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BLADDER MANAGEMENT, PATIENT SATISFACTION AND COMPLICATIONS IN SPINAL CORD INJURED PATIENTS AFTER AUGMENTATION ENTEROCYSTOPLASTY – A LONG-TERM FOLLOW-UP

Hypothesis / aims of study
To investigate the real world outcome after augmentation enterocystoplasty (AE) in spinal cord injured (SCI) patients with refractory neurogenic lower urinary tract dysfunction.

Study design, materials and methods
A total of 79 patients were included in this retrospective follow-up investigation in a single center. Among the patients the video urodynamic data, renal function, incontinence grade before and after AE, voiding pattern and management, clinical outcome, and complications were evaluated.

Results
Seventy-nine patients including 62 men and 17 women were included. The mean age at operation was 39.4 ± 11.6 years and the mean follow-up period was 128.4 ± 85.2 months (range, 1-293 months). At follow-up, 5 (6.7%) patients had spontaneous voiding, 60 (80%) had to perform clean intermittent catheterization (CIC), and 10 (13.3%) chose to keep the indwelling urethral catheter or cystostomy. The catheter depending rate was 93.3%, complete catheter dependent rate was 76%. The renal function did not show much deference after AE. Three patients developed end-stage renal disease and 4 patients had renal function decreased for more than 20% during the follow-up period. The incontinence grade showed much improved in symptom as 2.58 ± 0.95 preoperatively vs. 0.39 ± 0.81 postoperatively (p = 0.000). Among all patients 41.8% experienced recurrent urinary tract infection needing medical treatment and 21.5% of patients suffered from chronic diarrhea. Overall, 45.6% patients had experienced complications needing surgical interventions, most of them were urinary tract stones. Life-threatening complications like bowel obstruction, bladder cancer were also noted in some patients. The majority (86.8%) of patients reported moderate to excellent satisfaction with the outcome of AE.

Interpretation of results
The urodynamic parameters showed much improvement in voiding and storage function (Table 1). The incontinence was also much improved. Most patients depend on catheterization to void, the changes of voiding types was list in Table 2. The reason for the high rate of catheter usage is most likely because the majority of patients was neurogenic in nature (spinal cord injury or myelomenigocele), which impaired their bladder sensation or decreased their voiding efficiency, thereby making it necessary for them to perform CIC or long-term catheterization after AE. Due to the high rate of catheterization, associated high recurrent urinary tract infection may happen. The renal function change was able fifty to fifty, large amount decreasing was seldom. Several long-term complications well happen and need surgical interventions. The majority of surgical intervention comes from treatment of urinary stones. Some complications were life-threatening like bowel obstruction or bladder cancer. The complications and subsequent operations were list in Table 3.

Concluding message
AE is a procedure with long-term durability and high rates of patient satisfaction. However many bothersome complications could happen and effect on life quality. Patients might experience life-threaten complications. Both the patients and doctors need to think carefully before perform the operation.

Table 1. Baseline and follow-up surgical results in the NLUTD patients received AE

Bladder capacity (mL)	baseline	145.4 ± 88.8	p=0.000
	follow-up	472.7 ± 125.6	
Compliance (mL/cmH_2O)	baseline	8.21 ± 5.96	p=0.000
	follow-up	58.1 ± 51.1	
Voiding volume (mL)	baseline	52.7 ± 56.4	p=0.104
	follow-up	84.7 ± 151.6	
Qmax (mL/s)	baseline	3.69 ± 3.38	p=0.011
	follow-up	2.05 ± 4.78	
PVR (mL)	baseline	92.3 ± 86.3	p=0.000
	follow-up	425.1 ± 189.3	

AE: augmentation enterocystoplasty, Qmax: maximum flow rate, PVR: post-void residual urine

Table 2. The comparisons of voiding patterns before and after AE

		Baseline voiding pattern			
		Self-voiding	CIC	Foley catheter/ cystostomy	Total
Follow-up voiding pattern	Self-voiding	4(13.3%)	0	1(3.8%)	5(6.7%)
	CIC	21(70%)	18(94.7%)	21(80.8%)	60(80%)
	Foley catheter/ cystostomy	5(16.7%)	1(5.3%)	4(15.4%)	10(13.3%)
	Total	30	19	26	75

AE: augmentation enterocystoplasty, CIC: clean intermittent catheterization

Table 3. The major complications needing further surgical interventions in patients after AE

Complications	Operation	Case amount
Poorly compliant bladder, Urine extravasation	Revision	7
Bladder neck contracture	Transurethral bladder neck incision	5
Urethral stricture	Optic urethrotomy	6
Bladder stones	Cystolithotripsy	23
Upper urinary tract stone	percutaneous nephroscopic lithotomy	2
Recurrent pyelonephritis	Nephrectomy	1
Incontinence	Suburethal sling procedure	2
Detrusor overactivity/ Autonomic dysreflexia	Intravesical onabotulinumtoxinA injection	6
Difficult catheterization	Urethral onabotulinumtoxinA injection	2
Urethral fistula	Urethral fistula repair	2
Bladder cancer	Transurethral tumor resection	3
Adhesion ileus	Small bowel segmental resection	1

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