Major complication after intrauterine vesico-amniotic shunting

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ABSTRACT

Bilateral foetal uropathy is the leading cause of chronic renal failure in childhood. Vesico-amniotic shunting (VAS) is a simple, feasible, and widely used procedure for decompressing the foetal urinary system. We report a case of a boy with bilateral foetal uropathy who underwent VAS at a gestational age of 29 weeks. Vesico-abdominal shunt dislodgement occurred and led to urinary ascites and anhydramnios. Postpartal laparotomy showed a shunt perforation between the urinary bladder and the peritoneal cavity.

Key words: Foetal uropathy, posterior urethral valves, vesico-amniotic shunting

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INTRODUCTION

Bilateral foetal uropathy is the leading cause of chronic renal failure in childhood.[1] A therapeutic approach to this entity in the foetal stage of life is not standardized and still under discussion. Vesico-amniotic shunting (VAS) offers a simple and practical procedure for decompressing the urinary system.

CASE REPORT

A 27-year-old woman, gravida 1 was referred to the Department of Prenatal Diagnostics at our Institution at 18 weeks gestation. On an initial routine sonographic examination of the foetus, bilateral hydronephrosis and a significantly enlarged bladder was noted. Amniocentesis was performed and showed a normal 46XY male without chromosomal irregularities. At 25 weeks gestation a repeated ultrasound revealed oligohydramnios, a urinary bladder measuring 74.0 x 99.0 x 101.0 mm with a 387.4 cm^3 volume and moderate bilateral renal hydronephrosis [Figure 1]. Due to the severely enlarged bladder an ultrasound guided puncture of the urinary bladder was performed in which 320 ml of urine were evacuated. One week later a second puncture yielded 500 ml urine. On each further control ultrasound recurrence was established with a persisting significant megacystis and a VAS procedure was decided upon and performed at a gestational age of 27 weeks. A percutaneous ultrasound-guided VAS was performed by placing a double pigtailed stent between the foetal bladder and the amniotic cavity. Five days after the procedure was performed a foetal ultrasound showed moderate bilateral hydronephrosis, a urinary bladder with the shunt in situ, and moderate urinary ascites. Two weeks later the ascites had progressed significantly and a notably distended abdomen measured 117 x 125 mm. With the suspicion of a shunt dislocation dexamethasone was started for lung maturation and 2 days later a caesarean section was performed. At a gestational age of 29 weeks a 1700 g baby boy was delivered and developed respiratory distress syndrome requiring mechanical ventilation. The VA-shunt was noted to have been completely incorporated into the bladder [Figure 2]. Peritoneal drainage was performed and 700 ml of urinary ascites evacuated. Once clinically stable an exploratory laparotomy was performed on the sixth postnatal day. Perforation of the urinary bladder was found showing that the VA shunt had dislocated

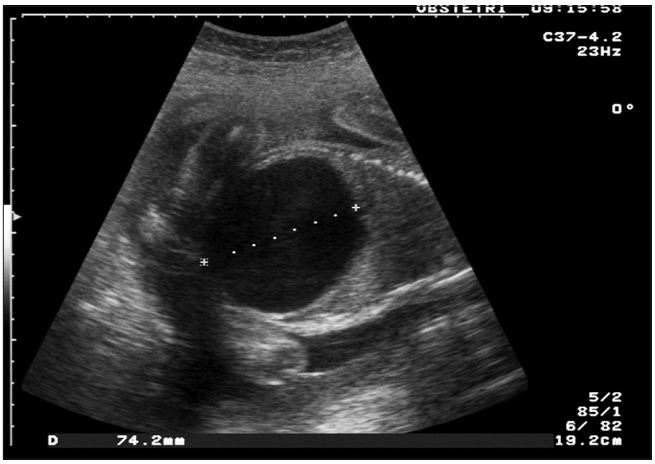


Figure 1: Massive megacystis at GA 25 weeks.

