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LONG TERM FOLLOW UP OF AUGMENTATION CYSTOPLASTY IN PATIENTS WITH SPINA BIFIDA

Hypothesis / aims of study

Spina bifida is common cause of neurogenic bladder dysfunction in children. Most patients with neurogenic bladder are treated by conservative therapy with clean intermittent catheterization (CIC) and anticholinergic pharmacotherapy. However there are some patients in whom conservative therapy is not effective, and these patients need surgical management due to small bladder capacity, low bladder compliance, refractory urinary incontinence, and secondary vesicoureteral reflux (VUR). The aim of this study was to evaluate the outcomes and complications of augmentation cystoplasty in neurogenic bladder patients with spina bifida with at least 5 years of follow up.

Study design, materials and methods

Seven male and 12 female patients with spina bifida (16 meningomyelocele and 3 spinal lipoma) underwent augmentation cystoplasty between 1991 and 2004. The duration of follow up was over 5 years after the operation. The patient ages ranged from 3 to 35 years (mean 11.2 years). The indication for augmentation cystoplasty was low bladder compliance, small bladder capacity, secondary vesicoureteral reflux and persistent urinary incontinence despite conservative therapies. We performed 14 procedures for sigmoid cystoplasty and 5 procedures for ileocystoplasty with 5 simultaneous anti-reflux operations, 1 urethroplasty, and 1 Mitrofanoff. We did not perform anti-incontinence operation, except for in one patient (Table 1). We retrospectively evaluated the preoperative and postoperative urodynamic examinations and cystography, and the outcomes and complications of augmentation cystoplasty in the long term.

Results

The median duration of follow up after the operation was 100±45.1 months (mean±SD), with a range from 60 to 212 months. The bladder capacity increased from 95.8±62.0 ml (mean±SD), preoperatively, to 303.2±117.0 ml, postoperatively ($p<0.001$). Bladder compliance also increased from 4.9±2.6 ml/cmH_2O preoperatively to 21.9±16.2 ml/cmH_2O postoperatively ($p<0.001$). Preoperative and postoperative VUR included 22 ureters (15 patients) and 1 ureter, respectively. Of 19 patients, 17 exhibited urinary incontinence before the operation, and 10 continued to exhibit urinary incontinence (4 patients had a small volume of urinary incontinence) after the operation. Preoperative and postoperative micturitional management courses are presented in Table 2. Preoperative renal function of all patients indicated by serum creatinine less than 1.2 mg/dl, but one patient increased serum creatinine to 1.6 mg/dl after the operation. Four of 19 patients exhibited bladder stones (3 sigmoid cystoplasty and 1 ileocystoplasty) after augmentation cystoplasty in the long term. All the patients with bladder stones underwent transurethral lithotripsy and 3 of 4 patients developed bladder stones more than two times (1 patient with ileocystoplasty and 3 patients with sigmoid cystoplasty, respectively). One patient who underwent sigmoid cystoplasty experienced bladder perforation 17 months after the augmentation. The patient had undergone CIC after the augmentation and the bladder perforation occurred naturally and the patient underwent emergency operation. Eight of 19 patients developed febrile urinary tract infection (UTI) postoperatively in the long term. However, none of the patients who developed febrile UTI exhibited recurrence during the long term (most patients became febrile only once). Two of 14 patients who underwent sigmoid cystoplasty developed metabolic acidosis and ingested citric acid every day. There was no infection of V-P shunt after the operation. We conducted routine cystoscopy, 10 years after the operation, to investigate the possibility of augmentation bladder tumor and none of the patients exhibited augmentation bladder tumor.

Table 1
Characteristics of patients who underwent augmentation cystoplasty

Age at augmentation		3-35 (median 10) years old
Sex		
Male		7
Female	12	
Diagnosis		
Meningomyelocele		16
Spinal lipoma		3
Hydrocephalus (V-P shunt)		5
Duration of follow up (months)		60-212 (median 100)
Operative methods		
Sigmoid cystoplasty		14
Ileocystoplasty		5
Anti-reflux operations		4 patients (5 ureters)
Urethroplasty		1
Mitrofanoff		1
Anti-incontinence operation		1

Table 2
Urodynamic results and micturition management

	Pre operation	Post operation	p-Value
Bladder capacity (ml) (mean±SD)	95.8±62.0	303.2±117.0	<0.001

Bladder compliance (ml/cm H_2O)	4.9±2.6		21.9±16.2	<0.001
VUR (ureters/patients)		22/15		1/1
Micturition management				
Transurethral Foley catheterization	8		1	
Cystostomy		2		0
CIC		6		15
CIC + spontaneous micturition		1		3
Spontaneous micturition		2		0

Interpretation of results

In this study, augmentation cystoplasty was able to increase bladder capacity and bladder compliance, and improved VUR in the long term. Augmentation cystoplasty improved urinary incontinence comparatively, but could not completely improve urinary incontinence. It seems that augmentation cystoplasty has limited capacity to improve urinary incontinence. The late complications of augmentation cystoplasty include bladder stones, bladder perforation, mild renal failure, febrile UTI, and metabolic acidosis. However, this method can be durable and relatively safe in the long term.

Concluding message

Augmentation cystoplasty for patients with spina bifida was durable and relatively safe in the long term. However there were some complications, such as bladder stones, bladder perforation, febrile UTI, renal dysfunction, urinary incontinence and metabolic acidosis. It is important to continue careful postoperative follow up over long-term.

Specify source of funding or grant	**nothing**
Is this a clinical trial?	**No**
What were the subjects in the study?	**HUMAN**
Was this study approved by an ethics committee?	**No**
This study did not require eithics committee approval because	**This study was retrospective study. In our institution, there is no need to pass the ethics committee approval in case of retrospective study based on medical records.**
Was the Declaration of Helsinki followed?	**Yes**
Was informed consent obtained from the patients?	**No**