

Podium Session 3: Pediatrics

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POD-03.01

2015 Prize Essay Winner: Clinical

Risk factors for fistula formation after distal and midshaft tip repair: A comprehensive time-to-event analysis of 1267 patients

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Purpose: To identify risk factors for urethrocuteaneous fistula (UCF) by performing a large, multi-centre, prospective cohort study of patients who underwent tubularized incised plate (TIP) repairs for midshaft or distal hypospadias.

Material and Methods: Between 2008-2014, 1267 children who underwent distal/midshaft TIP repair by 6 surgeons were prospectively followed. Proximal defects, redo repairs and those who received testosterone were excluded. Primary outcome was incidence and time to UCF formation. Eight a priori defined risk factors were explored: age at surgery (≤ 1 year vs. >1 year), glans groove (moderate/deep vs. shallow/no), meatal location (distal vs. midshaft), ventral curvature correction ($\geq 30^\circ$), suture type

(polydioxanone vs. polyglactin), urethroplasty (UP) layers (1 vs. 2 layers), coverage layer (dartos/spongioplasty vs. none), and stent insertion (yes vs. no). Cox-proportional hazard model was used to evaluate the associations between risk factors and time to UCF.

Results: Mean and median ages at surgery were 21.3 ± 24.7 months and 14 (6–325) months respectively. Out of 1267 children, 1123 (87%) had distal defects. Median follow-up time was 23 (2–92) months. Overall, 8% (97/1267) developed UCF at a median time of 6 (3–55) months post-repair. Mean age at surgery was similar between patients with vs. without UCF (21.6 ± 23.2 vs. 21.3 ± 24.8 , $p=0.9$). Table 1 shows univariate analyses. Shallow/no glans groove ($HR=4.7$, $p<0.01$), 1-layer UP ($HR=1.9$, $p=0.04$), and lack of coverage layer ($HR=2.2$, $p=0.02$) were found to be independent risk factors for UCF on multivariable analysis. Older age (>1 year), midshaft defects, suture type, curvature correction and stenting were not associated with higher UCF rates.

Conclusion: UCF is the most common complication after TIP repair for hypospadias. Our large, multi-centre, prospective cohort study has determined that shallow/no glans groove, single UP layer and no dartos/spongioplasty flap coverage layer are independent risk factors for UCF formation post-TIP repair in patients with distal/midshaft hypospadias and no previous testosterone treatment.

Table 1. POD-03.01. Univariate and multivariable analyses on factors associated with higher fistula rate

Risk factor	Univariate			Multivariable	
	Fistula N=97 (%)	Total N=1,267	p value	HR (95% CI)	p value
Age of surgery					
≤ 1 yr	36 (7)	501		Ref	
> 1 yr	61 (8)	766	0.61	1.01 (0.71–1.68)	0.70
Meatal location					
Distal	82 (7)	1123		Ref	
Midshaft	15 (10)	144	0.20	1.20 (0.66–2.10)	0.60
Glans groove					
Moderate deep groove	57 (6)	975		Ref	
Flat/No groove	40 (14)	292	<0.01	4.74 (3.05–7.34)	<0.01
Chordee correction					
Yes	20 (7)	287		Ref	
No	77 (8)	080	0.62	1.10 (0.64–1.90)	0.73
Suture type					
Polydioxanone	54 (6)	869		Ref	
Polyglactin	43 (11)	398	<0.01	1.40 (0.84–2.20)	0.21
Urethroplasty layers					
2	16 (5)	328		Ref	
1	81 (15)	939	0.03	1.87 (1.01–3.46)	0.04
Coverage layer					
Yes	86 (7)	1193		Ref	
No	11 (15)	74	0.02	2.20 (1.14–4.31)	0.02
Stenting					
Yes	80 (7)	1124		Ref	
No	17 (12)	143	0.04	1.70 (0.95–3.02)	0.07

