp/cgi-open-bin/ctr/ctr.cgi?function=brows&action=brows&type=summary&recptno=R000012628&language=E "Multicentre randomised controlled trial comparing bipolar with monopolar transurethral resection of the prostate" (UMIN000010801)

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Low risk	Study states: “randomisation was performed using a stratified permuted randomisation algorithm (1:1)”
Allocation concealment (selection bias): All outcomes	Unclear risk	Study states: “randomisation was performed using a stratified permuted randomisation algorithm (1:1)” Any specific measures to ensure allocation concealment not reported explicitly
Blinding of participants and personnel (performance bias): All outcomes	High risk	"The nature of the intervention made blinding of the treatment providers impossible and thus the surgeon was not blinded; however, both the outcome assessors and the patients were blinded with regard to the intervention type (double-blind RCT)"
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Low risk	"The nature of the intervention made blinding of the treatment providers impossible and thus the surgeon was not blinded; however, both the outcome assessors and the patients were blinded with regard to the intervention type (double-blind RCT)"
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	"The nature of the intervention made blinding of the treatment providers impossible and thus the surgeon was not blinded; however, both the outcome assessors and the patients were blinded with regard to the intervention type (double-blind RCT)"

Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Low risk	Study reports loss of follow-up at n = 1 for MTURP and n = 0 for BTURP for these perioperative outcomes
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	All patients (n = 58 for MTURP and n = 52 for BTURP), including those lost to follow-up (n = 9 for MTURP, n = 17 for BTURP), were accounted for in the reported analyses. Considered unclear how loss to follow-up may have impacted observed differences in outcomes between arms
Selective reporting (reporting bias): All outcomes	Low risk	The study protocol is available. The report includes all expected outcomes, including those that were prespecified

Kong 2009

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** Malaysia
Participants	● **Total number enrolled:** 102; (A) = 51, (B) = 51 ● **Inclusion criteria:** moderate to severe LUTS that failed medical treatment, complications of BOO or catheter dependency ● **Exclusion criteria:** American Society of Anesthesioligists Score > 2, pacemaker, suspected or known prostate cancer, concurrent bladder stone, previous bladder neck surgery **Baseline characteristics:** No significant differences between treatment arms reported Mean age, years (SD): (A) = 68.44 (7.33), (B) = 68.53 (6.69) Mean preoperative prostate volumes, mL: (A) = 41.8 (9.8), (B) = 43.1 (10.94)
Interventions	● **Intervention A:** bipolar TURP; Gyrus Plasmakinetic Resection (PKRP); irrigation fluid = saline ● **Intervention B:** monopolar TURP; Pfizer Electrosurgical Instrument System; irrigation fluid = glycine
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 51), (B) = 0 (n = 51) **Secondary outcomes:** Blood transfusion: (A) = 0 (n = 51), (B) = 2 (n = 51) Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** IPSS at 1 month HRQoL at 1 month Q_{max}

	Acute urinary retention Mean reduction in haemoglobin (g/dL) Mean reduction in serum sodium (mmol/l) Mean duration of catheterisation (hours) Mean duration of hospital stay (days) Duration of operation
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Low risk	Study states: "computerized random number generator was then used to select an envelope for each patient. A nurse not involved in this study then read the content of the envelope and assigned the appropriate method of surgery"
Allocation concealment (selection bias): All outcomes	Low risk	Study states: "allocation concealment was done via sequentially numbered, opaque, sealed envelopes"
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) was blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to have been affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Kumar 2013

Methods	● **Study type:** single-centre randomised controlled trial (1:1:1) ● **Setting:** India
Participants	● **Total number enrolled:** 117; (A) = 57, (B) = 60 ● **Inclusion criteria:** LUTS secondary to BPE, age ≥ 50, IPSS > 7, prostate volume measured by transrectal ultrasound (TRUS): > 20 and < 80 mL, Q_{max} < 15 mL/s ● **Exclusion criteria:** history of prostate, bladder, or urethral surgery; spinal surgery or spinal trauma; neurological disease; postvoid residual urine (PVRU) > 300 mL; indwelling Foley catheter where indication for catheterisation was chronic retention (PVRU > 300 mL); diagnosis of carcinoma of the prostate; carcinoma of the bladder; urethral stricture; those receiving antiplatelet drugs for whom drugs could not be safely stopped perioperatively; not giving written informed consent **Baseline characteristics:** No significant differences between arms reported Mean age, years (SD)**:** (A) = 62.31 (6.36), (B) = 63.68 (6.57) Mean preoperative prostate volume, mL (SD): (A) = 50.26 (16.50), (B) = 52.20 (15.93)
Interventions	● **Intervention A:** bipolar TURP; Gyrus ACMI Plasmakinetic System; irrigation fluid = 0.9% saline ● **Intervention B:** monopolar TURP, irrigation fluid = glycine ● **Intervention C:** third arm of RCT included Photoselective Vaporisation of the Prostate (PVP) with green light laser; no data were collected as not an intervention of interest
Outcomes	**Primary outcomes:** IPSS (12 months): (A) = 6.94 (1.22) (n = 52), (B) = 7.07 (1.22) (n = 57) HRQoL (12 months): (A) = 1.67 (0.61) (n = 52), (B) = 1.59 (0.65) (n = 57) TUR syndrome: (A) = 0 (n = 57), (B) = 1 (1.66) (n = 60) **Secondary outcomes:** Blood transfusion: (A) = 3 (n = 57), (B) = 7 (n = 60) Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): (A) = 16.30 (2.59) (n = 52), (B) = 16.17 (2.36) (n = 57) Need for repeat TURP (i.e. re-TURP): data provided for “re-operation” but not specifically for re-TURP **Other reported outcomes:** IPSS at 1, 3, 6, > 12 months HRQoL at 1, 3, 6, > 12 months Q_{max} IIEF-5 at 1, 3, 6, > 12 months Clot retention Urethral stricture and bladder neck contracture UTI Acute urinary retention Mean duration of operation

	Mean duration of catheterisation Duration and volume of irrigation fluid used postoperatively Haemoglobin level change Incidence of transient dysuria
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Low risk	Study states: "eligible patients were randomized into three groups using a computer generated randomization table of equal numbers"
Allocation concealment (selection bias): All outcomes	Unclear risk	Specific measures to ensure allocation concealment during randomisation process not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to have been affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Low risk	Study reports that all patients (n = 60 for MTURP, n = 57 for BTURP) were included in analyses for these perioperative outcomes
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	Study reports loss to follow-up of n = 3 for MTURP and n = 5 for BTURP for these outcomes. Considered unclear how this loss to follow-up may have impacted observed differences in outcomes between arms
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Lin 2006

Methods	● **Study type:** single-centre RCT (1:1) ● **Setting:** Taiwan
Participants	● **Total number enrolled:** 40; (A) = 22, (B) = 18 ● **Inclusion criteria:** LUTS due to BPH ● **Exclusion criteria:** evidence of suspicion of prostate or bladder malignancy, bladder stones and/or bladder diverticulum, urethral stricture,