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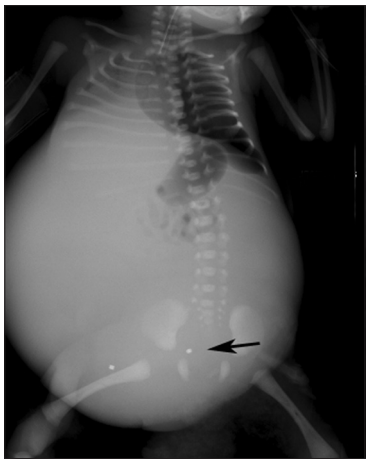


Figure 2: X-ray after birth: extensive urinary ascites, incorporated VA-shunt (marked with metal on both ends, arrow).

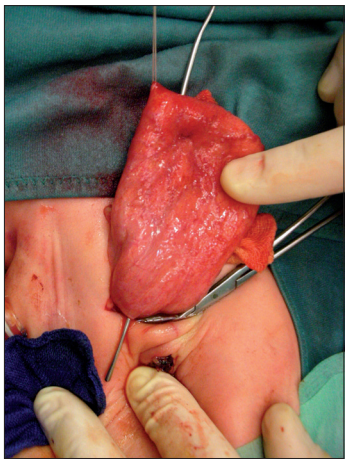


Figure 3: Exposed bladder on laparotomy, probe showing perforation of the bladder wall.

between the bladder and the peritoneal cavity [Figure 3]. The bladder was further closed in two layers and a vesicostomy diversion was performed. Further clinical and laboratory parameters were normal for bladder and renal function. Creatinine remained stable at 0.6 mg/dl and hydronephrosis continues to resolve. On cystoscopy posterior urethral valves could not be diagnosed.

DISCUSSION

Neonatal lower urinary tract obstruction (LUTO) is a heterogeneous group of pathologies including posterior urethral valves, urethral atresia, prune belly syndrome, cloacal malformations, megacystis-microcolon syndrome, and obstruction caused by less common diagnoses. The prevalence is estimated to be as high as 2.2 per 100 000 births.[2] LUTO results in renal damage mainly depend on the time of onset, duration, and severity of obstruction. Early obstruction leads to renal dysplasia and consecutively to renal insufficiency. Oligoanhydramnios may also be seen and constitutes a poor prognostic factor as it may result in pulmonary hypoplasia. The valve bladder syndrome, as noted by Duckett, is characterized by a thick-walled, poorly compliant bladder that stores urine at high pressures.[3] If untreated, LUTO is associated with high perinatal morbidity and a mortality up to 45%.[4]

Animal studies have shown a causal link between distal renal tract obstruction in the foetus and renal dysplasia and pulmonary hypoplasia.[5,6] Moreover animal studies have shown reversibility or preventability of this damage after decompression of the obstruction.[7,8] These studies set the beginning of foetal treatment of LUTO. Many different procedures have been tried and advocated including open foetal surgery and minimally invasive procedures. Today, the method most commonly used is percutaneous ultrasound-guided VAS by placing a double pigtailed stent between the foetal bladder and the amniotic cavity.[9] This antenatal treatment of LUTO is widely performed but remains controversial. In early publications the complication rates of foetal intervention are high. In an early report from 1987 including 57 prenatal interventions including VAS, Elder *et al*. reported a 44% complication rate including inadequate shunt drainage or migration, onset of premature labour, urinary ascites, and chorioamnionitis.[10] Malfunction of VAS may occur in up to 60% of cases.[11] Quintero *et al*. reported a total perinatal loss rate of approximately 5%.[12] On the other hand, in a report by McLorie *et al*. VAS was reported to be a safe procedure without major complications in a consecutive series of 9 patients.[13] Holmes *et al*. from the San Francisco group postulated that foetal intervention carries a considerable risk to the foetus with a foetal mortality rate of 43% although renal prognosis may not change and that these procedures should only be carried out in strictly selected patients in specialized centres.[14] We present a case of complete catheter dislocation into the peritoneal cavity with postnatal surgical management which required a close pre-, peri- and postnatal collaboration of gynaecologists, paediatricians, and surgeons. In the future other less invasive and/or more sophisticated techniques like foetal cystoscopy or LASER valve ablation may prove to be more effective and safe.[15,16] The PLUTO (percutaneous shunting for lower urinary tract obstruction) trial is a randomized controlled multicenter study which wants to compare if VAS for foetal bladder outflow obstruction in fact improves prenatal and perinatal mortality and renal function when compared with a conservative and non-interventional care.[17]

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