Retubularization of the ileocystoplasty patch for conversion into an ileal conduit

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Abstract

Introduction: We present the outcomes and long-term follow-up of patients who underwent conversion to an ileal conduit urinary diversion using the retubularized patch from the initial augmentation ileocystoplasty.

Methods: We reviewed the charts of all patients who underwent this surgery at our centre. The indications for surgery, workup, clinical outcomes and complication rates were assessed. Patient-reported symptom response based on global response assessment (GRA) was determined and used as a subjective measure of overall treatment effectiveness.

Results: Thirteen patients with either bladder pain syndrome/interstitial cystitis (BPS/IC) (n = 11) or neurogenic bladder (n = 2) were followed for a mean of 80 months. The most common indication for surgical conversion was persistent lower urinary tract symptoms (LUTS) or bladder pain. Late complications were frequent, typically low-grade, and usually manageable with conservative therapy; the most common were urinary tract infections (n = 6) and parastomal hernias (n = 5). Two patients developed ureteric strictures. Nine of 13 patients required additional surgery to manage complications or persistent symptoms. Only 5 of 11 GRA respondents reported a successful therapeutic outcome and BPS/IC patients who underwent concurrent cystourethrectomy tended to be most satisfied (2/3). Nevertheless, several patients still achieved symptom control when no other treatment options were available to them.

Conclusion: Conversion to an ileal conduit using the retubularized ileocystoplasty patch offers several technical and therapeutic advantages over creating a urinary diversion from a new bowel segment. It should therefore be considered a viable treatment option in patients who have exhausted more conservative management of their LUTS.

Introduction

A small volume, poorly compliant bladder with or without detrusor overactivity can arise from a number of urological disorders, ranging from structurally contracted bladders (such as those seen with radiation cystitis) to neurogenic bladder (such as those associated with spinal dysraphisms). These conditions can be associated with high bladder pressures, damage to the upper urinary tract, and severe lower urinary tract symptoms (LUTS). Patients with bladder pain syndrome/interstitial cystitis (BPS/IC) can also have debilitating storage LUTS and pelvic pain exacerbated by bladder filling. Despite conservative management, some patients will have unresolved symptoms or high pressure bladders and require more invasive treatment in the form of an augmentation cystoplasty.

For a number of reasons (including patient dissatisfaction, unresolved or recurrent LUTS or pain, bladder cancer, recurrent urinary tract infections, or failure to manage self-catheterizations), a bladder augmentation may not adequately treat the condition and conversion to an ileal conduit may be warranted. An alternative to a de novo ileal conduit with an additional segment of the small bowel is to form the conduit from the retubularized ileocystoplasty patch. We present our experience with this surgery and assess patient-reported symptom responses as a subjective measure of treatment outcome.

Methods

A total of 13 patients who underwent conversion to an ileal conduit after failed augmentation ileocystoplasty were included in this study. After Research Ethics Board approval, a chart review of all included patients was completed. The patient demographics and comorbidities, indications for and time to surgical conversion, previous workup and therapies, and surgical and clinical outcomes were reviewed. Complications were graded based on the Clavien-Dindo classification of surgical complications. To quantify the severity of symptoms preoperatively, the LUTS and pain of each patient were graded using a scale from 0 to 3 (Table 1) and as outlined in previous studies.

Patient-reported symptom response was assessed postoperatively using the global response assessment (GRA) scale...
as a subjective measure of clinical outcomes (Table 2). After their most recent clinical follow-up, patients were asked to retrospectively rate the change in their symptoms with conversion to an ileal conduit after failure of their prior augmentation ileocystoplasty (Table 2). The GRA scale has become a standard method of patient-symptom assessment in clinical trials of BPS/IC, particularly because successful treatment of the condition requires adequate symptom management. Therefore, in this study treatment success or failure was based on each patient’s response to the GRA scale. Patients who graded their therapeutic response as significantly worse, somewhat worse or unchanged were considered treatment failures, while patients who reported some or significant improvement in their symptoms were considered treatment successes.

