Iatrogenic Rupture of the Urinary Bladder in an Infant During Retrograde Cystourethrography

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Abstract

Iatrogenic bladder rupture in children during a retrograde cystourethrography is very uncommon. We present a case of iatrogenic intraperitoneal bladder rupture in a 9-month child during the retrograde cystourethrography performed by a radiologist. The child presented in a paediatric emergency after 6 h with an acute abdomen indicating urinary peritonitis. An urgent laparotomy was performed and the perforation was repaired in two layers. The follow-up was unremarkable. This report emphasises the importance of respecting the criteria of the proper retrograde cystourethrography imaging procedure.

Keywords: Bladder rupture, infant, retrograde cystourethrography

Introduction

Urinary peritonitis due to iatrogenic bladder rupture during retrograde cystourethrography is an uncommon entity in children and a very rare surgical emergency.[1] To perform a safe and perfect retrograde cystourethrography, radiologists must consider many factors such as bladder volume, method of contrast media instillation and patient condition. We present a case of iatrogenic intraperitoneal bladder rupture in a child during retrograde cystourethrography and its surgical management.[2]

Case Report

A 9-month-old girl was referred to our hospital with abdominal distension and haematuria 6 h after undergoing retrograde cystourethrography for recurrent urinary tract infections (UTIs) at the radiology centre.

The child was apyretic, haemodynamically stable and in no respiratory distress. Abdominal examination revealed features suggestive of generalised peritonitis with the distended abdomen and diffuse abdominal dullness. Laboratory tests showed a white blood cell count of 20,000 at neutrophils, renal function, and serum electrolytic levels.

On anamnesis, the retrograde cystourethrography had been performed with high-pressure and large-volume syringe injection.

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A provisional diagnosis of peritonitis with bladder rupture was made.

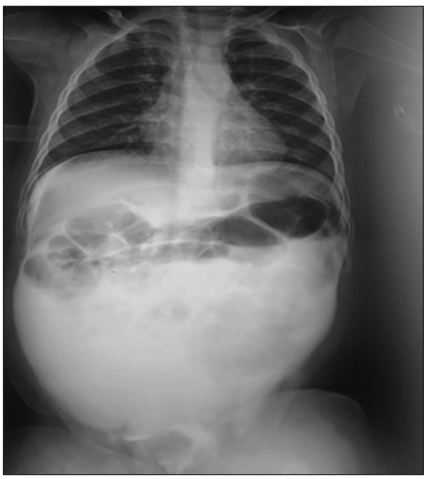


Figure 1: A plain abdominal x-ray showing intraperitoneal extravasation of contrast

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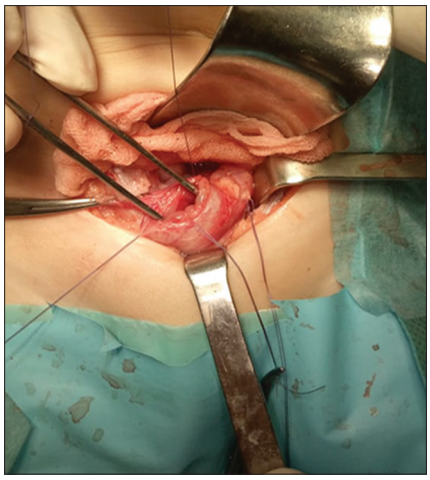


Figure 2: Intraoperative photograph showing bladder rupture

A plain abdominal X-ray in an orthostatic position revealed an abdominopelvic opacity that corresponds to the contrast spillage into the peritoneal cavity and crescent of right interhepato-diaphragmatic pneumoperitoneum was present [Figure 1] and thus confirming intraperitoneal rupture of the urinary bladder.

Urgent exploratory laparotomy was done, which revealed a 4 cm perforation in the posterosuperior aspect of the urinary bladder, associated with bilateral megaureter [Figure 2]. Urinary bladder perforation was repaired in two layers with vicryl 4/0 and all intraperitoneal fluid was aspirated. The peritoneal cavity was irrigated and a retrovesical suction drain was placed to monitor urine extravasation. An indwelling catheter was left. The cephalosporin third-generation antibiotic was administered by the venous route and maintained for 10 days. The drain and the catheter were removed on day 5. The follow-up was unremarkable.

Discussion

Iatrogenic bladder rupture is a very rare event in children, most bladder disruption has been associated with blunt/penetrating trauma, chronic diseases of the urinary bladder (such as congenital bladder diverticula), bladder outflow obstruction or a result of umbilical artery catheterisation.[2] It is an uncommon entity in children[1]

The immaturity of the urinary tract in children and the anatomical and functional development of the bladder in infants contribute to a high risk of iatrogenic bladder rupture. The bladder lies in a higher region of the abdomen and the bladder walls are thinnest during infancy, making them perceptible to iatrogenic rupture.[3] Retrograde cystourethrography is one of the investigations of choice ordered by a paediatric urologist for determining the anatomy and function of the lower urogenital tract.[4] It is indicated in the investigation of patients with UTIs such as in our case or suspected vesicoureteric reflux, posterior urethral valves, antenatal hydronephrosis, bladder diverticula, bladder neck trauma and in the assessment of an unstable bladder. Radiologists must pay attention to perform a safe and perfect retrograde cystourethrography. It must respect the following conditions: bladder volume, method of contrast media instillation and patient condition.[5]

A few cases of iatrogenic bladder perforation have been reported in the literature.[1]

The rupture was mostly intraperitoneally at the dome of the bladder. The main cause of the event was a significant increase in bladder pressure with an inappropriate manual syringe injection method used instead of the recommended gravity drip method.[4,6]

In our case, the perforation has occurred due to increased intravesical pressure and instilled volumes which were greater than anticipated.

Extraperitoneal iatrogenic rupture of the bladder is unusual. Khavari *et al*. presented one case in a normal child during the filling phase of retrograde cystourethrography.[6]

In blunt bladder trauma, recent guidelines suggest that intraperitoneal ruptures should always be managed by surgical exploration.[5] Oktar *et al*. presented the first case of intraperitoneal bladder rupture in a child that was managed by a laparoscopic intracorporeal two-layer suturing technique. Laparoscopic closure of a bladder perforation has been previously described in adult studies.[1] In our setting, the child had immediately undergone abdominal exploration due to the intraperitoneal nature of the defect. The same procedure was described by Kajbafzadeh *et al*. They reported two cases of intraperitoneal iatrogenic bladder rupture in infants during retrograde cystourethrography which were treated with immediate abdominal exploration.[5]

Conclusion

It is important to ensure safety measures to minimise the risks during retrograde cystourethrography. The management of the perforation can be done either through laparotomy or laparoscopically.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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