Percutaneous Cystolithotripsy in the Management of Vesical Calculi in Children

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We describe a technique for removal of vesical calculi in children through a percutaneous approach. The technique was performed easily and successfully in six children. Convalescence was uneventful. The technical details and the advantages of this approach are outlined and discussed.

The standard treatment for urolithiasis in children has been surgical removal.1–5 Recently, newer techniques such as percutaneous nephrolithotripsy (PCN)6–7 and extracorporeal shock wave lithotripsy (ESWL)8–10 have been used successfully for upper urinary tract stones in children. However, vesical calculi in children were not accessible to ESWL, therefore this procedure was not attempted in the management of those stones. We report the successful removal of vesical stones from four children using a percutaneous suprapubic approach. This technique is a modification of the one described by Badlani et al.12

Technique
After induction of general anaesthesia, the patient was placed in the supine position. If the condition indicated, a cystoscopy was done first in the lithotomy position. A size 8F Foley catheter was inserted and the bladder was filled with 100–150 ml of saline.

The catheter remained connected to the irrigation giving set. An 18 gauge angiocatheter was inserted two fingers-breadth above the symphysis pubis into the distended bladder. The needle was withdrawn leaving the sheath in place. An 0.038-inch guide wire was then inserted through the angiocatheter sheath into the bladder; X-ray control was not needed. A 5–10 mm longitudinal skin incision was made. Amplatz dilators were then used to dilate the tract up to size 12F. An angiography catheter was then slid over the guide wire followed by a nephrostomy balloon catheter. The balloon was inflated to 30F diameter. It was then deflated and withdrawn. A 30F Amplatz dilator was advanced over the guide wire into the bladder followed by the 32F Amplatz grey sheath. The dilator was then removed leaving the grey sheath and the guide wire in place. The rigid nephroscope was then inserted through the grey sheath. The stone was then removed either intact or after ultrasonic disintegration. The technique is illustrated in Fig. 1. If the bladder wall collapsed the irrigation fluid through the Foley catheter was restarted. At the end of the procedure and after removal of all the fragments, the nephroscope was removed and the skin was closed with one or two stitches of 5-0 subcuticular vicryl (Ethicon, Edinburgh, Scotland, UK). No drain was needed.

The Foley catheter was then connected to a urine bag for free drainage. The catheter was removed after 6 h and the patient discharged home. A prophylactic antibiotic was administered for 24 h, the first dose having been given with the induction of anaesthesia.

Table I illustrates the patients’ characteristics and the stone removal technique.
Figure 1. (A) Size 8F Foley catheter is inserted per urethra and a guide wire is passed through 18G angiography catheter sheath. (B) The balloon dilator is advanced over an angiography catheter. (C) 30F Amplatz dilator is advanced into bladder followed by 32F Amplatz grey sheath. (D) Nephroscope is inserted through the Amplatz grey sheath and the stone fragmented. US = Ultrasound.

Table 1

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age (years)</th>
<th>Sex</th>
<th>Size of stone (mm)</th>
<th>Extraction</th>
<th>Operation time (min)</th>
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<td>6</td>
<td>M</td>
<td>10</td>
<td>forceps</td>
<td>25</td>
</tr>
<tr>
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<td>8</td>
<td>M</td>
<td>25</td>
<td>US lithotrite</td>
<td>35</td>
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<td>M</td>
<td>10</td>
<td>forceps</td>
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<td>4</td>
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</table>

US: Ultrasound.

Discussion

A marked decline in the incidence of lower urinary tract stones in children was noticed in Western countries, yet it is still endemic in some developing countries.

Adult vesical stones can be successfully treated transurethrally using the ultrasonic or the electrohydraulic machines. However, in children the small diameter of the urethra could make this approach hazardous.

Urethral injuries in children are often iatrogenic from injudicious urethral instrumentation. These may lead to urethral stricture which in turn may cause severe difficulty requiring multiple dilatation or multiple surgical procedures. The incidence of urethral stricture after posterior urethral valve ablation has been reported to be 8–25%. A percutaneous suprapubic approach for valve ablation has been used in an attempt to avoid such a complication especially in the child with a small
calibre urethra.\textsuperscript{28,29} The electrolydraulic probe can be used through a small diameter paediatric cystoscope. However, it leaves some large fragments that can cause the child some discomfort through their passage.

With the percutaneous cystolithotripsy (PCCL) approach manipulation of the urethra is avoided except for the inception of a small size Foley catheter (8–10F) that remains for 4–6 h. The procedure is short, reducing the anaesthesia time, and can be easily achieved in a day-care unit reducing the costs of hospitalization and resulting in an efficient use of facilities and a more pleasant surgical experience for the child.

Acknowledgement
The authors acknowledge the advice of Dr Hidayatullah Hakem from Al-Shatey Hospital, Jeddah. He was the first to use the term PCCL.

References