POD-03.02**Incidence, risk factors and timing of surgery for undescended testis and hypospadias in Ontario: An 11-year retrospective cohort study**Dave, Sumit¹; Liu, Kuan²; Mamut, Adiel¹; Shariff, Salimah²¹Surgery, Division of Urology, Western University, London Health Sciences Centre, London, ON, Canada; ²Institute for Clinical Evaluative Sciences Western, Western University, London Health Sciences Centre, London, ON, Canada**Introduction and Objectives:** Recent reports suggest a possible increase in the incidence of undescended testis (UDT) and hypospadias (HYP). The current study uses a provincial database to calculate the population-based incidence of UDT and HYP, assess perinatal and maternal risk factors and timing of surgical intervention.**Methods:** Linked administrative databases in the province of Ontario, were used to identify all male newborns from 1997 to 2007. The trends in incidence rates of UDT and HYP, defined as an orchidopexy or hypospadias repair, respectively, within 5 years of birth were evaluated using the Cochran Armitage test. Procedures performed for testicular torsion were excluded. Time to surgical intervention was calculated as time from birth to the first procedure. Baseline maternal and fetal risk factors were assessed using generalized estimating equations with a logit link, adjusting for clustering amongst mothers with multiple offsprings with UDT or HYP.**Results:** The 5-year incidence of orchidopexy (7.5- 8.6/1000 male births) and hypospadias repair (3.6- 4.2/1000 male births) has remained stable during the study duration ($p > 0.5$). The incidence of males who underwent both procedures (0.1- 0.3 /1000 male births) showed an increasing, but clinically insignificant, trend ($p=0.02$). The surgical burden defined as the number of orchidopexies and HYP repairs performed every year divided by the Ontario pediatric population (<18 years) between 1992 and 2012 also showed a similar stable trend. The median age at orchidopexy (23 months, IQR 16-34) was beyond suggested guidelines, but a trend towards earlier intervention was noted in the last 3 years (21 months, IQR 15-31). Hypospadias repair was performed at a median age of 17 months (IQR 12-26), with no significant change during the study duration. In multivariable analysis, older maternal age, premature birth, small for gestational age and cesarean section were associated with a higher risk of UDT. The same factors and multiple gestation were associated with a higher risk of HYP.**Conclusions:** The incidence of isolated UDT and HYP has remained stable in the province of Ontario, between 1997- 2007. The timing of surgical intervention for boys with UDT is beyond suggested guidelines. Risk factor estimates can allow better counseling of prospective parents.**POD-03.03****The fate of primary obstructive megaureter (POM): A prospective outcome analysis of 72 infants**Braga, Luis H.²; D'Cruz, Jennifer²; Farrokhyar, Forough²; Rickard, Mandy²; DeMaria, Jorge E.²; Lorenzo, Armando¹¹Division of Urology, Hospital for Sick Children, Toronto, ON, Canada;²Department of Surgery, McMaster University, Hamilton, ON, Canada**Introduction and Objective:** Previous studies have assessed risk factors for febrile urinary tract infection (fUTI) in pts with prenatal hydronephrosis (HN), identifying those with POM as being at the highest risk. We sought to examine data from a prenatal HN cohort to identify those with POM, in order to determine their fUTI, surgical intervention and spontaneous resolution rates.**Methods:** POM pts were consecutively sampled from 2008-14 in a prospective fashion. Only those who had a VCUG to rule out VUR were included. Six a priori variables were studied: HN grade [low(I,II) vs. high(III,IV)], continuous antibiotic prophylaxis (CAP) use, gender, circumcision status, ureteral dilation (≥ 12 mm) and tortuosity. fUTI was defined as a >100000 CFU/ml positive culture from a catheterized urine sample, with a fever $\geq 38^\circ\text{C}$. Univariate and multivariable analyses (cox proportional regression) for fUTI risk factors were carried out. Resolution trends by surgery and ureteral dilation were analyzed using Kaplan-Meier curves and log-rank tests.**Table 1. POD-03.03. Univariate analysis of predefined risk factors for UTI in children with POM**

Risk factor	UTI n=21 (%)	Total N=72	p value
Gender			
Circumsised males	3 (14)	22	
Uncircumsised males	16 (38)	42	0.04
Females	2 (25)	3	0.60
HN Grade			
Low	4 (44)	9	
High	17 (27)	63	0.43
CAP			
Yes	5 (16)	31	
No	7 (41)	17	0.08
Unknown due to blinding	9 (38)	24	0.12
Tortuosity			
Yes	7 (26)	27	
No	14 (31)	45	0.64
Ureteral dilation			
<12 mm	8 (23)	35	
≥ 12 mm	13 (35)	37	0.25