	IPSS < 15, Q_{max} > 15, neurogenic bladder disorder, previous surgical treatments for BPH **Baseline characteristics:** No significant differences between arms reported. Mean age, years (SD): (A) = 69.0 (no SD) (n = 22), (B) = 69.0 (no SD) (n = 24) (P = 0.891) Mean preoperative prostate volume (grams) (SD): not reported. Preoperative catheterisation state: not reported.
Interventions	● **Intervention A (bipolar):** Vista CTR; irrigation fluid = saline ● **Intervention B (monopolar):** Vista CTR; irrigation fluid = distilled water
Outcomes	**Primary outcomes:** IPSS (12 months): values provided only for median (rather than mean) IPSS at 12 months: (A) = 15.5 (no SD) (n = 22), (B) = 18.5 (no SD) (n =18) HRQoL (12 months): not reported TUR syndrome: not reported **Secondary outcomes:** Blood transfusion: not reported Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** IPSS at 6 months Q_{max} Clot retention and evacuation Bladder neck contracture Resection time (minutes) (SD): (A) = 50.0 (no SD) (n = 22), (B) = 47.5 (no SD) (n = 18) Change in serum sodium levels, mEq/L (SD): (A) = -0.91 (3.56), (B) = -7.94 (5.12) Change in haemoglobin, g/dL (SD): (A) = -0.62 (0.59), (B) = -0.64 (0.41)
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Low risk	Study states: "patients were randomized using opaque envelopes"
Allocation concealment (selection bias): All outcomes	Low risk	Study reports use of "opaque envelopes" to ensure allocation concealment
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded

Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Unclear risk	These outcomes were not reported by the study
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	These outcomes were not reported by the study
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Low risk	Study states: "none of the patients were lost to follow-up"
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Mamoulakis 2013

Methods	● **Study type:** multi-centre RCT (1:1) ● **Settings:** Netherlands, Greece, Italy, Germany
Participants	● **Total number enrolled:** 279; (A) = 141, (B) = 139 ● **Inclusion criteria:** benign prostatic obstruction, Q_{max} < 15, IPSS > 13, voided volume > 125 mL, indwelling/intermittent catheterisation ● **Exclusion criteria:** suspected malignant disease of the lower urinary tract, including prostate cancer, impaired detrusor function (neurogenic bladder, postvoid residual urine volume > 400 mL), active UTI, 5-alpha reductase inhibitor or alpha blocker consumption within the last 3 months or 2 weeks before surgery, cardiovascular disease necessitating anticoagulation continuation that might jeopardise outcome, immunosuppression **Baseline characteristics:** No significant differences between arms reported Mean age, years (SD): (A) 69.3 (8.5) (n = 135), (B) 68.4 (8.2) (n = 120) (P = 0.525) Mean preoperative prostate volume, grams (SD): (A) = 63.8 (29.4) (n = 135), (B) = 63.5 (30.8) (n = 120) (P = 0.939) Preoperative catheterisation state: (A) = 47 (n = 135), (B) = 47 (n = 120)
Interventions	● **Intervention A:** bipolar TURP (Autocon II 400 ESU Karl Storz) ● **Intervention B:** monopolar TURP (Karl Storz), irrigation fluid = hypotonic solution as irrigation fluid (multi-centre): Centre 1 (Netherlands) sorbitol 5%, Centre 2 (Germany) sorbitol-mannitol, Centre 3 (Greece) water for injection, Centre 4 (Italy) glycine
Outcomes	**Primary outcomes:** IPSS (12 months) (SD): not catheterised preop: (A) = 7.7 (4.0) (n = 88), (B) =7.5 (4.8) (n =73)*; catheterised preop: (A) = 7.1 (4.5) (n = 47), (B) = 5.5 (4.8) (n = 47) HRQoL (12 months) (SD): not catheterised preop: (A) = 1.1 (1.0) (n = 88), (B) = 1.1 (1.2) (n = 73)*; catheterised preop (A) = 1.3 (0.8) (n = 47), (B) = 0.9 (1.1) (n =

	47) *Non-catheterised patients were included in the meta-analyses TUR syndrome: (A) = 0 (n = 141), (B) = 1 (n = 138) **Secondary outcomes:** Blood transfusion: (A) = 9 (n = 141), (B) = 4 (n = 138) Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): data provided for IIEF-15 scores only Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** IPSS at 24 to 36 months QoL at 24 to 36 months Q_{max} Clot retention Urethral stricture/Bladder neck contracture Acute urinary retention Hospitalisation time Sodium drop (mmol/L) Haemoglobin drop (mmol/L) Duration of operation (minutes) Catheterisation time (days) Capsular perforation rate Hospitalisation duration
Source of funding	"We acknowledge the support of Karl Storz Endoscope"
Notes	Protocol is available at http://www.trialregister.nl/trialreg/admin/rctview.asp?TC=703 "A prospective, randomized, double-blinded study to compare bipolar trans urethral resection of the prostate (bipolar TURP) versus monopolar trans urethral resection of the prostate (monopolar TURP) in terms of safety and efficacy" (NTR 703)

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Low risk	Study states: "randomization numbers were assigned using a stratified permuted computer algorithm after completing eligibility screening" (Mamoulakis 2012)
Allocation concealment (selection bias): All outcomes	Low risk	Study states: "randomization was performed within 24 h prior to treatment application, which was done blindly among centres through the central electronic system to minimize potential selection bias and guarantee allocation concealment"
Blinding of participants and personnel (performance bias): All outcomes	High risk	Study reports that surgeons were not blinded due to the nature of interventions

Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Low risk	Study states: "outcome assessors and patients were both blinded for the intervention type (double-blind RCT)"
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Study states: "outcome assessors and patients were both blinded for the intervention type (double-blind RCT)"
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Low risk	Study states that all participants were included in analysis for these outcomes, except n = 1/139 in the MTURP arm was excluded because of incidental bladder cancer
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	At 12 months, differential loss to follow-up between arms; at 12 months, n = 121 analysed in MTURP arm (n = 139 received intervention) and n = 135 analysed in BTURP arm (n = 141 received intervention). The subsequent impact of loss to follow-up on observed differences in outcomes between arms was considered unclear
Selective reporting (reporting bias): All outcomes	Low risk	The study protocol is available and all of the study's prespecified (primary and secondary) outcomes that are of interest in the review have been reported in the prespecified way

Mei 2010

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** China
Participants	● **Total participants enrolled:** 146; (A) = 73, (B) = 73 ● **Inclusion criteria:** symptomatic BPH that required surgery owing to urinary retention or failed medical therapy ● **Exclusion criteria:** neurogenic bladder dysfunction, previous prostatic or urethral surgery, prostate cancer, bladder cancer, severe medical disease **Baseline characteristics:** No significant differences between arms reported Mean age (SD): (A) = 72.1 (4.4), (B) = 71.6 (5.1) Mean preoperative prostate volume, mL (SD): (A) = 55.5 (6.3), (B) = 53.6 (5.2) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (Gyrus Electrosurgical System) ● **Intervention B:** monopolar TURP (WOLF Electrosurgical System, irrigation fluid = 5% mannitol)
Outcomes	**Primary outcomes:** IPSS (12 months): data available only at 3 and 6 months HRQoL (12 months): data available only at 3 and 6 months TUR syndrome: (A) = 0 (n = 73), (B) = 2 (n = 73) **Secondary outcomes:**

