

## RENAL FUNCTION AND URODYNAMIC EVALUATIONS IN MYELOMENINGOCELE RELATED NEUROGENIC BLADDER MANAGED WITH CLEAN INTERMITTENT CATHETERIZATION

### Hypothesis / aims of study

Patients with myelomeningocele are at risk of deterioration of renal function due to neurogenic disorder of the bladder. The common goal in caring for such patients is prevention of progressive renal damage. We evaluated renal function and bladder function in patients with myelomeningocele in whom symptoms were managed with clean intermittent catheterization (CIC) and anticholinergic therapy.

### Study design, materials and methods

We enrolled 32 patients who had undergone CIC for more than 2 years. These patients underwent video-urodynamic studies, excretory urography, ultrasonography, and radionuclide scintigraphy. We evaluated detrusor leak point pressure (DLPP) and vesicoureteral reflux (VUR) on video-urodynamic studies and hydronephrosis on excretory urography or on ultrasonography. Renal function was measured by dimercapto-succinic acid (DMSA) uptake. We defined impaired renal function as total DMSA uptake of less than 30%. Patients with DLPP of over 40 cm water were classified as the low DLPP group, and those aged over 13 years old were classified as the young adult group.

### Results

All patients were undergoing anticholinergic therapy. Patient age ranged from 2 to 32 years (mean age 15.0 years). The young adult group consisted of 18 patients (56.3%). Twenty-seven patients had started CIC before the age of 8 years; mean duration of CIC management was 9.6 years (range: 2-24 years). Of the 32 patients, 14 had a history of urinary tract infections (UTIs), 12 had exhibited VUR, and 9 had exhibited hydronephrosis. During management with CIC and anticholinergic therapy, VUR had resolved in 5 patients.

The low DLPP group consisted of 21 patients (65.6%). DLPP was higher in patients with hydronephrosis ( $P<0.05$ ), however, it did not differ significantly in patients with history of UTI or in those with VUR. Total DMSA uptake ranged from 19.0% to 62.5% (mean uptake 33.4%), and that in the patients with resolution of VUR ranged from 24.7 % to 40.0% (mean uptake 32.8%). Sixteen patients (50.0%) had impaired renal function. Total DMSA uptake gradually decreased with age, and it did not differ significantly in patients with hydronephrosis or VUR, or in those with a history of UTI. Total DMSA uptake in the young adult group was significantly lower than that in patients less than 13 years old. Of the 13 adults with impaired renal function, 7 had a history of UTI (53.8%), and of these, 4 had low DLPP.

### Interpretation of results

Many of the patients with high bladder storage pressure had hydronephrosis. In these patients, bladder deformity and VUR progressed and the risk from upper urinary tract damage was high. Adult myelomeningocele patients with low bladder storage pressure could not maintain normal renal function. Although these patients might have exhibited congenital nephropathy, about half of these patients with impaired renal function had a history of UTI. Thus prevention of UTI becomes a more serious problem in patients with renal damage.

### Concluding message

Our study demonstrates that adequate urological management is required for the prevention of progressive urinary tract deterioration. In young adults with myelomeningocele, morphological and urodynamic evaluations alone are insufficient; monitoring of renal function is necessary for urological management to prevent progressive renal damage.

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**HUMAN SUBJECTS:** This study did not need ethical approval because this study was not invasive. but followed the Declaration of Helsinki Informed consent was obtained from the patients.