

RENAL FUNCTION AND URODYNAMIC EVALUATIONS IN ADULT SPINA BIFIDA PATIENTS

Hypothesis / aims of study

Patients with spina bifida are at risk of renal function deterioration due to neurogenic disorders of the bladder. However, the effect of puberty on renal function is poorly documented. We evaluated renal and bladder function in adult patients with spina bifida who were managed with clean intermittent catheterization (CIC) and anticholinergic therapy.

Study design, materials and methods

Methods: We enrolled 22 spina bifida patients aged 18 or older. These patients underwent video-urodynamic studies, ultrasonography, and radionuclide scintigraphy. We evaluated vesicoureteral reflux (VUR), bladder deformity, and detrusor leak point pressure (DLPP) on video-urodynamic studies and assessed hydronephrosis by ultrasonography. Renal function was measured by dimercapto-succinic acid (DMSA) uptake. No patients started CIC before age 3. Patients who started CIC at age 6 or younger were classified as the early start group and those who started at age 7 or older were classified as the late start group. DLPP less than 40 cm water was classified as low. We defined impaired renal function as unilateral DMSA uptake of less than 15% or total DMSA uptake of less than 30%. The relative DMSA uptake was calculated by the formula: relative uptake = uptake in the right kidney / total uptake x 100%. Symmetrical nephropathy was defined as relative DMSA uptake from 40% to 60%.

Patients: Patient age ranged from 18 to 36 years (mean age 22.1 years). Of the 22 patients, 12 had a history of febrile urinary tract infections (UTIs). Two had undergone previous operations for VUR. The early CIC start group consisted of 10 patients (45.6%).

Results

Of the 22 patients, 7 had VUR, 7 had hydronephrosis, and 11 had bladder deformity. Twelve had no hydronephrosis and no bladder deformity. Low DLPP was found in 16 patients (72.7%). DLPP was higher in patients with hydronephrosis ($P < 0.05$); however, it did not differ significantly according to history of UTI or presence of VUR. Total DMSA uptake ranged from 21.5% to 34.5% (mean uptake 26.8%), and 18 patients (81.8%) had impaired renal function. Eleven patients had symmetrical nephropathy, while 7 had unilateral nephropathy. Total DMSA uptake gradually decreased with age. It did not differ significantly according to presence of hydronephrosis or VUR, history of febrile UTIs, or time of starting CIC. However, it was significantly lower in those with high DLPP ($p < 0.05$). After 2 years 14 patients underwent re-evaluation of renal function by radionuclide scintigraphy. One patient was found to have newly impaired renal function.

Interpretation of results

Adult spina bifida patients with low bladder storage pressure could not maintain normal renal function. Several factors might account for this. As one of these was starting CIC later, starting therapy soon after birth could help safeguard renal function. Moreover, some teenage patients might not comply with CIC regimens to keep bladder pressure low. About half the patients with impaired renal function had a history of febrile UTIs; hence, prevention of UTI appears to be a more serious problem in patients with renal damage.

Concluding message

Our study demonstrates that, to prevent renal damage, regular monitoring of renal function is necessary in addition to imaging and urodynamic studies. If signs of early renal dysfunction appear, it is important to improve overall urinary tract management.

<i>Specify source of funding or grant</i>	No External Funding
<i>Is this a clinical trial?</i>	No
<i>What were the subjects in the study?</i>	HUMAN
<i>Was this study approved by an ethics committee?</i>	No
<i>This study did not require ethics committee approval because</i>	This study was not invasive, but followed the Declaration of Helsinki.
<i>Was the Declaration of Helsinki followed?</i>	Yes
<i>Was informed consent obtained from the patients?</i>	Yes