	Blood transfusion: (A) = 1 (n = 73), (B) = 4 (n = 73) Urinary incontinence (12 months): reported only at 6 months Erectile dysfunction (IIEF-5) (12 months): no specific data provided Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Mean Q_{max} Urethral stricture Mean duration of operation (minutes) Mean duration of catheterisation (days) Mean change in postoperative serum sodium (Na+) Mean reduction in postoperative haemoglobin (Hb)
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to have been affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Low risk	All included participants (n = 73 in monopolar and n = 73 in bipolar arms) included in analyses for these outcomes
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Michielsen 2007

Methods	● **Study type:** single-centre RCT (1:1) ● **Setting:** Belgium
Participants	● **Total number enrolled:** 518; (A) = 263, (B) = 255 ● **Inclusion criteria:** bladder obstruction due to BPH, IPSS ≥ 13, QoL ≥ 3, Q_{max} < 15 mL/s ● **Exclusion criteria:** neurogenic bladder, prostate cancer, previous prostatic or urethral surgery, bladder stones, receiving anticoagulant therapy **Baseline characteristics** No significant differences between arms reported Mean age, years (SD): (A) = 72.5 (9.2), (B) = 72.4 (9.0) Mean preoperative prostate volume, mL (SD): (A) = 45.0 (18.3), (B) = 53.9 (23.6) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (Olympus SurgMaster), irrigation fluid = saline ● **Intervention B:** monopolar TURP (Olympus), irrigation fluid = glycine 1,5%
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 285), (B) = 2 (n = 265) **Secondary outcomes:** Blood transfusion: (A) = 4 (n = 118), (B) = 1 (n = 120) Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported; only treatment rates for urethral stricture as postoperative complication reported **Other reported outcomes:** Clot retention Urethral stricture Acute urinary retention Drop in sodium level Drop in haemoglobin Duration of operation (minutes) Duration of catheterisation (days) Hospitalisation time (days)
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement

Random sequence generation (selection bias): All outcomes	Low risk	"After initial cystoscopy and examination with the patient under anesthesia the patient was randomized to monopolar TURP or bipolar TURIS by drawing a closed envelope" (Michielsen 2007; Michielsen 2010; Michielsen 2010b)
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported if envelopes were opaque, or if other measures were taken to ensure allocation concealment
Blinding of participants and personnel (performance bias): All outcomes	High risk	Study reported as "unblinded study"
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	High risk	Study reported as "unblinded study"
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Study reported as "unblinded study" but objective outcomes unlikely to have been affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported by this trial
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol could not be identified to allow for full assessment

Méndez-Probst 2011

Methods	● **Study type:** multi-centre, randomised controlled trial (1:1) ● **Setting:** 5 Canadian centres, Canada
Participants	● **Total number enrolled:** 43; (A) = 22, (B) = 21 ● **Inclusion criteria:** LUTS suggestive of BPH, peak urinary flow rates < 12 mL/s, American Urological Association (AUA) symptom scores > 12, acute urinary retention ● **Exclusion criteria:** previous prostatic surgery (open or transurethral), urethral stricture, failure to discontinue alpha-adrenergic blocking agents for at least 14 days before surgery, failure to discontinue 5-alpha reductase inhibitor for at least 1 month before surgery, interest in future fertility, known neurogenic bladder dysfunction, untreated urinary tract infection, American Society of Anesthesiology (ASA) class > III, requiring anticoagulation, unwilling or unable to comply with the follow-up schedule **Baseline characteristics:** No significant differences between arms reported

	Mean age years: (A) = 68 (7), (B) = 67 (7) Mean preoperative prostate volume, grams (SD): (A) = 57.92 (25.56), (B) = 50.23 (20.74) Preoperative catheterisation state: (A) = 6 (n = 22), (B) = 6 (n = 21)
Interventions	● **Intervention A:** bipolar TURP (VISTA, ACMI), irrigation fluid = not explicitly stated. Assumed normal saline ● **Intervention B:** monopolar TURP (ERBE, Marietta, GA, or ValleyLab, Tyco Healthcare Group LP), irrigation fluid = not explicitly stated
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 22), (B) = 0 (n = 21) **Secondary outcomes:** Blood transfusion: (A) = 0 (n = 22), (B) = 0 (n = 21) Urinary incontinence (12 months): not reported explicitly at 12 months Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** AUA QoL not reported explicitly at 12 months Q_{max} (mL/s) Urethral stricture Bladder neck contracture UTI Acute urinary retention Duration of operation (minutes) Duration of bladder irrigation (minutes) Duration of postop catheterisation (days) Duration of hospital stay (days) Haemoglobin change Serum sodium change Incidence of haematuria requiring intervention Incidence of dysuria/overactive bladder symptoms
Source of funding	Study authors received funding from Olympus/ACMI. This investigator-initiated study was supported by ACMI Canada. All sites received financial support and investigative product
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported

Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported; considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported; objective outcomes unlikely to have been affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported by the trial
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Nasution 2017

Methods	● **Study type:** multi-centre randomised controlled trial (1:1:1) ● **Setting:** 3 Indonesian centres
Participants	● **Total number enrolled:** 220; (A) = 80, (B) = 76, (C) = 64 ● **Inclusion criteria:** BPH and urinary retention planning for surgery ● **Exclusion criteria:** not reported **Baseline characteristics:** No significant differences between arms reported Mean age, years: not reported Mean preoperative prostate volume, grams (SD): 46.63 (12.33) (both arms) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP, irrigation fluid = not explicitly stated. Assumed normal saline ● **Intervention B:** monopolar TURP, irrigation fluid = not explicitly stated ● **Intervention C:** Thulium Laser Vaporesection
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: not reported **Secondary outcomes:** Blood transfusion: not reported Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported

	Other reported outcomes: Mean operation time Catheterisation time Hospital stay Mean change in haemoglobin Mean change in sodium level
Source of funding	
Notes	Only abstract proceedings available

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported; considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Unclear risk	These outcomes were not reported
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	These outcomes were not reported
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Nuhoğlu 2006

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** Turkey
Participants	● **Total number enrolled:** 57; (A) = 27, (B) = 30 ● **Inclusion criteria:** diagnosis of BPH, LUTS, I-PSS > 15, Q_{max} < 10 mL/s ● **Exclusion criteria:** prostate/urethra surgery, suspicion of prostate cancer, neurogenic bladder **Baseline characteristics:** No significant differences between arms reported Mean age, years (SD): (A) = 65.2 (9.3) (B) = 64.6 (8.8)

	Mean preoperative prostate volume, grams (SD): (A) = 47 (7.7), (B) = 49 (8.1)
Interventions	● **Intervention A:** bipolar (Gyrus), irrigation fluid = saline ● **Intervention B:** monopolar (Storz), irrigation fluid = glycine
Outcomes	**Primary outcomes:** IPSS (12 months): (A) = 5.4 ± 3.7 (n = 24), (B) = 5.2.± 3.2 (n = 26) HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 27), (B) = 0 (n = 30) **Secondary outcomes:** Blood transfusion: (A) = 1 (n = 27), (B) = 2 (n = 30) Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): (A) = 0 (n = 27), (B) = 0 (n = 30) **Other reported outcomes:** IPSS at 1 month Q_{max} (mL/s) Acute urinary retention Urethral stricture Duration operation (minutes) Duration of catheter (hours) Haemoglobin level change Serum sodium level change
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Study states: "patients randomly divided into two groups" No description of how randomisation was undertaken
Allocation concealment (selection bias): All outcomes	Unclear risk	Study states: "patients randomly divided into two groups" Unclear if steps undertaken to ensure allocation concealment
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported; considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to have been affected

Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Low risk	Study states that all participants were included in all analyses up to 1-month follow-up
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	Study reports loss to follow-up of n = 4/30 for MTURP and 3/27 for BTURP with specific reasons provided. Considered unclear how loss to follow-up may have impacted observed differences between arms
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Patankar 2006

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting: India**
Participants	● **Total participants enrolled:** 512; (A) = 261, (B) = 251 ● **Inclusion criteria:** men older than 45 years, AUA score ≥ 18, prostate volume 35 to 70 mL, Q_{max} ≤ 10 mL/s ● **Exclusion criteria:** previous prostate surgery or prostate cancer **Baseline characteristics:** No statistically significant differences between arms reported Mean age, years (SD): (A) = and (B)=; not clear which data refer to which intervention arm Mean preoperative prostate volume, mL (SD): (A) = 51.3 (12.44), (B) = 52.26 (10.71) Preoperative catheterisation status: not reported
Interventions	● **Intervention A:** bipolar TURP (PK Superpulse) ● **Intervention B:** monopolar TURP (irrigation fluid = glycine)
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 52), (B) = 2 (n = 51) **Secondary outcomes:** Blood transfusion: (A) = 0 (n = 52), (B) = 1 (n = 51) Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** UTI Duration of operation Cathterisation duration Change in serum sodium level Clot retention rate Urethral stricture

Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Low risk	Study states: "randomization was done by the opaque envelope method"
Allocation concealment (selection bias): All outcomes	Low risk	Study states: "opaque envelopes" were used for allocation concealment
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported if operating surgeon(s) were blinded but considered unlikely; study reports that participants were blinded "Participants were blinded regarding the treatment modality they were undergoing, as was the staff that did the outcome assessment and decided when to remove the catheter"
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Low risk	Study states: "participants were blinded regarding the treatment modality they were undergoing, as was the staff that did the outcome assessment and decided when to remove the catheter"
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Study states: "participants were blinded regarding the treatment modality they were undergoing, as was the staff that did the outcome assessment and decided when to remove the catheter"
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Low risk	Study states: n = 1/53 patients were lost to follow-up in the BTURP arm, with no patients in the MTURP arm lost to follow-up
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Qian 2014

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** China

Participants	● **Total participants enrolled:** 150; (A) = 75, (B) = 75 ● **Inclusion criteria:** symptomatic BPH that required surgery owing to urinary retention or failed medical therapy ● **Exclusion criteria:** neurogenic bladder dysfunction, previous prostatic or urethral surgery, prostate cancer, bladder cancer, severe medical disease **Baseline characteristics:** No significant differences between arms reported Mean age, years (SD): (A) = 61.1 (10.9), (B) = 60.4 (11.3) Mean preoperative prostate volume, mL (SD): (A) = 59.1 (8.2), (B) = 59.5 (8.6) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (technology not reported) ● **Intervention B:** monopolar TURP (irrigation fluid not reported)
Outcomes	**Primary outcomes:** IPSS (12 months): not reported explicitly at 12 months HRQoL (12 months): not reported explicitly at 12 months TUR syndrome: not reported **Secondary outcomes:** Blood transfusion: not reported Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): reported only for 8-month follow-up Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Mean Q_{max} Erectile dysfunction (IIEF-5 at 8 months) Mean duration of operation (minutes) Mean duration of catheterisation (days) Mean duration of hospital stay (days)
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Low risk	Describes use of random number tables - no specific quotation available due to Chinese translation
Allocation concealment (selection bias): All outcomes	Unclear risk	Describes use of random number tables; unclear if additional measures were used to ensure allocation concealment
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported; considered unlikely that blinding surgeon(s) were blinded

Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	These outcomes were not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Unclear risk	These outcomes were not reported
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	These outcomes were not reported
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Rojo 2018

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** Spain
Participants	● **Total participants enrolled:** 100; (A) = 42, (B) = 58 ● **Inclusion criteria:** refractory BPH (no response to oral treatment), acute urine retention, repetitive urinary tract infection ● **Exclusion criteria:** prostate cancer, previous pelvis surgery, previous pelvic radiotherapy, cognitive problems to follow study instructions **Baseline characteristics:** No significant differences between arms reported Mean age, years (SD): (A) = 66.3 (6.8), (B) = 66.32 (7.5) Mean preoperative prostate volume, mL (SD): (A) = 41.35 (17.1), (B) = 37.02 (16.7) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (technology not reported) ● **Intervention B:** monopolar TURP (irrigation fluid = glycine)
Outcomes	**Primary outcomes:** IPSS (12 months): not reported explicitly at 12 months HRQoL (12 months): not reported TUR syndrome: not reported **Secondary outcomes:** Blood transfusion: not reported Urinary Incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported at 12 months Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Retrograde ejaculation

Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Low risk	In methods section, study authors state: "randomization under a cross sequence of numbers 1:1"
Allocation concealment (selection bias): All outcomes	Unclear risk	Describes use of cross-section of numbers for randomisation; unclear if additional measures were used to ensure allocation concealment
Blinding of participants and personnel (performance bias): All outcomes	High risk	Study reported blinding of participants; blinding of surgeons not reported but considered unlikely that this was undertaken
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	These outcomes were not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Unclear risk	These outcomes were not reported
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	These outcomes were not reported
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported
Selective reporting (reporting bias): All outcomes	Unclear risk	Study authors state that IIEF-5 tool was used to measure erectile function outcomes. However, specific data are not provided, but rather only use of the phrase "erectile problems" when referring to data. Considered unclear how this may have impacted overall findings

Rose 2007

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** Germany
Participants	● **Total participants enrolled:** 72 (A) = 38, (B) = 34 ● **Inclusion criteria:** not reported **Baseline characteristics:** No significant differences between arms reported

	Mean age, years (SD): not reported specifically for BTURP and MTURP arms Mean preoperative prostate volume, mL (SD): not reported Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (TURIS Olympus) ● **Intervention B:** monopolar TURP (irrigation fluid = mannitol)
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 38), (B) = 0 (n = 34) **Secondary outcomes:** Blood transfusion: not reported Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Duration of operation Catheterisation duration Hospitalisation duration Serum sodium level drop Haemoglobin level drop
Source of funding	No clear source reported from translation
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Specific method used for randomisation not completely clear: "the distribution in each surgical procedure took randomly place in two operating theaters, in one of which a conventional resectoscope was installed, in the other a TURis resectoscope was installed"
Allocation concealment (selection bias): All outcomes	Unclear risk	Specific method used for randomisation not completely clear: "the distribution in each surgical procedure took randomly place in two operating theaters, in one of which a conventional resectoscope was installed, in the other a TURis resectoscope was installed"
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported

Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Unclear risk	These outcomes were not reported
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Low risk	All participants (n = 38 for BTURP and n = 34 for MTURP) were included in the analyses for these outcomes
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Seckiner 2006

Methods	● **Study type:** single-centre RCT (1:1) ● **Setting:** Turkey
Participants	● **Total number enrolled:** 48, (A) = 24, (B) = 24 ● **Inclusion criteria:** IPSS > 8, Q_{max} < 15 mL/s, prostate volume 30 to 70 g on transrectal ultrasonography ● **Exclusion criteria:** < 50 years of age; those with a known neurogenic bladder, cancer of the prostate or bladder, history of prostate surgery, currently on medication known to affect voiding function **Baseline characteristics:** No significant differences between arms reported Mean age, years (SD): (A) = 61.2 (9.3) (n = 24), (B) = 63.9 (10.9) (n = 24) Mean preoperative prostate volume, grams (SD): (A) = 49.4 (18.9) (n = 24), (B) = 41.4 (14.5) (n = 24) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (Gyrus), irrigation fluid = saline ● **Intervention B:** monopolar (Karl Storz), irrigation fluid = glycine
Outcomes	**Primary outcomes:** IPSS (12 months) (SD): (A) = 8.7 (4.1) (n = 23), (B) = 8.3 (2.9) (n = 21) HRQoL (12 months) (SD): (A) = 1.8 (0.8) (n = 23), (B) = 2.0 (0.8) (n = 21) TUR syndrome: (A) = 0 (n = 24), (B) = 0 (n = 24) **Secondary outcomes:** Blood transfusion: not reported Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Q_{max} (1, 3, 6, 12 months) Urethral stricture rate Mean duration of operation Mean duration of catheterisation

	Haemoglobin level change Serum sodium level change
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Study states: "patients were randomized 1:1", but no information on method of randomisation reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to have been affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Low risk	Study reports inclusion of all participants (n = 24/24 for MTURP and n = 24/24 for BTURP) for analysis of these outcomes
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	12-month data are not reported for 3 patients in MTURP arm and for 1 patient in BTURP arm. No reasons for missing data provided; considered unclear how missing data may have impacted observed differences between arms
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol could not be identified to allow for full assessment

Shaik 2017

Methods	● **Study type:** single-centre RCT (1:1) ● **Setting:** India
Participants	● **Total number enrolled:** 60; (A) = 32 (B) = 28 ● **Inclusion criteria:** not reported ● **Exclusion criteria:** not reported **Baseline characteristics:** No significant differences between arms reported Mean age, years (SD): not reported for individual arms, mean age for both arms: 72 years (3)

	Mean preoperative prostate volume, mL (SD): not reported for individual arms, mean volume for both arms: 71 (5) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (specific technology not reported), irrigation fluid/specific technology not reported ● **Intervention B:** monopolar (specific technology not reported), irrigation fluid/specific technology not reported
Outcomes	**Primary outcomes:** IPSS (12 months): no specific data reported, although study reports this outcome as recorded HRQoL (12 months): not reported TUR syndrome: not reported **Secondary outcomes:** Blood transfusion: not reported Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Resection time Postoperative catheterisation duration Duration of hospital stay Q_{max}
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	These outcomes were not reported by the trial
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Unclear risk	These outcomes were not reported by the trial
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	These outcomes were not reported by the trial

Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported by the trial
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment of selective reporting. However, this study reports IPSS at 12 months as recorded but no specific data provided within published abstract

Singh 2005

Methods	● **Study type:** single-centre, RCT (1:1) ● **Setting:** India
Participants	● **Total number enrolled:** 60, (A) = 30, (B) = 30 ● **Inclusion criteria:** symptomatic benign prostatic hyperplasia (BPH) requiring surgical intervention, chronic retention with Schäfer obstruction grade 2 ● **Exclusion criteria:** IPSS < 7, Qmax > 12 mL/s, PCAR < 0.75 on transrectal ultrasonography, neurological illness, renal insufficiency, bladder stone, urethral stricture, taking finasteride **Baseline characteristics:** Not reported whether baseline characteristics significantly different. No P values Mean age, years (SD): (A) 68.9 (7.6) (n = 30), (B) 67.9 (9.8) (n = 30). P not reported Mean preoperative prostate volume: not reported Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (ACMI Corp), **i**rrigation fluid = saline with 1% ethanol ● **Intervention B:** monopolar TURP (Valley Laboratory), irrigation fluid = not stated
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 30), (B) = 0 (n = 30) **Secondary outcomes:** Blood transfusion: (A) = 0 (n = 30), (B) = 1 (n = 30) Urinary incontinence (12 months): reported only at 4 weeks Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** IPSS at 1, 3 months HRQoL at 1, 3 months Q_{max} at 1, 3 months Urinary incontinence at 4 weeks

	Urethral stricture Bladder neck contracture UTI Drop in postoperative serum sodium Drop in postoperative haemoglobin Duration of operation Duration of catheterisation Duration of bladder irrigation
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Low risk	"Patients were randomized 1:1 using envelopes into two groups..."
Allocation concealment (selection bias): All outcomes	Unclear risk	"Patients were randomized 1:1 using envelopes into two groups..." Unclear whether the envelopes were sealed, sequentially numbered, and opaque
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to have been affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol could not be identified to allow for full assessment

Singhania 2010

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** India
Participants	● **Total number enrolled:** 60; (A) = 30, (B) = 30 ● **Inclusion criteria:** failed medical therapy, acute urinary retention with failed voiding trial, recurrent urinary tract infection and haematuria, documented or suspected prostate cancer, neurogenic bladder, previous prostate surgery, urethral stricture, bladder stones, renal impairment ● **Exclusion criteria:** documented or suspected prostate cancer, neurogenic bladder, previous prostate cancer, neurogenic bladder, previous prostate surgery, urethral stricture, associated bladder stones, renal impairment **Baseline characteristics:** Only limited data for baseline characteristics provided for comparison Mean age (SD): (A) = 63.86 (6.1), (B) = 65.96 (6.6) Mean preoperative prostate volume: not reported Preoperative catheterisation status: not reported
Interventions	● **Intervention A:** bipolar TURP (Gyrus PK Bipolar Resection System), irrigation fluid = normal saline ● **Intervention B:** monopolar TURP (Erbee); 1.5%, irrigation fluid = glycine
Outcomes	**Primary outcomes:** IPSS (12 months): (A) = 6.13 (0.94), (B) = 6.23 (0.94) HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 30), (B) = 0 (n = 30) **Secondary outcomes:** Blood transfusion: (A) = 0 (n = 30), (B) = 0 (n = 30) Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): (A) = 0 (n = 30), (B) = 0 (n = 30) **Other reported outcomes:** Mean IPSS at 1, 3, 6 months Mean Q_{max} at 1, 3, 6, 12 months Clot retention Urethral stricture Bladder neck contracture UTI Mean duration of operation (minutes) Mean decline in serum sodium (mEq/L) Mean decline in haemoglobin (g %) Postoperative incidence of epididymitis
Source of funding	From the research society, BYL Nair Hospital
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Low risk	Study states: "they were divided into two groups using standard randomization codes"
Allocation concealment (selection bias): All outcomes	Unclear risk	Any steps taken to ensure allocation concealment were not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to have been affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Stucki 2014

