Lower urinary tract obstruction in male children – a report of three cases.

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Abstract

Urinary retention in young children and infancy is relatively rare. The commonest malignancy cause of bladder outlet obstruction in infancy is prostatic rhabdomyosarcoma; the commonest cause of congenital bladder outlet obstruction in a male infant is posterior urethral valve and the commonest cause of urethral obstruction in male children is urethral calculi. We present here a report on three cases of urethral obstruction in male children.

Keywords: urethra, urine retention, posterior urethral valve, calculi, rhabdomyosarcoma.

Introduction

Urinary retention in the young child and infancy is relatively rare. Urethral obstruction can occur at the prostatic, bulbomembranous, or penile urethral levels. The commonest malignancy to cause bladder outlet obstruction in infancy is prostatic rhabdomyosarcoma (RMS). The commonest congenital disease to cause outlet obstruction in a male infant is posterior urethral valve (PUV) and the commonest cause of lower urinary tract obstruction in male children is urethral calculi of which penile urethral calculi is more common than posterior urethral calculi [1,2,3]. We present here three paediatric cases with lower urinary tract obstruction due to prostatic RMS, PUV, and calculus.

The ultrasound examinations were performed using the Logiq P5, GE Milwaukee US and Philips HD7, Bothell, WA, USA diagnostic ultrasound system.

Prostatic urethral obstruction

Case 1: Lower urinary tract obstruction due to a prostatic mass (embryonal RMS) in an infant.

A 9 month old male child presented with a history of acute onset of urine retention. Ultrasound examination evidenced a large solid mass of prostate with bladder distension (fig 1a); the mass showed good internal vascularity (fig 1b). Both the kidneys were seen to have dilatation of the pelvicalyceal system with preserved cortical thickness and echogenicity (fig 1c). Histological examination proved to be an embryonal RMS.

Bulbomembranous urethral obstruction

Case 2: Lower urinary tract obstruction due to PUV.

A 1 month old male infant presented with a lump in the suprapubic region. On physical examination the suprapubic lump extended above the level of the umbilicus and was soft and had a smooth outline. An ultrasound examination was advised. Transabdominal ultrasound evidenced bilateral hydroureteronephrosis and the bladder was distended with a keyhole appearance (fig 2a-d). Transperineal ultrasound showed evidence of dilated posterior urethra suggestive of PUV (fig 2e,f). A 6F infant feeding tube was easily negotiated into the bladder.

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Fig 1. Sonography in bladder outlet obstruction due to prostatic mass (embryonal rhabdomyosarcoma) in a 9 month old male infant with bilateral hydroureteronephrosis: a). ultrasound using curvilinear probe show a inhomogeneous solid mass (M) in the region of the prostate, without calcification. Ascites (Asc) is seen; b) Colour Doppler imaging of the mass lesion (M) shows moderate internal vascularity; c) both kidneys show mild hydronephrosis with preserved cortical thickness and normal echogenicity, no perinephric fluid, and smooth renal outline.

Fig 2. Sonography of a 1 month old male infant with a posterior urethral valve: a) and b) Transabdominal ultrasound (TAS) using a transvaginal sonography (TVS) probe showing long section of the right (rk) and left (lk) kidneys with hydronephrosis, echogenic cortex, and accentuated corticomedullary differentiation. Note the right pleural effusion (PE); and left perinephric urinoma (U); c) TAS using a TVS probe showing a true sagittal sonographic image of the grossly distended urinary bladder (UB) with dilated posterior urethra (PU) known as a keyhole sign; d) TAS using curvilinear probe showing the axial section of the urinary bladder (UB) with the dilated lower ureters (RU-right ureter, LU- left ureter); e) Transperineal perineal sonography (TPS) using linear probe showing dilated prostatic urethra (PU), dilated internal sphincter (IS), dilated external sphincter (ES) with dilated and blunt ended proximal bulbous urethra (BU); f) TPS showing collapse external sphincter (ES) with collapse proximal bulbous urethra (BU).

Fig 3. Sonography of bladder outlet obstruction due to the anterior penile urethral calculus causing bilateral hydro-ureteronephrosis in a 9 year old male child: a) and b) Sonography using a curvilinear probe showing mild hydronephrosis of the right and left kidneys preserved cortical thickness and echogenicity; c) Pelvic sonography using curvilinear probe showing the distended urinary bladder (UB) with mildly dilated bilateral lower ureters (U); d) Perineal sonography using a transvaginal probe show dilatation of the bulbous urethra (BU) and penile urethra (PU) proximal to an obstructing calculus (Cal); e) Sonography using a linear probe evidencing the calculus (Cal) measuring 7.1 mm in long section in the anterior penile urethra (PU).

Penile urethral obstruction

Case 3: bladder outlet obstruction due to penile urethral calculus

A 9 year old male child presented with a 1 day history of urine retention with penile pain. Abdominal ultrasound evidenced distended urinary bladder with bilateral hydroureteronephrosis (fig 3a-c). Local ultrasound examination of the penile shaft showed an impacted calcu-

lus in the anterior penile urethra measuring more than 7 mm with proximal fluid filled dilated urethra (fig 3d-e). The calculus was pushed back into the bladder and an elective suprapubic cystolithotomy was planned.

Discussions

RMS is the most common paediatric soft-tissue sarcoma and constitutes 51% of all paediatric soft tissue

tumours. Approximately two thirds of rhabdomyosarcomas are embryonal in type, and the remainder are almost evenly divided between the alveolar type and not otherwise specified [4]. The majority (83.2 %) of RMS occur in children less than 10 years of age, 68.3 % of all childhood RMS occur in the male child, and about 43.5 % of all childhood RMS arises from the genitourinary tract in childhood [5].

PUV is a congenital obstruction of the posterior urethra. It is the commonest cause of bilateral renal obstruction in the lower urinary tract in male infants. Perineal sonography is a very sensitive technique for the detection of this pathology. In comparing routine pelvic and transperineal sonography in the diagnosis of PUV it was found out that transperineal imaging can aid in the diagnosis of PUV and may enable imaging of the valve itself [6]. Transperineal ultrasound is used to demonstrate dilatation of the posterior urethra also known as the “keyhole” sign.

Long standing bladder outlet obstruction in utero will lead to dysplastic changes with increased cortical echogenicity or perirenal urinoma as seen in our case. Urinary ascites can also result from long standing obstructive uropathy. PUV is a common cause of urinary ascites in the newborn [7].

According to the Young classification, there are three types of PUV. Our case is a type III PUV with a diaphragm oriented perpendicular to the urethra and having a small opening.

In a review of the radiology database on the sonographic diagnosis of urethral anomalies in infants, Helmut Schoellnast et al found that the overall sensitivity of urethral sonography for detection of urethral anomalies was 100%; specificity, 94%; positive predictive value, 58%; negative predictive value, 100%; and accuracy, 94% [8].

In children less than 14 years, lower urinary tract stones were found to constitute 27.9 % of all causes of acute retention. The incidence of lower urinary tract stones was 5.5-fold in boys [2]. Of all impacted urethral calculi in children less than 12 years, the site of impac-

tion was more common in the anterior than the posterior urethra. Stones in anterior urethra are either removed by meatotomy or urethrolithotomy, while stones in the bulbous and posterior urethra are usually pushed back into the bladder and later performed by suprapubic vesicolithotomy [3].

In conclusion abdominal ultrasound plays a major role in the investigation of lower urinary tract obstruction in male children and this along with transperineal sonography helps in giving a more reliable diagnosis in urethral lesions.

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