Results

Of the 13 patients included in this study, 3 were male and 10 were female; the mean age was 56 years. The primary diagnoses included BPS/IC (11 patients) and neurogenic bladder (2 patients). Of the patients with neurogenic bladder, 1 had spina bifida and the other had a traumatic spinal cord injury. Two patients died from non-urologic causes prior to carrying out the study.

On preoperative LUTS and pain grading (Table 1), all patients reported at least 1 symptom as severely bothersome (Grade 3), and 3 or more symptoms as at least moderately bothersome (Grade ≥2). The indications for conversion from an augmentation ileocystoplasty to an ileal conduit in all patients with BPS/IC were persistent or recurrent severe storage LUTS or pelvic pain despite several prior therapies. Attempted therapies included dietary modification, oral medications (anticholinergics, pentosan polysulfate, amitriptyline, and/or analgesics), hydrodistension, intravesical therapies (clorpactin, dimethyl sulfoxide, and/or exogenous glycosaminoglycans), neuremodulation, and eventually augmentation ileocystoplasty. Excluding dietary modification, all patients with BPS/IC had failed at least 4 of the aforementioned therapies. In the 2 patients with neurogenic bladder, the indications for conversion after augmentation ileocystoplasty were intolerance of clean intermittent self-catheterization or indwelling catheter with persistent incontinence.

The mean time between the initial bladder augmentation and conversion to an ileal conduit was 55 months (range: 4 to 220 months). In the BPS/IC and neurogenic bladder populations, the mean time to conversion was 68 months (range: 4 to 220 months) and 37 months (range: 9 to 69 months), respectively.

During the surgery, the abdomen and peritoneum were entered through a midline suprapubic incision. Adhesions were sharply dissected to mobilize any overlying small bowel and to identify the ileocystoplasty patch. The patch was dissected free from the bladder using electrocautery and was retubularized along its original incision using running 3-0 braided, absorbable sutures. The posterior wall of the bladder was closed and the ureters were subsequently identified, divided and anastomosed to the proximal end of the retubularized ileal segment in a Wallace fashion. The distal end of the conduit was brought out through the abdominal wall and the stoma was created. Four patients with BPS/IC also underwent simple cystectomy and urethrectomy at the time of surgery. The only intra-operative complication was a blood transfusion required in 1 patient (Table 3).

### Table 1. Lower urinary tract symptom and pain grading preoperatively*

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suprapubic pain</td>
<td>None (more than every 2 hrs)</td>
<td>Mild (every 2 hrs)</td>
<td>Moderate (every hour)</td>
<td>Severe (less than every hour)*</td>
</tr>
<tr>
<td>Frequency</td>
<td>None (0-1)</td>
<td>Mild (twice)</td>
<td>Moderate (3-4)</td>
<td>Severe (&gt;5)</td>
</tr>
<tr>
<td>Urgency</td>
<td>None</td>
<td>Mild</td>
<td>Moderate</td>
<td>Severe</td>
</tr>
<tr>
<td>Nocturia</td>
<td>None</td>
<td>Mild (strain to void)</td>
<td>Moderate (interrupted stream)</td>
<td>Severe (dribbling)</td>
</tr>
<tr>
<td>Urine flow</td>
<td>None</td>
<td>Mild</td>
<td>Moderate</td>
<td>Severe</td>
</tr>
<tr>
<td>Urge incontinence</td>
<td>None</td>
<td>Mild</td>
<td>Moderate</td>
<td>Severe</td>
</tr>
<tr>
<td>Stress incontinence</td>
<td>None</td>
<td>Mild (slight with cough)</td>
<td>Moderate (with cough)</td>
<td>Severe (with any activity)</td>
</tr>
</tbody>
</table>

