NEONATAL BLADDER RUPTURE: A RARE ETIOLOGY

Ahmad M. Al-Shammari, MD, FRCS(Ed); Michael P. Leonard, MD, FRCSC, FAAP

Bladder rupture in the neonate is an uncommon event, and mostly occurs as a rare complication of umbilical artery catheterization.[1] The usual manifestations include low urine output, ascites, respiratory distress, and rising serum, urea and creatinine. Another cause is observed in premature infants who are managed in the neonatal intensive care unit by minimal stimulation therapy and mechanical ventilation. This is a report on a case of bladder rupture in a premature infant as a result of the Credé maneuver.

Case Report

An 880-gram premature male was the product of a spontaneous vaginal delivery at 24 weeks' gestation to a 24-year-old gravida 6, para 2. Apgar score was 1 at one minute and 6 at five minutes. He was intubated, and managed by intermittent positive pressure ventilation (IPPV), Fentanyl® 0.05 mg/kg/min, and Dopamine® 2 µg/kg/min. The umbilical vein was catheterized as umbilical artery catheterization was unsuccessful. On the second postnatal day, the patient developed low urine output (0.16 mL/kg/hr) and respiratory distress requiring an increase in positive end-expiratory pressure (PEEP). The Credé maneuver was used to assist in emptying his distended bladder. On the third postnatal day he became markedly oliguric, and abdominal distension was noted. Multiple attempts to catheterize his bladder with feeding tubes French 3.5 and French 5 were unsuccessful. Serum electrolytes were obtained: sodium 126 mmol/L (N=135-147 mmol/L), chloride 90 mmol/L (N=95-110 mmol/L), potassium 3.5 mmol/L (N=3.5-5.3 mmol/L), urea 10.4 mmol/L (N=2.8-7.1 mmol/L), and creatinine 119 µmol/L (N=30-110 µmol/L). Abdominal ultrasound was obtained which confirmed the presence of ascites, a partially filled bladder, and bilateral mild hydronephrosis. A suprapubic puncture cystogram was performed using a gauge 23 needle under ultrasound guidance, and it revealed an intraperitoneal bladder rupture (Figure 1). A laparotomy was performed through a lower midline incision, which confirmed the presence of 1.5-cm tear in the posterior bladder wall. The defect was closed and intraperitoneal urine was drained. Because of the unknown status of the urethra, the anticipated difficulty of keeping a suprapubic tube in place, and the presence of bilateral hydronephrosis, a vesicostomy was performed. Postoperatively, the patient maintained good urine output at 3.5 mL/kg/hr. Serum electrolytes revealed sodium 139 mmol/L, potassium 4.4 mmol/L, chloride 109 mmol/L, urea 8.4 mmol/L, and creatinine 55 µmol/L.

Discussion

Neonatal bladder rupture is an uncommon event, usually caused by a complication of umbilical artery catheterization or a cutdown.[1,2] These procedures are performed with increasing frequency due to larger numbers of premature infants being admitted to the neonatal intensive care unit. Premature neonates managed by mechanical ventilation and minimal stimulation therapy develop temporary anoxia of the brain stem. This results in impaired micturation due to development of areflexic bladder.[3] The use of the Credé maneuver (gentle manual suprapubic expression with the infant in the prone position, and the first two fingers of each hand used while the thumbs remain in the back) to empty the hypotonic bladder in such a setting may cause bladder rupture. The mortality and morbidity of a bladder rupture can be reduced by early recognition and management. Low urine output, ascites, unexplained respiratory distress, and rising serum urea and creatinine should raise the suspicion of a bladder rupture. Diagnosis can be confirmed by cystogram, which can be performed per urethra, or via suprapubic bladder puncture. Management will depend on the type of rupture, whether intraperitoneal or extraperitoneal,[4] and the presence or absence of intravesical abnormality. Paracentesis may be needed to reduce the ascites and relieve respiratory distress if laparotomy is not contemplated. The optimal management of neonatal bladder rupture has yet to be defined. It is unacceptable to draw conclusions from the small number of cases reported in the literature. Roth et al. reported two cases of bladder rupture as a result of the Credé maneuver: one case was managed successfully by urethral catheter, and the second died from severe respiratory insufficiency soon after diagnosis.[5] Diamond and Ford reported a mortality of 18%

From the Department of Pediatric Urology, Children's Hospital, University of Manitoba, Winnipeg, Manitoba, Canada.

Address reprint requests and correspondence to Dr. Al-Shammari: P.O. Box 4787, Riyadh, Saudi Arabia.

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FIGURE 1. A suprapubic puncture cystogram showing intraperitoneal bladder rupture.

(2 of 11) among bladder ruptures from umbilical artery catheterization. The two patients who died were managed conservatively by a urethral catheter. All the cases managed by laparotomy with repair of bladder rupture (8 out of 11) survived.[1] We feel that extraperitoneal ruptures can be managed with catheter drainage, but intraperitoneal ruptures mandate laparotomy and repair. The choice of bladder drainage postoperatively would likely be a temporary suprapubic tube, but in patients with neurogenic bladder, outlet obstruction, and/or significant hydronephrosis, a vesicostomy may be indicated. Awareness of this complication, especially in premature infants managed by mechanical ventilation and minimal stimulation therapy or those who have umbilical artery catheters, may lead to early diagnosis and prompt management. We believe that the cause of the bladder rupture in this case was the use of the Credé maneuver, since the tear was in the posterior wall of the bladder and not in the dome, as is often reported in the complications of umbilical artery catheterization. The Credé maneuver should likely not be used in such infants. A bladder which is not emptying well should be managed by intermittent catheterization performed by the NICU nursing staff.

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