Results: Mean and median patient age at 1st clinic visit were 3.4 ± 3.9 and 2 mos (0-21). Median follow-up time was 2 years (6-60 mos). Overall, 21 of 72 infants (29%) developed a fUTI at a median age of 3 (mean=6; 1-24) mos. The majority were males (n=64, 89%), and 21 (33%) were circumcised. High-grade HN was present in 63 (87%) pts and CAP was prescribed for 31 (43%). Univariate analysis is displayed in Table 1. Cox regression identified uncircumcised males (HR=5.7, $p=0.01$) and lack of CAP (HR=5.9, $p=0.01$) as independent risk factors for fUTI. HN grade, ureteral diameter and tortuosity were not associated with higher fUTI rates. Pts who underwent surgery (n=17, 20%) had a larger mean ureteral diameter vs. those treated conservatively (18 ± 12 vs. 11 ± 3 mm, $p<0.01$). Kaplan-Meier curves showed that only 30% of surgical pts had resolution of their HN by 36 mos vs. 60% of those whose POM was managed conservatively ($p=0.04$).**Conclusion:** Most POM infants developed fUTIs within the first 3 months of life. Circumcision and use of CAP significantly reduced fUTI rates in those pts. Ureteral diameter ≥ 12 mm was significantly associated with a higher operation rate, but not with increased UTI rates as one would expect. Resolution of HN after tapered ureteral reimplantation may take longer than 3 years.**POD-03.04****Long-term functional outcomes of peno-scrotal hypospadias repair: A single center retrospective comparative analysis of proximal TIP, Onlay and Duckett**Hueber, Pierre-alain¹; Abdo, Al'a¹; Franc-Guimond, Julie¹; Barrieras, J. Diego¹; Houle, Anne-Marie¹¹Department of Surgery, Division of Pediatric Urology, Centre hospitalier universitaire Sainte-Justine, Montreal, QC, Canada**Introduction and Objectives:** The aim of this study is to evaluate the long-term evolution of patients following penoscrotal hypospadias repair. A comparative analysis was performed between proximal TIP, Onlay and Duckett hypospadias repair in terms of complications and uroflowmetric functional outcomes with a follow-up including the adolescent period.**Methods:** Files from patients who underwent primary hypospadias repair at our institution between 1997 and 2001 were reviewed. Patients with serial documented postoperative uroflowmetry profiles at follow-up visits were included. A comparative analysis was performed according to

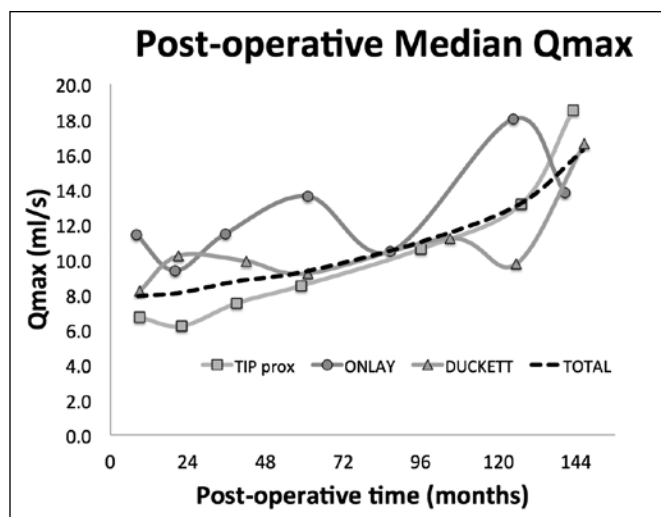


Fig. 1. POD-03.04.

surgery types (TIP vs. Onlay vs. Duckett) at baseline and at the following post-operative time interval endpoints: 0-12 months, 12-24 months, 24-48 months, 4-6 years, 6-10 years and >10 years. Qmax in relation to Voiding Volume (VV) adjusted for Age was also evaluated in comparison to normal children using established Miskolc nomograms.

Results: 54 patients with total mean follow-up of 8 years were included: n=25 TIP, n=18 Onlay and n=9 Duckett. In terms of complications, none of the patients that underwent Onlay developed urethral stenosis (0%) compared to 32% for TIP and 44% for Duckett ($p<0.01$). On the other hand, cure for diverticula was more prevalent in Onlay patients with a rate of 55% compared to 5.6% and 11.5% for TIP and Duckett respectively ($p<0.01$). Post-operative Qmax increases progressively according to time with a trend suggesting an advantageous uroflowmetric profile for Onlay compared to the other type of surgeries. Between age 3-7, compared to nomogram, more than 64% of Onlay patients exhibit a Qmax >5th percentile against 18% and 37% for TIP and Duckett respectively ($p<0.01$). However, this difference detected at an early age disappears after puberty. For patients aged >13, 87.5%, 90% and 91.3% exhibit a Qmax >5th percentile with no significant differences between surgeries ($p=0.72$) (Fig. 1).