*Based on Gajewski et al.*

### Table 2. Global response assessment scale

<table>
<thead>
<tr>
<th>Number</th>
<th>Response</th>
<th>Grading (%)</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Significantly worse</td>
<td>0</td>
<td>Failure of the therapy</td>
</tr>
<tr>
<td>2</td>
<td>Somewhat worse</td>
<td>&gt;0 to 25</td>
<td>Failure of the therapy</td>
</tr>
<tr>
<td>3</td>
<td>Unchanged (neither worse nor better)</td>
<td>&gt;25 to 50</td>
<td>Failure of the therapy</td>
</tr>
<tr>
<td>4</td>
<td>Somewhat improved</td>
<td>&gt;50 to 75</td>
<td>Successful therapy</td>
</tr>
<tr>
<td>5</td>
<td>Significantly improved</td>
<td>&gt;75 to 100</td>
<td>Successful therapy</td>
</tr>
</tbody>
</table>
The mean follow-up from date of surgical conversion to administration of the GRA scale, or, in the case of deceased patients, last clinic visit was 80 months (75 and 103 months in the BPS/IC and neurogenic bladder groups, respectively). We tallied intra-operative, early (prior to discharge from hospital) and late (after discharge from hospital) postoperative complications and classified them using the Clavien-Dindo classification system (Table 3). The most common complications were urinary tract infections (n = 6), parastomal hernias (n = 5), and wound infections (n = 3). Of the highest grade complications, there were 2 patients who developed ureteric strictures. One patient required a ureteric reimplantation, and the other proceeded to develop ipsilateral renal atrophy and subsequent chronic renal insufficiency. The latter patient also developed colovesical and enterocodont fistulae due to a small bowel anastomotic leak. One patient developed a refractory stomal stricture requiring regular bilateral ureteric catheter changes, and another developed stomal retraction requiring surgical revision.

Of the 10 patients with BPS/IC, 4 underwent concurrent simple cystourethrectomy at the time of conversion to an ileal conduit. Nine out of 10 of the BPS/IC patients required additional surgery including: simple cystourethrectomy (n = 3), stomal revision (n = 4), incisional hernia repair (n = 2), conversion to an Indiana Pouch (n = 1), conversion back to an ileocystoplasty, ureteric reimplantation (n = 1), and dilatation of a ureteric stricture. The 2 patients with neurogenic bladder did not require additional surgery.

Patient responses to the GRA scale are summarized in Fig. 1. Two patients died prior to administering the GRA scale, so there were only 11 respondents. Based on their responses, 5 patients had a successful therapeutic outcome (4 significantly improved, 1 somewhat improved), and 6 failed to respond to surgical conversion (4 significantly worse, 1 somewhat worse, 1 unchanged). The symptoms of the one living neurogenic bladder patient were unchanged. In the BPS/IC group, GRA responses were evenly split (4 significantly improved, 1 somewhat improved, 4 significantly worse, 1 somewhat worse). However, when the BPS/IC group was stratified to whether they had a concurrent cystourethrectomy, there was a trend towards superior symptom response with concurrent cystourethrectomy (2/3 improved) versus delayed or no cystourethrectomy (2/7).

**Discussion**

Patients with neurogenic bladder and BPS/IC can have debilitating symptoms despite conservative therapy, and may require surgical intervention in the form of an augmentation ileocystoplasty or a urinary diversion. We have presented the second series in the urological literature of patients converted to a urinary diversion utilizing the patch from the original bladder augmentation.

The first case report of this surgery was by Emmert and colleagues. In their case, the male paraplegic with a neurogenic bladder maintained renal function and normal upper urinary tracts after 2 years of follow-up. In a multicentre case series, Bissada and colleagues described successful clinical outcomes after 42 months; they tallied the mean follow-up of 29 patients who underwent urinary conduit creation using retubularized bowel from continent urinary diversions or enterocystoplasty. A sub-study of the patients

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**Table 3. Clavien-Dindo classification of surgical complications**

<table>
<thead>
<tr>
<th>Complication</th>
<th>Grade of complication</th>
<th>No. occurrences</th>
<th>Early/Late</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parastomal hernia</td>
<td>I</td>
<td>1</td>
<td>Late (1)</td>
<td>Observed</td>
</tr>
<tr>
<td>Small bowel obstruction</td>
<td>I</td>
<td>2</td>
<td>Late (2)</td>
<td>Treated conservatively</td>
</tr>
<tr>
<td>Wound infection</td>
<td>II</td>
<td>3</td>
<td>Early (3)</td>
<td></td>
</tr>
<tr>
<td>Peri-operative blood transfusion</td>
<td>II</td>
<td>2</td>
<td>Early (2)</td>
<td></td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>II</td>
<td>6</td>
<td>Early (1), Late (5)</td>
<td>Pyelonephritis (1), urosepsis (3)</td>
</tr>
<tr>
<td>Pyocystis</td>
<td>II</td>
<td>1</td>
<td>Late (1)</td>
<td></td>
</tr>
<tr>
<td>Stomal stricture</td>
<td>IIIa</td>
<td>1</td>
<td>Late (1)</td>
<td>Requiring regular stent changes</td>
</tr>
<tr>
<td>Colovesical/enteroconduit fistula</td>
<td>IIib</td>
<td>1</td>
<td>Late (1)</td>
<td></td>
</tr>
<tr>
<td>Parastomal hernia</td>
<td>IIib</td>
<td>4</td>
<td>Late (4)</td>
<td>Surgically repaired</td>
</tr>
<tr>
<td>Incisional hernia</td>
<td>IIib</td>
<td>2</td>
<td>Late (2)</td>
<td>Surgically repaired</td>
</tr>
<tr>
<td>Stomal retraction</td>
<td>IIib</td>
<td>1</td>
<td>Late (1)</td>
<td>Required revision of stoma</td>
</tr>
<tr>
<td>Ureteral stricture</td>
<td>IIIb</td>
<td>2</td>
<td>Late (2)</td>
<td>One patient developed CRI, one required ureteric reimplantation</td>
</tr>
</tbody>
</table>

*Based on Dindo et al.14 CRI: chronic renal insufficiency.
Grade I: Deviation from normal post-op course without pharmacological, surgical, endoscopic, or radiological intervention
Grade II: Requiring pharmacological treatment other than those allowed for grade I complications (e.g. analgesics); including TPN and blood transfusions
Grade IIIa: Surgical/endoscopic/radiological intervention not under general anesthesia
Grade IIIb: Surgical/endoscopic/radiological intervention under general anesthesia
Grade IV: Life-threatening complication requiring intensive care unit (ICUICU) management
Grade V: Death of a patient
Conversion to an ileal conduit urinary diversion

with IC was subsequently completed. The authors concluded that conversion from an enterocystoplasty or continent urinary diversion to a urinary conduit utilizing the original bowel segment yielded acceptable patient outcomes in this population, with no intraoperative or early postoperative complications.

The two populations of patients included in our series differed in terms of their indications for surgical conversion, but all had at least 1 symptom rated as severely bothersome. The primary indications for conversion in the neurogenic bladder and BPS/IC groups were intolerance of catherization with persistent incontinence, and ongoing LUTS or recurrent pelvic pain, respectively. Intra-operative and early complications were rare, with most complications being late-presenting and generally amenable to conservative or minor surgical therapy. The higher frequency of long-term complications in this series may reflect the longer follow-up period (mean 80 months), as well as the use of the Clavien-Dindo classification which more rigorously categorizes complications.

Interestingly, Fig. 1 shows the global response assessment responses. Significantly Improved, 4

Somewhat Worse, 1

Unchanged, 1

Somewhat Improved, 1

Significantly Worse, 4

Late complications are common, but typically low grade, in patients with neurogenic bladder and BPS/IC converted to an ileal conduit utilizing the retubularized patch from the initial augmentation ileocystoplasty. However, most patients will require subsequent surgical intervention and only half will be satisfied with their symptom response. Nevertheless,
several patients still achieve symptom control when no other treatment option is available to them. Therefore, in this population, surgical conversion offers several therapeutic advantages over creation of a de novo conduit and should be considered as a viable treatment option when other less invasive therapies have failed.

Competing interests: None declared.

This paper has been peer-reviewed.

References


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