CASE REPORT

Antepartum fetal bladder rupture leading to urinary ascitis: attempt to rescue by placement of peritoneo-amniotic shunt

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SUMMARY

Fetal bladder rupture is a rare complication occurring due to bladder outlet obstruction, mostly posterior urethral valves. A 26-year-old primigravida presented to us at 27 weeks gestation with an ultrasound report showing gross fetal ascitis and mild oligohydramnios. A repeat scan was performed which showed fetal bladder rupture and urinary ascitis. In conjunction with paediatric surgeon, we performed ultrasound-guided placement of double-ended pigtail catheter connecting the fetal peritoneal cavity with the amniotic cavity at 28 weeks gestation. Ultrasound performed 3 days after the placement of the catheter showed its correct placement. Unfortunately, 1 week after the procedure at 29 weeks gestation, the patient had premature rupture of membranes and later went into labour and delivered vaginally. The neonate could not be revived and expired after few hours of birth due to prematurity-related complications. The placement of the shunt could have probably precipitated preterm rupture of membranes.

BACKGROUND

Antepartum fetal bladder rupture leading to urinary ascitis is a rare complication of bladder outlet obstruction with few reported cases.^{1–7} Intrauterine fetal therapy has been attempted in bladder outlet obstruction, though their role seems controversial. There are reports of placement of vesico-amniotic shunt in utero in obstructed lower urinary tract with limited success.⁸ Since, in our case the bladder has ruptured leading to urinary ascitis, we attempted placement of peritoneo-amniotic shunt. There is only one prior case report of peritoneo-amniotic shunt placement to authors' knowledge.⁴ In this case report we emphasise on the importance of proper selection of cases for shunt placement and parental counselling.

CASE PRESENTATION AND INVESTIGATIONS

A 26-year-old primigravida with 27 weeks of gestation was referred to us with an ultrasound report of gross fetal ascitis and mild oligohydramnios. No other abnormality was reported in that ultrasonography report. No significant medical or family history was present. She had not taken any drug apart from hematinics during her antenatal period. Examination findings were normal and her uterine size corresponded to 26–28 weeks gestation. The patient was non-diabetic and all her antenatal blood and urine investigations were within normal range.

We performed a repeat ultrasound which showed single, live, male fetus with fetal ascitis. Along with it, we found partially distended urinary bladder with a rent in it from which jet of urine flow to peritoneal cavity could be seen, suggestive of bladder rupture (figure 1). There was mild dilation of bilateral renal pelvis (5 mm) but hydronephrotic changes were not seen in renal parenchyma. Proximally dilated urethra with keyhole appearance (typical of posterior urethral valve (PUV)) was seen suggestive of urethral obstruction. Thoracic circumference seemed to be normal. The fetal spine, heart, anterior abdominal wall and other organs appeared to be normal on ultrasound. We made a diagnosis of bladder outlet obstruction due to PUV (most common cause) leading to megacystitis followed by bladder rupture and fetal ascitis.

TREATMENT

We planned to perform shunt placement between the fetal peritoneal cavity and the amniotic cavity to decompress fetal ascitis, thus preventing further increase in ascitic fluid volume and associated complications. We explained the pros and cons of the procedure to the parents and they opted for shunt placement rather than no intervention. The patient was admitted and steroid cover was given for fetal lung maturity. Intravenous fentanyl 500 µg was given to mother for maternal and fetal sedation. Abdominal ultrasound was carried out to locate accessible area of fetal abdomen and the overlying maternal abdomen was locally infiltrated with 10% lignocaine. A double-ended pigtail catheter was

Figure 1 Transabdominal ultrasound of fetus showing rent in urinary bladder wall (shown by arrow) with jet of urine flow seen towards peritoneal cavity.

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Figure 2 Transabdominal ultrasound of fetus after placement of stent. The arrow shows the tip of the pigtail catheter in peritoneal cavity.

placed between fetal peritoneal cavity and amniotic cavity by the paediatric surgeon under ultrasound guidance. On third day of the procedure, we performed a sonography to confirm the stent placement, which appeared normal (figure 2). We had planned weekly ultrasound to evaluate the effect of stenting on fetal ascitis.