Conclusions: Onlay patients have a tendency of harboring a higher urinary flow rate at early age during childhood compared to TIP and Duckett respectively. All patients exhibit favourable long-term evolution including at the adolescence regardless of the procedure.

POD-03.05

Short stay for pediatric pyeloplasty: A pilot project

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Introduction and Objectives: Health care costs continue to escalate, and this has incentivized hospitals and health care workers to increase value by maintaining and/or increasing quality and safety, while reducing wastes and costs. A surgical short stay (SSS) unit was introduced to our facility, where cases were identified by each service, where potentially, length of stay (LOS) could be reduced to <24 hours. Pediatric pyeloplasty was the procedure chosen as the pilot case for analysis in this unit by Urology.

The primary objective was to assess adverse outcomes (AO's) associated with reduced LOS by examining readmissions and ER visits.

Methods: During the inaugural period of this pilot project, September 23- November 15, 2014, 149 total patients passed through the SSS. The records of these patients were reviewed to document those who underwent pyeloplasty and measure LOS compared to historic controls and report any AE's.

Results: Pyeloplasty represented the fourth most common indication for SSS admission, 7/149 (9%) of patients, equal to that of appendectomy. In 2013-2014, 54 pyeloplasties were performed with mean LOS of 1.61 +/- 1.69 days compared to 0.89 +/- .41 days in the SSS group. No patients in the SSS was re-admitted. However, a single child was evaluated and treated in the ER for a febrile UTI, > 48 hours after discharge. All 8 services who utilized SSS felt that the pilot was of benefit, although other than pyeloplasty, in the majority of other procedures, LOS did not demonstrate a trend to decrease. Of 44% (n=60) of families who completed feedback by returning a survey, satisfaction with the SSS unit surpassed that of pre-pilot patients in 8 categories.

Conclusion: Pediatric pyeloplasty patients can be discharged safely with LOS < 24 hrs, from a unit where the culture is focused on SSS. Based on our early experience, there is the potential for reducing costs because of reduced LOS. We have agreed to expand our inclusion criteria to include other common surgical procedures involving the ureter and bladder (e.g. reimplants). It has been our observation that if cases selected for SSS unit are performed as the first case of the day, that they invariably are ready to be discharged that evening with the proper nursing support and family /patient education. Family and surgeon acceptance is superb.

POD-03.06

Long term outcomes of demucosalized sigmoid bladder augmentation in children in comparison to standard ileocystoplasty

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Introduction: Few reports have been published on long term outcomes regarding demucosalized sigmoid bladder augmentation (DSBA) showing lower bladder stones and mucus production. Herein we report our long term outcomes of DSBA in comparison to standard ileocystoplasty.

Methods: After an REB approval, a retrospective chart review of all patients who underwent bladder augmentation at our institution over the last 14 years was done. Patients status post DSBA (group A) were matched in (1:3 ratio) to patients who underwent traditional ileocystoplasty (Group B), with minimum 6 years follow up for all patients. Demographics, UTIs, bladder calculi, average bladder capacity, need for revision surgery, spontaneous bladder perforation and incontinence were compared between the two groups.

Results: Over the study period there were 100 bladder augmentation performed in our institution. There were 5 (50%) males in group A and 16 (53%) in group B. The average age was 10.3 and 10 years respectively, with an average follow up of 6.7 years in group A and 6 years in group B. All the study patients were on regular clear intermittent catheterization (CIC). There were no statistically significant differences in the rate of UTIs, subjective mucus production, achieved bladder capacity, urinary continence, rate of subsequent surgery, or the rate of spontaneous bladder perforation. Importantly there was a significant difference in the rate of bladder calculi between the two groups 0 vs. 8 patients in group A and B respectively (p value 0.06).

Conclusion: Although DSBA is a viable alternative option to standard bladder augmentation, our data does not show a superior outcome on long term follow up aside from a lower bladder stone rate.