Complete duplication of urinary bladder and urethra: prenatal sonographic features

S. BOOPATHY VIJAYARAGHAVAN* and A. B. NIRMALA†
*SONOSCAN, Ultrasonic Scan Centre, Coimbatore and †Department of Obstetrics and Gynecology, Saravana Hospital, Kalpana Road, Udamalpet, India

KEYWORDS: duplication; prenatal; sonography; urethra; urinary bladder

ABSTRACT

Prenatal sonographic features of the rare anomaly of complete duplication of the urinary bladder and urethra are described in this case report. A coronal scan of the fetal pelvis at 29 weeks of gestation revealed two pyriform cystic structures. The umbilical arteries coursed around both of them. They emptied independently of each other. Postnatally the newborn had two vulvae, two anal openings, two bladders and two uteri. Copyright © 2004 ISUOG. Published by John Wiley & Sons, Ltd.

INTRODUCTION

Complete duplication of the urinary bladder and urethra is a very rare congenital anomaly of the urinary system. Most often it is associated with other anomalies. The prenatal sonographic features of this condition are described in this case report.

CASE REPORT

A 24-year-old primigravida was referred at 29 weeks’ gestation for targeted ultrasound examination following visualization of a septate fetal urinary bladder. Sonography was performed using a Philips HDI 5000 ultrasound machine (Philips Medical Systems, Bothell, WA, USA). Fetal biometry was consistent with gestational age. The sex of the fetus was female. A coronal scan of the fetal pelvis revealed two pyriform cystic structures adjacent to one another in the coronal plane. On an axial scan the umbilical arteries were seen to course around both structures. On subsequent visualization in the coronal plane the left structure contracted and completely disappeared so that only one cystic structure could be seen for some time (Figure 1). Then the left one gradually filled and after a while the right one contracted and emptied. At term a female baby was delivered. The newborn had two separate vulvae with separate urethral and vaginal orifices. There were also two anal openings. Sonography on the fifth day of postnatal life showed two separate urinary bladders, emptying independently of each other (Figure 2). There were two uteri. The kidneys and other intra-abdominal structures were normal. On reviewing the image of the fetal perineum two vulvae were seen (Figure 3).

DISCUSSION

Complete duplication of the urinary bladder and urethra is extremely uncommon and is more frequent in males. In complete bladder duplication a septum divides the two bladders and orientation of the septum is variable. A sagittal septum is more common. Each bladder receives a ureter of its ipsilateral kidney and is drained by its own urethra lying side by side. Associated anomalies are more common in children with the sagittal type of duplication. In more than 50% of cases there is also duplication of the hindgut. About 90% may demonstrate duplication of the genital tract. In males there may be duplication of the penis with bifid scrotum. In females duplication of the vagina and/or uterus is present. Various hypotheses have been proposed as an embryological explanation for duplication of urinary bladder.

A review of the literature identified only one report on the complete duplication of the urinary bladder seen on prenatal sonography as a septate bladder. Postnatally, completely separate bladders with a septum between them was described. On micturating cystourethrography the proximal urethrae were separate and they united in the membranous portion. The bulbous and penile portions of the urethra were single and normal. In the present case there were two separate pyriform cystic structures, which were seen to contract and empty independently of one another. The possibility of an ovarian cyst in this female fetus could be excluded because the umbilical arteries coursed around both cystic structures and there
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Figure 1 Serial coronal ultrasound images of the fetal pelvis showing two urinary bladders. (a) Both bladders are visible. (b) 5 min after (a) showing partially contracted left bladder. (c) 16 s after (b) showing that left bladder has completely emptied and right bladder is even more distended.

Figure 2 Postnatal transverse ultrasound image of the pelvis of the newborn showing two bladders (BL1, BL2) and two uteri (U1, U2) posterior to them.

Figure 3 Prenatal ultrasound image of the fetal perineum showing the two vulvae (arrows).

was independent change in their size. A large diverticulum of the urinary bladder was excluded because both cystic structures showed emptying. Independent emptying of these two bladders may indicate complete duplication of the bladder and urethra. Retrospective analysis of the scan of the fetal perineum revealed the two vulvae. There were no prenatal sonographic features to suggest the double uteri and duplication of the midgut.

In conclusion, the finding of two separate pyriform cystic structures in the fetal pelvis showing independent
change in size is diagnostic of complete duplication of the urinary bladder and urethra. This diagnosis will be corroborated if duplicated external genitalia are also seen. The present case also demonstrates that the observation of emptying of the fetal urinary bladder may contribute to diagnosis.

REFERENCES


