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Original Article

Renal Involvement in Children with Spina Bifida

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ABSTRACT. Renal scarring and renal failure remain life-threatening for children born with spinal dysraphism. An early start of therapy helps to safeguard renal function for such children and avoid end-stage renal disease. However, optimal care is not always available in developing countries. We reviewed our data on all newborns with spina bifida who were born at King Abdulaziz University Hospital between 1997 and 2006. Thirty-three children with myelomeningocele (MMC) were evaluated; MMC site was thoracolumbar in 26 patients (77.1%) and in the lumbosacral area in 7 patients (22.9%). The mean age at the time of evaluation was 5.4 ± 2.3 years. Thirty (90%) patients presented with neurogenic bladder, and 26(78%) with vesico-uretral reflux (VUR). Only 8 patients (group A) received clean intermittent catheterization (CIC), while the rest (group B) were either non-complaint or not on any therapy. Urinary tract infections overall were 4.5 ± 3.8 per year. Patient undergoing CIC had a lower number of UTI (mean per year) 3.3 ± 1.2 vs 6.6 ± 2.3. Sixty two percent of group A had VUR compared with 93% in group B. The mean creatinine was 46 ± 39 µmol/L for the whole group. However, group A had a lower mean creatinine 38 ± 11 compared to 50 ± 34 in group B. In conclusion, early intervention to relieve urinary retention in children born with spina bifida resulted in preserving renal function and less incidence of VUR and UTI. There is a need of more awareness about the importance of starting proactive treatment of risks of upper urinary tract disease and development of renal failure in babies with spina bifida.

Keywords: Spina bifida, VUR, Reflux, Infection, Urinary, Renal failure

Introduction

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Neuropathic bladder caused by spina bifida remains an important cause of chronic renal failure in developing countries.[1-3] In contrast, recent reports from western countries showed that children born with spina bifida can avoid such complication if they are provided adequate urological intervention.[4] Early therapy with clean intermittent catheterization to decrease intravesical pressure is the preferred treatment, and

antimuscarinic agents to counteract detrusor instability[5-6] help in safe guarding renal function for such children.

Optimal therapy is not usually available for children living in developing or underdeveloped countries. Furthermore, the incidence of spina bifida is still high in the kingdom of Saudi Arabia despite the recent fortification of flour with folic acid.[7-9]

In this study, we aim to investigate the urological complications in spina bifida children who were born and followed up at our institution, and discuss the possible causes for high percentage of renal complications.

Patients and Methods

All babies born with spina bifida at King Abdulaziz University hospital (KAUH) between 1997 and 2006 were included in the study. Referred patients were not included.

The clinical notes of the babies were reviewed. We have studied the type of treatment, antimuscarinic agents, clean intermittent catheterisation (CIC), and antibiotic prophylaxis. Renal function, ultrasound, micturating cystourethrogram (MCUG), DMSA scan, serum creatinine, and bladder function (urodynamic studies) were evaluated.

Results

Data of 33 children with myelomeningocele (MMC) were evaluated. MMC site was thoracolumbar in 26 (77.1%) patients and in the lumbosacral area in 7 (22.9%).

The mean age at the time of evaluation was 5.4 ± 2.3 years. Sixteen (48%) children were Saudi and the rest (52%) were non-Saudi. Most of the non-Saudi group was from poor socioeconomic background. Fourteen children were from outside the city

Ninety percent (30 patients) were diagnosed as neurogenic bladder and 26(78%) patients diagnosed to have vesico-uretral reflux (VUR). Ten children had unilateral VUR and the remaining 16 had bilateral VUR. Only 8 (24%) patients (group A) received clean intermittent catheterization (CIC), while the rest (group B) were either non-complaint or did not receive it. Oxybutinin was used only by 18 children (55%) and the rest were not prescribed any medication to reduce the intravesical pressure.

The mean number of urinary tract infections per year was 4.5 ± 3.8. Patient who received CIC had a lower number of UTI of a mean 3.3 ± 1.2 compared with 6.6 ± 2.3. Sixty-two percent of group A had VUR compared with 93% in group B. Twelve (36%) patients had evidence of renal scars (10 in one kidney and 2 had scars in both kidneys). Children with scared kidneys (92%) were all except one from group B. One child had a single left kidney.

The mean creatinine was 46 ± 39 µmol/L. Group A had a lower mean creatinine 38 ± 11 compared to 50 ± 34 µmol/L in group B. One patient progressed to chronic renal failure at 6 years of age (creatinine was 146 µmol/L). Seven patients were lost to follow-up.

Discussion

Our results demonstrate that our studied spina bifida children developed a considerable renal damage at an early age. This is different from reports from western countries; 36% of our cohort had scared kidneys at 5 years of age, while Dik et al have reported recently that only 6 out of 144 (4%) children with spina bifida had evidence of renal scars at the age of six years.[4] Lewis et al in 1994, reported that the prevalence of renal parenchymal damage was 19.4% with higher prevalence of parenchymal damage in children over 10 year of age (27.3%), twice that of the 13.3% under 5 years of age.[10]

The cause of higher incidence of renal damage in our cohort could be explained by the delay in proper management, as regular emptying of the bladder was not commenced early and anticholinergic drugs were not instituted in considerable number of the children. Furthermore, the lack of good medical follow-up and management including early diagnosis and treatment of acute pyelonephritis could also have contributed to the worse outcome in these patients. This is caused by the lack of multi-

disciplinary specialized spina bifida clinics where children have an easy access. Establishing such clinics, would help to reduce this observed delay in commencing the appropriate management to protect the kidneys. However, our cohort is rather disadvantaged group as many of them came from poor socio-economic background resulting in non-compliance issues.

Early investigation and management of neurogenic bladder is crucial to protect the kidneys.[4,11] Early start of CIC is the most important factor to avoid renal damage. It was reported that the prognosis of children with upper renal tract changes at birth did not seem to be any worse than children developing changes later in life.[12] Five of the 6 patients with renal scarring in Dik et al report, were started on therapy with intermittent catheterization and antimuscarinic therapy several months after birth.

CIC is not accepted by many families as modality of therapy. It has psychosocial impact on the treated children and their families[13,14] and probably the rejection to this form of treatment is more common in Arab cultures like ours. Furthermore, advice from the practitioners of alternative medicine and lack of update knowledge of health care professionals to delay the CIC was also a major factor.

Our Group B patients, who were not receiving CIC, had a higher incidence of VUR, UTI and renal scars. One patient from this group progressed to renal failure at an early age.

One patient of our cohort was reported to have a single kidney. Whitaker et al, reported three decades ago the prevalence of renal anomalies in spina bifida patients to be around 8.9%.[15] They observed also that renal agenesis was associated with a sensory level in the dermatomes T5-8, horseshoe kidneys with T9-L1 and duplications predominantly with the sacral dermatomes. However, Hulton et al, reported few year later similar prevalence of renal abnormalities, but a consistent pattern was not confirmed.[16] It was also shown by previous investigators that children with spina bifida, but without a history of intrinsic renal disease, have small kidneys when compared with age-matched standard renal growth charts.[17,18] This further stresses the need for an aggressive approach for optimal care of the bladder to protect already compromised kidneys.

In conclusion, we have shown that the lack of an early therapy in form of CIC resulted in a considerable morbidity at young age in children born with spina bifida. Children with poor compliance had higher incidence of VUR and UTI. There is a need of more awareness about the importance of starting proactive treatment to prevent renal damage in babies with spina bifida.

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