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APPLICATION OF CHURCHILL'S CLASSIFICATION TO NEUROGENIC BLADDER IN THE PEDIATRIC PATIENTS WITH SPINA BIFIDA

Aims of Study

Although there were various classifications for neurogenic bladder, Churchill has recently proposed newly simplified classification (type I-V) of the bladder in children with spina bifida. We studied retrospectively whether this classification reflects characteristics in clinical state and helps to determine the best corrective surgical procedure in the patients of spina bifida clinic.

Methods

Patient population consisted in 148 lipomenigomyelocele and 92 meningomyelocele patients. Mean age was 8 years and 9 months old (range: 10 months – 24 years). All the patients received urodynamic study at least one time. According to Churchill's classification we classified the bladder based upon filling, holding and voiding abnormality (type I – normal in all three components, type II – voiding inability only but others normal, type III – filling normal but holding and voiding inability, type IV – abnormal in all three components and type V – holding normal but filling and voiding abnormal). Abnormal filling was defined if there was found low compliance (end filling pressure: >20 cmH2O during filling stage) at the second cystometry. During the first cystometry the infusion rate per minute was 10% of functional bladder capacity [(Age + 2) x 30 ml]. In less than one-year-old baby, however, the infusion rate per minute was 5 ml/min. During the second cystometry the infusion rate per minute was 10% of maximum cystometric capacity which could get from the first cystometry. Holding inability was defined if there was clinical incontinence (except urge incontinence due to uninhibited detrusor contraction) despite proper intermittent catheterization and bladder relaxant drug therapy. This definition of holding inability is somewhat different from the original Churchill's definition. He used less than 40 cmH20 bladder leak point pressure for the criteria of holding inability. Renal damage was expressed as A – D according to severity (A – unilateral polar defect, B – unilateral multiple, C – bilateral and D – renal failure state) based upon DMSA renal scan, renal ultrasonography and blood chemistry test.

Results

Ninety patients belonged to type I. Among them 37 patients showed hyperreflexia. Five (6 %) out of ninety type I patients had renal damage (A in 1, B in 3 and D in 1 patient). Thirty-three patients had type II bladder and most patients (30 patients) had hyperreflexia. Seven type II patients (21%) had renal damage (A in 3, B in 3 and D in 1 patients). Two patients received vesicostomy to prevent from further renal damage in this group. Type III was found in 5 patients. All the patients had normal kidney. Among them, one patient received ileal augmentation and bladder neck closure (Ileal+BNC) and another one patient received ileal augmentation and rectus sling procedure (Ileal+Sling). Type IV was found in 55 patients. Among them, 33 patients had hyperreflexia. Renal damage was found in 11 (20%) type IV patients (A in 8, B in 1, C in 1 and D in 1 patient) Seven patients received augmentation (6 ileal and 1 gastro) and BNC simultaneously. Eight patients received augmentation (Aug) and bladder neck (BN) plasty (6 sling, 1 Salle and 1 Young-Dees). Three out of these 8 patients (Aug + BN plasty) had successful continence postoperatively. Two patients underwent ileal augmentation only but incontinence continued postoperatively. One patient is vesicostomy state.

Fifty-seven patients had type V bladder. Among them, hyperreflexia was found in 30 patients. Renal damage was found in 25 (44%) type V patients (A in 6, B in 9, C in 3 and D in 7). Ten patients received ileal augmentation and 4 patients received gastrocystoplasty. And one patient underwent sigmoid cystoplasty. All the type V patients who had augmentation cystoplasty maintain continence state postoperatively. Another five patients are vesicostomy state. Regarding pre-operative continence state all the type III and type IV patients needed diaper despite frequent intermittent catheterization and bladder relaxant drug therapy. Type I, II and V patients, however, was enable to maintain continence state with proper intermittent catheterization and drug therapy.

Conclusions

From the above data, we can classify neurogenic bladder in the pediatric patients with spina bifida by Churchill's classification. Individual type showed characteristics of clinical state. And this classification seems to help to determine the best corrective surgical procedure in individual neurogenic bladder type of the pediatric patients with spina bifida.

References

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