

Laparoscopic Bladder Diverticulum Excision in Boys: Three Case Reports

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Abstract

Bladder diverticula can be congenital or acquired in children. In this study, we present three male patients with congenital bladder diverticulum who underwent laparoscopic diverticulum excision. The main presenting symptoms of the patients were abdominal pain and urinary tract infection. Two patients also had vesicoureteral reflux. Postoperatively, symptoms associated with the urinary system disappeared in all patients. Laparoscopic diverticulum excision is preferred as an effective surgical method in children.

Keywords: Bladder diverticulum, congenital, laparoscopic

Introduction

A bladder diverticulum (BD) is a prolapse of the bladder mucosa outward from a weak area of the detrusor muscle (1). BD is a rare pathology in children, and its incidence is reported as 1.7% in the literature (2). In the pediatric age group, the diverticulum is observed in an anatomical region close to the ureteric orifices. Therefore, vesicourethral reflux may be associated with disruption of the submucosal tunnel (3).

These patients usually visit the outpatient clinic with signs of infection. In addition, these urinary tract infections must be surgically corrected because they will cause kidney damage. Correction of the diverticulum and related reflux can be performed by the open method or successfully laparoscopically by experienced clinicians. In this article, we present a rare case of congenital BD in three boys.

Case Presentations

Case 1 is a 4-year-old male patient with a history of urinary tract infection. Urinary system ultrasonography (US) revealed 23x13 mm diverticulum in the right lateral aspect of the bladder. No vesicoureteral reflux (VUR) was detected during voiding cystourethrography (VCUG). Excess diverticulum filling

is observed on the right. Renal functions were normal on static renal scintigraphy (DMSA), and no scar was observed. No feature was detected except for the bladder with increased capacity. Two wide-mouthed diverticula on the right cystoscope were observed. Diverticulum excision was performed laparoscopically. Case 2 is an 8-year-old male patient with a history of abdominal pain and urinary tract infection. During US, 28x20 mm diverticulum was detected in the right posterolateral aspect of the bladder. In VCUG, 3x2 cm diverticulum in the bladder and grade 1 VUR on the right were observed. In the DMSA performed, the right kidney function was 34.5%. In the urodynamic study, there were phasic detrusor contractions, bladder capacity was decreased, and postvoid residual urine was detected. Cystoscopy revealed diverticula in the right orifice. The orifice was at the 5 o'clock position of the diverticulum. Diverticulum excision and right ureteroneocystostomy were performed laparoscopically. Case 3 is a 9-year-old male patient with a history of fever and abdominal pain. In US, the right kidney is smaller than the left. A focal ectatic area is observed in the upper pole of the right kidney. No diverticula appearance in the bladder was observed in the VCUG, but grade 4 VUR was observed on the right. In the DMSA performed, the right kidney function was 30.6%. A diverticulum was found on the right side on cystoscopy. The right ureteral

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orifice opened into the diverticulum. