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LONG-TERM FOLLOW-UP OF AUGMENTATION ENTEROCYSTOPLASTY FOR NEUROGENIC BLADDER DYSFUNCTION

Hypothesis / aims of study

Augmentation enterocystoplasty (AE) with an ileal patch was first described by Von Mickulicz in 1899(1). Since then different gastrointestinal segments have been described, such as colon (Lemoine, 1912), sigmoid (Bisgard, 1943), cecum (Couvelaire, 1950), and stomach (Leong, 1978). In 1959, Goodwin described the modern operative technique of using a detubularized ileal patch (2). The procedure has been used over the years for contracted bladders of any etiology. Its use in neurogenic bladder dysfunction (NBD) has decreased in recent years possibly (3) due to availability of other options such as botulinum toxin, but it is still an option in patients with refractory disease, either urinary incontinence (UI) and/or upper tract deterioration. There is still a need for eluciation of long-term experience in modern cohorts.

The aim of this ongoing study is to to review the management and long-term results in a cohort of 161 patients with NBD who underwent AE, primarily for UI.

Study design, materials and methods

This is a retrospective cohort study. The records of all patients treated at our institution with AE for hostile NBD over the last 30 years were reviewed. Most were referred from outside institutions and/or from a children's hospital after the age of 18. Evaluation included a history, with review of previous operative reports, physical exam, cystoscopy, imaging, and multichannel urodynamics. These were recorded in our database.

The procedures used for each patient were based on individual patient characteristics and needs. The goals of management were to establish a low pressure reservoir, continence, and upper tract improvement and/or stabilization. Long-term follow-up consisted clinic visits for kidney ultrasound and periodic cystoscopy, when possible.

Results

	Continent stoma		No continent stoma		Total
Urethral Procedure	Females	Males	Females	Males	
	65	20	31	45	161
BN tapering and sling	4	8	8	29	49
Sling	33		14	7	54
BN closure	9			2	11
No procedure	9	10	6	6	31

There were 161 patients, (mean age 33 y.) who underwent AC including, 65 males and 96 females. Spina bifida (82), spinal cord injury (52), MS (9) were the most common etiologies. Foley catheterization (66) and clean intermittent catheterization (44) with pads were the most common preop management methods. Twenty-one patients had ileal conduits and were undiverted. Pre-operatively, 30 patients had either moderate or severe hydronephrosis. Fifty-six patients (35%) had previous GU surgery.

Of the 161 patients, 85 underwent continent stomas (18 males and 62 females). Nearly all of these required bladder neck procedures. Of the 76 patients with AC alone (45 males and 31 females), the majority needed bladder neck procedures (Table).

Thirty patients needed concomitant ureteral procedures, including the 21 undiversions. There was a significant postoperative increase in mean bladder capacity (183 to 443 cc $p<0.0001$) and decrease on endfilling pressure (37 to 11 cm water, $p<0.0001$). Re-interventions were required in 48% of patients over time, most commonly for bladder stones (24%). Bladder stones were significantly more commonly seen in patients with continent stomas versus those without ($p<0.001$). All of the abnormal renal units stabilized or improved. Late re-interventions were also seen.

Successful term pregnancies (2 vaginal and 3 C-sections) were seen in 5 women.

Overall mean follow up time was 9.6 years (<1-31). Success regarding continence, persistence with intermittent catheterization, and stability of the upper tracts was seen in 138 patients (85.7%). Failures were treated with urinary diversion, indwelling catheters, and/or pads.

Bladder cancers developed in 4 patients at 4 to 15 years and all succumbed to metastatic disease despite follow-up.

Interpretation of results

AE is a useful option in patients with NBD who are refractory to less interventional treatment. It can also be offered as a means for undiversion from ileal conduits. AE is frequently only part of the reconstruction that addresses the urethral, ureteral, and intermittent catheterization access challenges. Reintervention is common, most of which are minor procedures. However, reoperations for continence, stomal problems, and diversion are possible. Although the risk of malignancy low, it is higher than in the general population but appropriate monitoring and follow-up are still to be determined. Despite these drawbacks, long-term success is substantial.

Concluding message

For patients with NBD, AE can be offered as a means of improving quality of life in selected patients. The approach and reconstructive procedures are complex. Long-term success is common but life-long followup is essential.

References
1. Mickulicz JA. Zentralbl Chir 1899; 26: 641.
2. Goodwin W E, Winter CC, and Barker WF. 1959; Surg Gynecol Obstet 108(2): 240-244.
3. Schlomer, B.J., Saperston, K. & Baskin, L. 2013; J Urol 190, 1352-1357.

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