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** Switzerland
Participants	● **Total number enrolled:** 137; (A) = 70, (B) = 67 ● **Included:** presence of LUTS and relevant reduction in IPSS Qol and/or significant PVR > 100 mL refractory to medical therapy with alpha-blockers and/or 5 alpha-reductase inhibitors, BPH with acute urinary retention, failed TWOC ● **Exclusion criteria:** neurogenic bladder, prostate cancer, previous prostatic/urethral surgery, bleeding disorders **Baseline characteristics:** No significant differences between arms reported Mean age, years (SD): (A) = 67 (none), (B) = 66 (none) Median preoperative prostate volume (cm^3) (SD): (A) = 34 (none) (n = 67), (B) = 35 (none) (n = 66) Preoperative catheterisation state: not reported

Interventions	● **Intervention A:** bipolar TURP (Gyrus), irrigation fluid = 0.9% saline ● **Intervention B:** monopolar TURP (Karl Storz), irrigation fluid = sorbitol/mannitol
Outcomes	**Primary outcomes:** IPSS (12 months): no numerical values reported HRQoL (12 months): no numerical values reported TUR syndrome: (A) = 0 (n = 70), (B) = 1 (n = 67) **Secondary outcomes:** Blood transfusion: (A) = 1 (n = 70), (B) = 1 (n = 67) Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Clot retention Urethral stricture Bladder neck stricture Need for reoperation for procedures (other than re-TURP) Duration of operation (median minutes) Duration of catheterisation (median days) Duration of hospital stay (median days) Haemoglobin level change Clot retention rate
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Low risk	Study states: "were computer randomized at a 1:1 ratio"
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to have been affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes

Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	High risk	Study reports that n = 46/67 and n = 43/70 of participants in monopolar and bipolar arms, respectively, were included in 12-month IPSS follow-up analysis. No reasons for incomplete data are reported. This was considered to represent significant loss to follow-up not accounted for in the analyses
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Symons 2002

Methods	● **Study type:** single-centre randomised controlled trial (2:1) ● **Setting:** United Kingdom
Participants	● **Total number enrolled:** 45; (A) = 32, (B) = 13 ● **Inclusion criteria:** clinical diagnosis of BPH with bladder outflow obstruction ● **Exclusion criteria:** not reported **Baseline characteristics:** No significant differences between arms reported Mean age (SD): not reported Mean preoperative prostate volume: not reported Preoperative catheterisation status: not reported
Interventions	● **Intervention A:** bipolar TURP; Gyrus Plasmakinetic Electrosurgical System, irrigation fluid = saline ● **Intervention B:** monopolar TURP, irrigation fluid = 1.5% glycine
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: not reported **Secondary outcomes:** Blood transfusion: not reported Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported
Source of funding	None reported
Notes	This is a conference abstract with limited information

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	These outcomes were not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Unclear risk	These outcomes were not reported
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	These outcomes were not reported
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported; only abstract available with limited reported data
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Terrone 2006

Methods	● **Study type:** single-centre RCT; randomisation ratio not reported ● **Setting:** Italy
Participants	● **Total number enrolled:** 50; (A) = not reported, (B) = not reported ● **Inclusion criteria:** bothersome LUTS ● **Exclusion criteria:** not reported **Baseline characteristics** Study reports no significant differences between arms but specific data not available Mean age (SD): not reported Mean preoperative prostate volume: not reported Preoperative catheterisation status: not reported
Interventions	● **Intervention A:** bipolar TURP (Vista CTR Bipolar Resection System, ACMI) ● **Intervention B:** monopolar TURP; specific irrigation fluid not reported

Outcomes	**Primary outcomes:** IPSS (12 months): unclear which values refer to specific arms of the trial HRQoL (12 months): unclear which values refer to specific arms of the trial TUR syndrome: not reported **Secondary outcomes:** Blood transfusion: not reported Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Q_{max}: data provided only for range of improvement; not possible to determine which values refer to specific arms of the trial Mean duration of catheterisation Mean duration of procedure (minutes) Mean postoperative haemoglobin (g/dL) Mean postoperative sodium (mmol/L)
Source of funding	None reported
Notes	This is a conference abstract with limited information

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Unclear risk	These outcomes were not reported
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	No evidence that these outcomes were recorded
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	It is unclear which data refer to which arms of the trial; therefore presented data cannot be fully interpreted to allow for full judgement
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Wang 2007

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** China
Participants	● **Total participants enrolled:** 164; (A) = 82, (B) = 82 ● **Inclusion criteria:** symptomatic BPH that required surgery owing to urinary retention or failed medical therapy ● **Exclusion criteria:** neurogenic bladder dysfunction, previous prostatic or urethral surgery, prostate cancer, bladder cancer, severe medical disease **Baseline characteristics:** No significant differences between arms reported Mean age (SD): (A) = 70.0 (4.2), (B) = 70.5 (4.6) Mean preoperative prostate volume, mL (SD): (A) = 57.9 (5.8), (B) = 58.6 (5.6) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (Gyrus F27 Electrosurgical System) ● **Intervention B:** monopolar TURP (WOLF Electrosurgical System), irrigation fluid = 5% mannitol
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 72), (B) = 2 (n = 76) **Secondary outcomes:** Blood transfusion: not reported Urinary incontinence (12 months): reported only at 6 months Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** IPSS at 3 months (data for 6/12 months available only in graphical format with no specific data) QoL at 3 months Q_{max} (mL/s) Urinary incontinence at 6 months Urethral stricture Bladder neck contracture Mean duration of operation (minutes) Mean duration of catheterisation (days) Mean duration of hospital stay (days) Mean change in postoperative serum sodium (Na+) (mEq/L) Mean reduction in postoperative haemoglobin (Hb) (g/dL)
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Unclear risk	These outcomes were not reported
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Low risk	Study reports that all participants (n = 76 in monopolar and n = 72 in bipolar arms) were included in the analysis for these outcomes
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Wu 2005

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** China
Participants	● **Total participants enrolled:** 400; (A) = 200, (B) = 200 ● **Inclusion criteria:** symptomatic BPH that required surgery owing to urinary retention or failed medical therapy ● **Exclusion criteria:** prostate cancer **Baseline characteristics:** No significant differences between arms reported Mean age, years (range): (A) = 74.1 (58 to 91), (B) = 73.8 (56 to 90) Mean preoperative prostate volume, grams (SD): (A) = 56.3 (40.2), (B) = 49.3 (36.6) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (Gyrus 27F Stoze Electrosurgical System) ● **Intervention B:** monopolar TURP (WOLF Electrosurgical System, irrigation fluid = 5% glucose)

Outcomes	**Primary outcomes:** Mean IPSS (12 months): not reported (only 6 months) Mean QoL (12 months): not reported (only 6 months) TUR syndrome: (A) = 0 (n = 200), (B) = 5 (n = 200) **Secondary outcomes:** Blood transfusion: (A) = 0 (n = 200), (B) = 18 (n = 200) Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5, 12 months): not reported explicitly at 12 months Need for re-TURP: not reported **Other reported outcomes:** Mean duration of operation Mean change in postoperative serum sodium Mean change in postoperative haemoglobin
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to have been affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Low risk	Study reports that all participants (n = 200 in both arms) were included in analyses for these perioperative outcomes
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Xie 2012

