Case report

Bladder outflow obstruction in a male infant

The most common causes of bilateral hydronephrosis in infants are posterior urethral valves, bilateral vesico-ureteric reflux, bilateral pelvi-ureteric junction obstruction or uretero-vesical junction obstruction. If ultrasound findings show a distended bladder with or without a distended posterior urethra, the most likely diagnosis is posterior urethral valves.

Background

History

A 6-month-old male infant was referred to our department with bladder outlet obstruction, associated with acute pyelonephritis, with a urethral catheter *in situ*.

Perinatal history

The mother of the child is a 39-year-old healthy woman from KwaNdebele in Mpumalanga. This was her fourth pregnancy. The other siblings were healthy. Her pregnancy was uneventful and no antenatal ultrasound had been done. The mother had a normal vaginal delivery at term with no complications during or after delivery. The child's birth weight was 3 kg and the Apgar scores were normal.

Clinical examination

On general examination the child did not look acutely ill. He was not clinically anaemic and was well hydrated. General examination was unremarkable. He was, however, small for age.

On abdominal examination his kidneys were palpable and the right kidney was enlarged. The bladder was also palpable. His genitalia were normal and both testes were palpable in the scrotum. Neurological examination was normal. He had good sphincter tone and examination of his back did not reveal any stigmata of a spinal dysraphism. Cardiovascular and respiratory examinations were normal.

A urinary dipstick test revealed 1+ protein and 2+ leucocytes. The microscopy, culture and sensitivity cultured *Eschericia coli* sensitive to cefuroxime and amikacin.

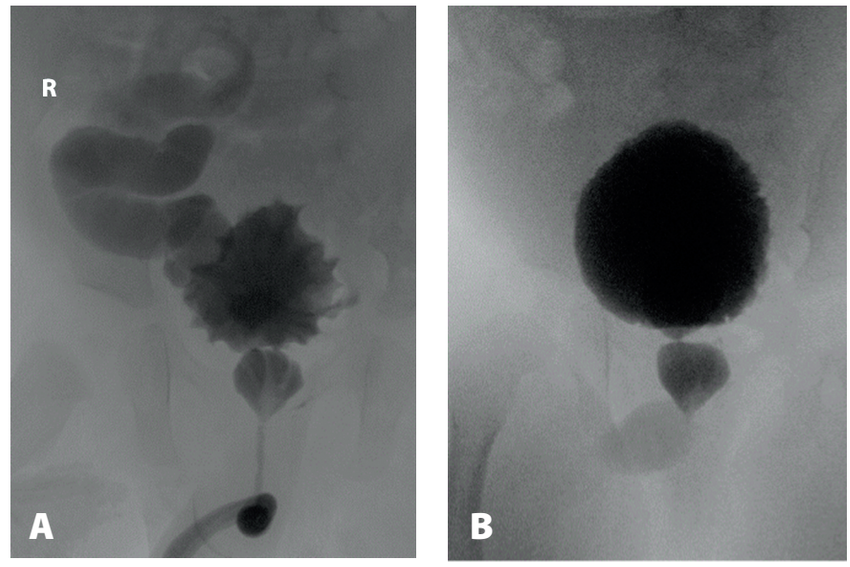

Fig. 1. A: Voiding cysto-urethrogram showing reflux on the right and a trabeculated bladder. B: Bladder with distended posterior urethra and bladder neck hypertrophy.

Special investigations

Special investigations showed the following: blood chemistry – Na 117 mmol/l, K 6.7 mmol/l, urea 39.9 mmol/l, and creatinine 432 µmol/l; full blood count – haemoglobin 9.2 g/dl, and white cell count 25.2 x 10^9/l with 74% neutrophils.

A renal ultrasound showed bilateral severe hydronephrosis and hydro-ureter. The renal parenchyma was dense, with no corticomedullary differentiation. The bladder wall was thickened and irregular.

The infant was catheterised to relieve the obstruction and kept on free drainage via an 8F urethral catheter. Once the infection had cleared, a voiding cysto-urethrogram was done, which revealed bilateral grade V vesico-urethral reflux with tortuous ureters. The bladder was trabeculated with a diverticulum. The posterior urethra was dilated with radiological signs of bladder neck hypertrophy (Fig. 1).

The final diagnosis was that of posterior urethral valves with bilateral grade V vesico-ureteric reflux.

Management

Once the infant was stable, he was prepared for theatre. A cutaneous vesicostomy was done, i.e. a urinary diversion, with the opened bladder sutured to the skin to drain the upper tracts to allow the renal function to improve and the child to grow. Six months later, ablation of the posterior urethral valves and vesicostomy closure was carried out.

What to look out for

The diagnosis of posterior urethral valves can and should be made antenatally. The obstruction to urine outlet will lead to decreased output by the fetus and results in oligohydramnios. The observation of hydronephrosis, marked dilatation of the bladder and increased bladder wall thickness must raise the suspicion of posterior urethral valves.

Children who present later in life usually have urinary tract infection or voiding dysfunction, or fail to thrive.

Follow-up of patients with posterior urethral valves

Patients with previously treated posterior urethral valves need life-long monitoring. They often have bladder dysfunction ('valve bladder') secondary to poor bladder sensation and compliance, detrusor instability and polyuria. They also struggle with incontinence during the day and night. Between 10% and 47% of these patients develop end-stage renal failure and will need renal transplantation.

Key guidelines

Perinatal ultrasound is used to grade hydronephrosis, as recommended by the Society for Fetal Urology (SFU). Ultrasound that shows bilateral uretero-hydronephrosis, and a thick distended bladder with or without a dilated urethra (keyhole sign), is suggestive of posterior urethral valves.

There is not always obstruction with hydronephrosis; the clinician has to determine the presence of obstruction and the risk of renal damage.

Differential diagnosis of antenatal hydronephrosis

- Pelvi-ureteric junction obstruction.
- Bilateral vesico-ureteric reflux and bilateral vesico-ureteric obstruction.
- Transient and physiological hydronephrosis.

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