OUTCOME AND FOLLOW-UP

One week after the procedure, the patient developed premature rupture of membrane and soon went into preterm labour. She delivered vaginally with newborn Apgar score of 1, 4, 4 at 1, 5 and 10 min, respectively. The neonate could not be resuscitated and expired due to prematurity and birth asphyxia approximately 5 h after delivery. Postmortem clinical examination and ultrasound revealed PUV and gross urinary ascitis. The parents refused neonatal autopsy.

DISCUSSION

PUVs are not very infrequent occurrence and the incidence ranges between 1/5000 and 1/12 500 births.¹ It is the most common cause of lower urinary tract obstruction in male children. Other causes of fetal lower urinary tract obstruction are urethral atresia, urethral valves, prolapsed ureterocele, megacystitis megaureter and megacystis microcolon. Bladder rupture is a rare complication of PUV with few reported cases.^{1 3-5 7} Anterior urethral valve has also been reported to cause fetal bladder rupture.⁶ Common complications of PUV are increased pressure in urinary system and vesico-ureteral reflux leading to renal dysplasia in severe cases.¹ Oligohydramnios associated with PUV can lead to pulmonary hypoplasia and extremity deformities.

There are some mechanisms to prevent renal parenchyma damage in fetuses with PUV, that is, urine extravasation in fetal peritoneal cavity, unilateral vesico-ureteric reflux and bladder diverticula formation.¹ In our patient, neither of these mechanisms were effective, still the renal parenchyma was preserved. The reason was early rupture of urinary bladder which could be a result of inherent weakness of bladder wall or functional uretero-vesical antireflux valve.

Lower urinary tract obstruction has been reported to be the cause of antepartum fetal bladder rupture in most of the cases but urinary retention due to maternal drug exposure has also been reported to be its cause.² Fentanyl, furosemide, diltiazem, aminophylline, morphine sulfate are some of the drugs associated with fetal urinary retention when administered to

mother. Periodic ultrasonography should be performed to evaluate megacystitis when these medications are administered to the mother, especially in high doses. Associated bladder outlet obstruction should be ruled out. Fetal cystoscopy and intrauterine invasive procedures have been reported for diagnosing and treating fetal lower urinary tract anomalies.⁸

Fetal bladder rupture can be diagnosed by ultrasonography and in most of the reported cases, serial sonography was diagnostic.¹⁻³ The changes in bladder seen after bladder rupture and development of ascitis are suggestive of bladder rupture. The change from thin-walled, distended bladder to thick-walled, decompressed bladder with significant ascitis can be seen on ultrasonography. Blessed *et al*⁴ confirmed the diagnosis by observing a jet of stream coming out of the bladder on colour Doppler. We also noted urinary jet coming out of the bladder rent, which was well visualised without any colour doppler.

Complications associated with urinary tract obstructions like oligohydramnios, pulmonary hypoplasia, facial and limb deformities, hydronephrosis and renal hypoplasias may accompany fetal bladder rupture. Along with these complications, secondary gastroschisis associated with fetal bladder rupture has also been reported.⁵ Gastroschisis occurred due to rupture of anterior abdominal wall following tense ascitis. Vesico-amniotic shunts have been tried by some clinicians for fetal bladder outlet obstruction with limited success and controversial role. Gastroschisis in association with vesico-amniotic shunt placement has also been reported by some authors.^{9 10} Before placement of vesico-amniotic stent, renal dysplasia, structural anomalies and preferably chromosomal anomalies should be ruled out. A case-series demonstrated 90% survival in fetuses properly selected for in utero vesico-amniotic shunting.¹¹

The management of antepartum fetal bladder rupture depends on gestational age, associated structural and chromosomal anomalies and preservation of renal function. Salvageable fetus can undergo termination of pregnancy as reported by Palmer *et al*² with successful outcome. Bataille *et al*¹ reported spontaneous resolution of antepartum bladder rupture with resection of PUV performed in postnatal period. There was no oligohydramnios, fetal ascitis or hydronephrosis seen due to development of patent urachus, which acted as a defence mechanism. Blessed *et al*⁴ placed a peritoneal amniotic shunt with successful outcome. They reported spontaneous healing of bladder rent as seen on postnatal cystourethrogram.

Our patient presented to us at 27 weeks gestation when fetal salvage is not good in our resource setting. Hence, we wanted to prolong the period of gestation and decided to put peritoneo-amniotic shunt under ultrasound guidance. The patient developed premature rupture of membranes 1 week later and delivered vaginally. The rupture of membranes could be due to inflammatory mediators released after the procedure. Other complications of shunt can be dislodgement or blockage of stent, preterm labour, amniorrhexis, oligohydramnios, sepsis and gastroschisis.¹⁰ Misplaced stent may require laparotomy in neonate for stent removal.¹⁰ Despite antenatal and postnatal management, the baby in our case could not be salvaged due to pulmonary complications which can be associated with prematurity and oligohydramnios.

Fetal urinary bladder rupture is a rare complication and is well-tolerated by the fetus sometimes. Delivery at tertiary care centre is essential. Amnio-peritoneal shunt placement should be considered in selected cases. Despite this invasive procedure, fetal prognosis may or may not be improved. Whether the fetus would have had a better prognosis without any intervention in our patient, could not be commented upon. Parents should be

informed regarding pros and cons of the intervention and involved in decision making.

Learning points

- ▶ Antepartum fetal bladder rupture is a rare complication of lower urinary tract obstruction.
- ▶ It can be diagnosed by ultrasonography when the thin-walled, distended bladder changes to thick-walled, decompressed bladder with significant ascitis on serial scans. At times, jet of urine flowing from the bladder rent can be identified to confirm the diagnosis.
- ▶ Renal dysplasia, other structural anomalies and preferably chromosomal anomalies should be ruled out before placement of vesico-amniotic/peritoneo-amniotic stent.
- ▶ The complications of intrauterine shunt placement are dislodgement or blockage of stent, preterm labour or rupture of membranes, amniorrhexis, oligohydramnios, sepsis and gastroschisis.
- ▶ Fetal prognosis may or may not be improved by peritoneo-amniotic stenting. Counselling of parents is important.

Contributors All the authors have contributed in preparing manuscript of this case report. NS has prepared the manuscript. RT and ST have revised the manuscript. AB has provided articles for literature review and revised the article.

Competing interests None.

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REFERENCES

- 1 Bataille D, Van Hoorde E, Cassart M, *et al.* In utero urinary bladder rupture: a case report. *Acta Chir Belg* 2007;107:429–31.
- 2 Palmer E, Oliveros M, Fong E, *et al.* Medication induced fetal bladder rupture: a case report. *Open J Obstet Gynaecol* 2011;1:17–20.
- 3 Bettelheim D, Pumberger W, Deutinger J, *et al.* Prenatal diagnosis of fetal urinary Ascitis. *Ultrasound Obstet Gynaecol* 2000;16:473–5.
- 4 Blessed WB, Sepulveda W, Romero R, *et al.* Pre-natal diagnosis of spontaneous rupture of the foetal bladder with colour Doppler ultrasonography. *Am J Obstet Gynecol* 1993;169:1629–31.
- 5 Dinsmoor MJ, Seeds JW. Fetal urethral obstruction with spontaneous rupture of the bladder and creation of a gastroschisis. *J Ultrasound Med* 2002;21:577–9.
- 6 Merrot T, Chaumoitre K, Shojai R, *et al.* Fetal bladder rupture due to anterior urethral valves. *Urology* 2003;61:1259.
- 7 Hatis CG. In utero diagnosis of spontaneous fetal urinary bladder rupture. *J Clin Ultrasound* 1993;21:645–7.
- 8 Johnson MP. Fetal obstructive uropathy. In: Harrison MR, Evans MJ, Adzick NS, Holzgreve W. eds. *The unborn patient: the art and science of fetal therapy*. Philadelphia: W.B.Saunders, 2001:259–86.
- 9 Irwin BH, Vane DW. Complications of intrauterine intervention for treatment of fetal obstructive uropathy. *Urology* 2000;55:774.
- 10 Lewis KM, Pinckert TL, Cain MP, *et al.* Complications of intrauterine placement of a vesicoamniotic shunt. *Obstet Gynecol* 1998;91:825–7.
- 11 Biard JM, Johnson MP, Carr MC, *et al.* Long-term outcomes in children treated by prenatal shunting for lower urinary tract obstruction. *Obstet Gynecol* 2005;106:503–8.

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