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** China
Participants	● **Total number enrolled:** 220; (A) = 110, (B) = 110 ● **Inclusion criteria:** BPO, maximal flow rate (Q_{max}) < 15 mL/s, > 45 years of age, prostate volume on transrectal ultrasound > 20 g, medication (5α-reductase inhibitors or α-blockers) failure ● **Exclusion criteria:** renal impairment, neurovesical dysfunction, bladder calculus, prostate carcinoma, previous history of prostatic or urethral surgery, urethral stricture, hydronephrosis **Baseline characteristics:** No significant difference between arms reported Mean age, years (SD): (A) = 69.95 (11.54), (B) = 64.91 (10.92) Mean preoperative prostate volume, mL (SD): (A) = 65.86 (17.32), (B) = 67.00 (18.93) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (Gyrus), irrigation fluid = saline ● **Intervention B:** monopolar (Olympus), irrigation fluid = glycine 1.5%
Outcomes	**Primary outcomes:** IPSS (12 months): (A) = 6.50 ± 2.03* (n = nr), (B) = 6.79 ± 2.59* (n = nr) HRQoL (12 months): (A) = 2.15 ± 0.58* (n = nr), (B) = 2.56 ± 0.97* (n = nr) TUR syndrome: (A) = 0 (n = 110), (B) = 2 (n = 110) **Secondary outcomes:** Blood transfusion: (A) = 0 (n = 110), (B) = 2 (n = 110) Urinary incontinence (12 months): reported only at 6 months Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): (A) = 3 (n = nr), (B) = 3 (n = nr) **Other reported outcomes:** IPSS at 24, 36, 48, 60 months (n = unclear except for 60 months) HRQoL at 24, 36, 48, 60 months Q_{max} at 12, 24, 36, 48, 60 months Clot retention Urethral stricture Bladder neck stenosis UTI Acute urinary retention Mean drop in sodium (mmol/L) Mean drop in haemoglobin (g/dL) Mean operative time (minutes) Postoperative irrigation time (hours) Mean catheterisation duration (days) Mean hospital stay (days)
Source of funding	None reported

Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Low risk	"Randomization was performed using the opaque envelope method"
Allocation concealment (selection bias): All outcomes	Low risk	Study states: "opaque envelopes were used as method of allocation concealment"
Blinding of participants and personnel (performance bias): All outcomes	High risk	Study states: "neither the patient nor the surgeon was blinded to the type of the procedure performed"
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	High risk	Study reports that patients were not blinded to allocated arm Study states: "one independent investigator, who was blinded to the type of surgery, performed the 1-, 6-, 12-, 24-, 36-, 48-, and 60-month follow-ups" Study authors considered that IPSS, HRQoL, IIEF-5, and urinary incontinence are primarily patient-reported symptoms
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	"One independent investigator, who was blinded to the type of surgery, performed the 1-, 6-, 12-, 24-, 36-, 48-, and 60-month follow-ups"
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Low risk	Study reports that all participants (n = 110 in each arm) were included in analyses for these outcomes
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Low risk	Study does not specifically report on completeness of outcome data nor loss to follow-up at 1 year for these outcomes - only at 5 years
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol could not be identified to allow for full assessment

Xin 2007

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** China
Participants	● **Total participants enrolled:** 130; (A) = 65, (B) = 65 ● **Inclusion criteria:** not reported ● **Exclusion criteria:** not reported **Baseline characteristics:**

	Not clear if significant differences reported between arms Mean age (SD): not reported Mean preoperative prostate volume (mL) (SD): not reported Preoperative catheterisation status: not reported
Interventions	● **Intervention A:** bipolar TURP (Plasmakinetic TURP, Gyrus device) ● **Intervention B:** monopolar TURP, irrigation fluid = not reported
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 65), (B) = 3 (n = 65) **Secondary outcomes:** Blood transfusion: not reported Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Mean decrease in postoperative serum sodium (mmol/L) Mean decrease in postoperative Hb (gram/L)
Source of funding	None reported
Notes	This is a conference abstract with limited information

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Unclear risk	These outcomes were not reported
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Low risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported

Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol could not be identified to allow for full assessment

Xin 2009

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** China
Participants	● **Total participants enrolled:** 160; (A) = 80, (B) = 80 ● **Inclusion criteria:** symptomatic BPH that required surgery owing to urinary retention or failed medical therapy ● **Exclusion criteria:** neurogenic bladder dysfunction, prostate cancer, bladder cancer, severe medical disease, detrusor weakness **Baseline characteristics:** No significant differences between arms reported Mean age, years (SD): (A) = 69.0 (6.6), (B) = 66.0 (7.2) Mean preoperative prostate volume, mL (SD): (A) = 51.4 (19.5), (B) = 53.0 (19.2) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (Gyrus Electrosurgical System) ● **Intervention B:** monopolar TURP (WOLF F26 Storz Electrosurgical System), irrigation fluid = 1.5% glycine
Outcomes	**Primary outcomes:** IPSS (12 months): reported only at 6 months HRQoL (12 months): reported only at 6 months TUR syndrome: (A) = 0 (n = 76), (B) = 5 (n = 77) **Secondary outcomes:** Blood transfusion: (A) = 2 (n = 76), (B) = 13 (n = 77) Urinary incontinence (12 months): reported only at 6 months Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Mean Q_{max} (mL/s) (6 months) Urethral stricture Mean duration of catheterisation (days) Mean duration of hospital stay (days)
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported

Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to have been affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Low risk	Study reports that all participants (n = 76 in bipolar and n = 77 in monopolar arm) have been included in the analyses for these outcomes
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Xue 2008

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** China
Participants	● **Total participants enrolled:** 64; (A) = 32, (B) = 32 ● **Inclusion criteria:** symptomatic BPH that required surgery owing to urinary retention or failed medical therapy ● **Exclusion criteria:** neurogenic bladder dysfunction, prostate cancer **Baseline characteristics:** No significant differences between arms reported Mean age, years (range): (A) = 69.5 (55 to 84), (B) = 68.2 (53 to 84) Mean preoperative prostate volume, mL (range): (A) = 54.4 (30 to 102), (B) = 53.6 (36 to 92) Preoperative catheterisation state: 2 in group A were catheterised for retention
Interventions	● **Intervention A:** bipolar TURP (Gyrus Electrosurgical System) ● **Intervention B:** monopolar TURP (WOLF Electrosurgical System), irrigation fluid = 1.5% glycine
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 32), (B) = 1 (n = 32) **Secondary outcomes:** Blood transfusion: (A) = 0 (n = 32), (B) = 3 (n = 32) Urinary incontinence (12 months): reported only at 6 months

	Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** IPSS: reported at 3 months, results for 6 and 12 months only reported in graphical format QoL reported at 3 months only Mean Q_{max} (mL/s) Mean duration of operation (minutes) Mean duration of catheterisation (days) Mean duration of hospital stay (days) Mean change in postoperative serum sodium (Na+) (mEq/L) Mean reduction in postoperative haemoglobin (Hb) (g/dL)
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to have been affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Low risk	Study reports that all participants (n = 32 in bipolar and n = 32 in monopolar arm) have been included in analyses for these outcomes
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Yang 2004

