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Posterior urethra: Anterior urethra ratio in the evaluation of success following PUV ablation

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Summary

Introduction
There are conflicting reports on the criteria with which to determine success following posterior urethral valve (PUV) ablation. The aims of this study were to assess the value of the posterior urethra: anterior urethra ratio (PAR) in predicting successful PUV ablation.

Materials and Methods
All neonates and infants with confirmed PUV on voiding cystourethrogram (VCUG) were included. Initial PAR was computed by dividing maximum posterior urethral diameter by anterior urethral diameter. Distances were measured by an on-screen distance measurement tool in the Radiology department, to avoid error. Only oblique images with good voiding phases were used for assessment. All patients underwent cystoscopy and PUV ablation using cold knife. Postoperative VCUG and cystoscopy were performed at 3 months follow-up. Success was defined as cystoscopic resolution of obstruction, in addition to biochemical and radiological improvement, and this was compared with PAR findings. An equal number of age-matched control patients who had a normal VCUG (as a part of evaluation of antenatal hydronephrosis) were also analyzed.

Results
A total of 56 patients (median age 15 days, range 3–250 days) were analyzed between 2013 and 2016. The mean PAR was 1.5 (0.42) in controls and 3.42 (0.75) in those with PUV at diagnosis ($P = 0.001$). In those with successful PUV ablation ($n = 51$) the mean PAR was 1.8 (0.21), and in those with residual PUV/stricture ($n = 5$) the mean PAR was 3.16 (0.54). The difference between these two groups was statistically significant ($P = 0.0001$). Applying the value of mean + 2 SD of successful PUV ablation, an upper limit of PAR >2.2 was proposed to predict failure. Using this cut-off, 4/7 with PAR >2.2 had confirmed failure, while 48/49 with PAR <2.2 had successful resolution ($P = 0.001$)

Conclusion
Whenever the posterior urethra is more than 2.2 times the diameter of the anterior urethra (PAR >2.2) on repeat VCUG following a PUV ablation, a cystoscopy check is essential to rule out residual PUV/stricture.

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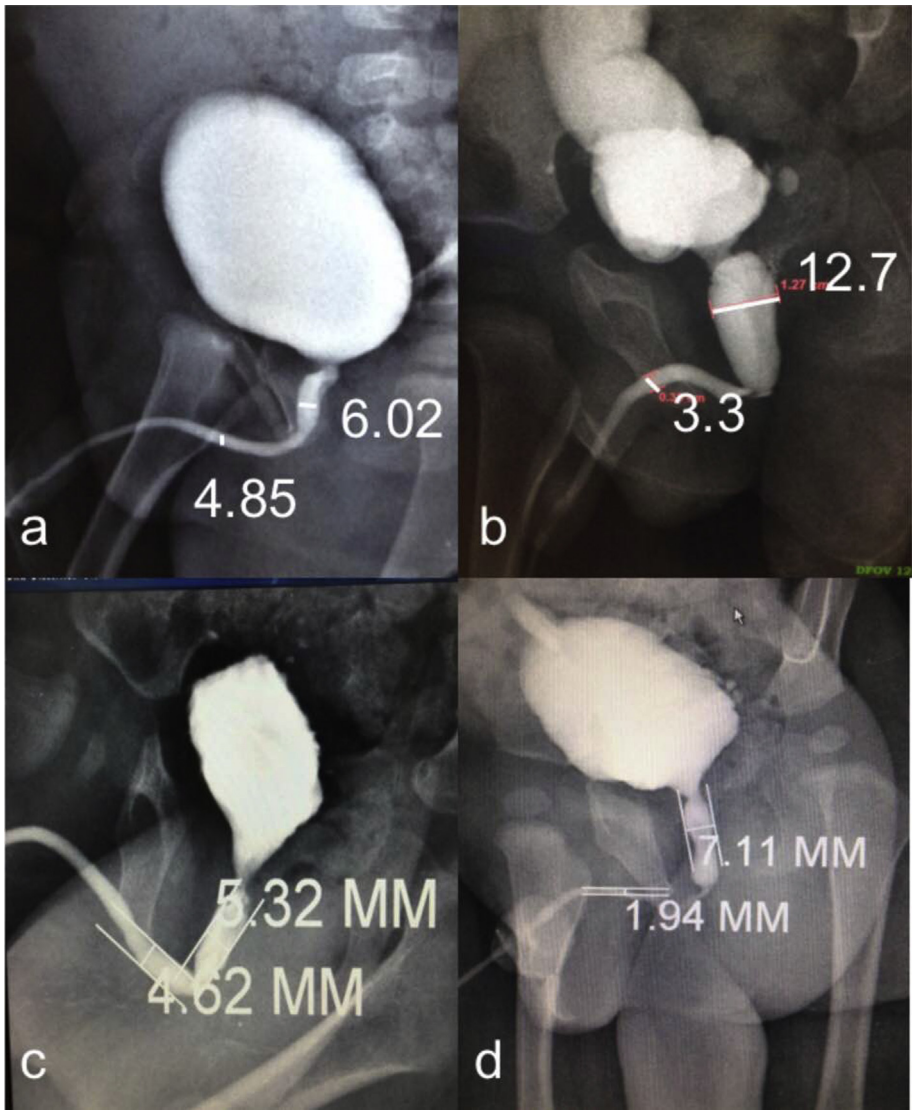

Figure The posterior urethra: anterior urethra ratio (PAR) was computed by dividing the maximum posterior urethral diameter by the anterior urethral diameter (in mm). Distances were measured by an on-screen distance measurement tool in the Radiology department, to avoid error. a) Normal VCUG — control: PAR = 6.02/4.85 = 1.24; b) PUV at the time of diagnosis: PAR = 12.7/3.3 = 3.84; c) successful PUV ablation: PAR = 5.32/4.62 = 1.15; d) persistent obstruction due to stricture or residual valve: PAR = 7.11/1.94 = 3.66.

Introduction

Posterior urethral valve (PUV) is an important cause of obstructive uropathy in boys, and can lead to severe life-threatening complications like end-stage renal disease [1,2]. Primary valve ablation is the widely accepted treatment modality for newborns with PUV. The incidence of recurrent obstruction following PUV ablation due to residual valve or stricture has been reported to be around 10—20% [3,4]. Some surgeons subject all patients to a routine repeat cystoscopy around 3 months after PUV ablation, while others repeat a VCUG before embarking on a repeat cystoscopy, which warrants a general anesthesia [5—11]. There are conflicting reports in the literature on the criterion to determine success following PUV ablation [12—18]. The aims of the present study were to assess the changes in the posterior urethra: anterior urethra (PU: AU) ratio (PAR) after ablation, and correlate them with cystoscopic findings. It was hypothesized that PAR could be used as an objective tool with which to predict success or failure following PUV ablation.

Materials and methods

All neonates and infants with confirmed PUV on VCUG between 2013 and 2016 were prospectively studied. A fixed protocol was used, wherein all patients were initially stabilized with catheterization, intravenous fluids and antibiotics until biochemical parameters/hydration were normalized. A single surgeon performed PUV ablation using 8.5/9 F resectoscope and cold knife at 5, 7, and 12 o'clock positions, as described previously [7]. Per-urethral drainage was kept for 48—72 h post operation.