Methods	● **Study type:** single-centre randomised controlled trial (1:1) ● **Setting:** Taiwan
Participants	● **Total number enrolled:** 117; (A) = 58, (B) = 59 ● **Inclusion criteria:** confirmed bladder outlet obstruction caused by BPH and about to undergo surgical management (TURP); high PSA but with significant comorbid disease or old age not suitable or unwilling to undergo radical surgery ● **Exclusion criteria:** medical history suggesting little or no improvement in voiding symptoms after surgical management **Baseline characteristics:** No significant differences between arms reported Mean age, years (SD): not reported Mean preoperative prostate volume, mL (SD): (A) = 45.8 (n = 58), (B) = 48.9 (n = 59) Preoperative catheterisation state: not reported
Interventions	● **Intervention A:** bipolar TURP (Gyrus Plasmasect), irrigation fluid = normal saline ● **Intervention B:** monopolar TURP, irrigation fluid = distilled water
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 58), (B) = 1 (n = 59) **Secondary outcomes:** Blood transfusion: (A) = 1 (n = 58), (B) = 1 (n = 59) Urinary incontinence (12 months): not reported specifically at 12 months Erectile dysfunction (IIEF-5) (12 months): not reported specifically at 12 months Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** IPSS at 3 months QoL at 3 months Q_{max} (mL/s) IIEF-5 at 3 months Urethral stricture Acute urinary retention Mean drop in postoperative haemoglobin (g/dL) Mean drop in postoperative Na (mEq/L) Frequency of retrograde ejaculation Mean duration of operation (minutes) Mean duration of irrigation (hours) Mean duration of catheterisation (days) Mean duration of hospital stay (days)
Source of funding	None reported
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Unclear risk	Not reported
Allocation concealment (selection bias): All outcomes	Unclear risk	Not reported
Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Not reported
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to have been affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Unclear risk	This study does not explicitly report on attrition, exclusion of participants from analyses, or the presence of incomplete outcome data for these outcomes
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol could not be identified to allow for full assessment

Yousef 2010

Methods	● **Study type:** single-centre, single-blinded RCT (1:1:1) ● **Setting:** Tanta, Egypt
Participants	● **Total number enrolled:** 360; (A) = 120, (B) = 120, (C) = 120 ● **Inclusion criteria:** symptomatic BPH ● **Exclusion criteria:** bleeding disorders or existing coagulopathy, diabetes mellitus, metabolic acidosis, apparent cardiac disease with ECG evidence of ischaemia, history of myocardial infarction/congestive cardiac failure, renal insufficiency, contraindication to spinal anaesthesia **Baseline characteristics:** No significant differences between arms reported Mean age, years (SD): (A) = 62 (6.5), (B) = 60.7 (5.1), (C) = 60.9 (4.9) Mean preoperative prostate volume, grams (SD): not reported Preoperative catheterisation state: not reported

Interventions	● **Intervention A:** bipolar TURP (Storez, Tottling, Germany), irrigation fluid = normal saline ● **Intervention B:** monopolar TURP (Storez, Tottling, Germany), irrigation fluid = glycine 1.5% ● **Intervention C:** monopolar TURP (Storez, Tottling, Germany), irrigation fluid = glucose 5%
Outcomes	**Primary outcomes:** IPSS (12 months): not reported HRQoL (12 months): not reported TUR syndrome: (A) = 0 (n = 120) (B) = 17 (n = 240) **Secondary outcomes:** Blood transfusion: (A) = 0 (n = 120), (B) = 4 (n = 240) Urinary incontinence (12 months): not reported Erectile dysfunction (IIEF-5) (12 months): not reported Need for repeat TURP (i.e. re-TURP): not reported **Other reported outcomes:** Clot retention Acute urinary retention Mean duration of operation Mean duration of postoperative catheterisation Mean duration of hospital stay Serum sodium level change Haemoglobin level change
Source of funding	None reported
Notes	Protocol is available at http://www.pactr.org/ATMWeb/appmanager/atm/atmregistry?_nfpb=true&_windowLabel=BasicSearchUpdateController_1&BasicSearchUpdateController_1_actionOverride=%2Fpageflows%2Ftrial%2FbasicSearchUpdate%2FviewTrail&BasicSearchUpdateController_1id=179 "A Randomized Comparison Between Three Types of Irrigating Fluids During Transurethral Resection in Benign Prostatic Hyperplasia" (PACT Registry ID: ATMR2010010001793131)

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias): All outcomes	Low risk	"Simple randomisation using a randomisation table created by a computer software program" (as stated in the protocol) "Randomization was performed by computer-generated random allocations sequence by simple randomization" (Yousef 2010)
Allocation concealment (selection bias): All outcomes	Unclear risk	Steps taken to ensure allocation concealment are not reported explicitly

Blinding of participants and personnel (performance bias): All outcomes	High risk	Not reported but considered unlikely that operating surgeon(s) were blinded
Blinding of outcome assessment (detection bias): Subjective outcomes (IPSS, HRQoL, IIEF-5, TUR syndrome, Urinary Incontinence)	Unclear risk	Study states: "the medical and nursing stuff involved in patients care, monitoring in the post-operative period and assessment of the complications and the incidence and the severity of TUR syndrome were completely blinded to the patient's group assignment and the type irrigating fluid used" (Yousef 2010) However, not reported whether patients were blinded to interventions
Blinding of outcome assessment: Objective outcomes (Blood transfusion, Re-TURP)	Low risk	Not reported but objective outcomes unlikely to have been affected
Incomplete outcome data (attrition bias): Immediate postoperative outcomes (TUR syndrome, Blood transfusion)	Low risk	Study reports that all participants (n = 120 in each trial arm) were included in analyses for these outcomes
Incomplete outcome data (attrition bias): Long-term outcomes (IPSS/HRQoL/IIEF-5/urinary incontinence at 12 months, and re-TURP)	Unclear risk	These outcomes were not reported
Selective reporting (reporting bias): All outcomes	Unclear risk	RCT protocol not available to allow for full assessment

Footnotes

ASA: American Society of Anesthesiology.

AUA: American Urological Association.

AUASS: AUA Symptom Score.

BEP: benign enlargement of the prostate.

BOO: bladder outlet obstruction.

BPE: benign prostatic enlargement.

BPH: benign prostatic hyperplasia.

BTURP: bipolar transurethral resection of the prostate.

DRE: digital rectal examination.

HRQoL: health-related quality of life.

IIEF-5: International Index of Erectile Function.

IPSS: International Prostate Symptoms Score.

LUTS: lower urinary tract symptoms.

MTURP: monopolar transurethral resection of the prostate.

PMR: postmicturition residual.

PSA: prostate-specific antigen.

PVR: postvoid residual.

Q_{max}: maximum urinary flow rate.

QoL: quality of life.

RCT: randomised controlled trial.

SD: standard deviation.

TRUS: transrectal ultrasound.

TUR: transurethral resection.

TURP: transurethral resection of the prostate.

UTI: urinary tract infection.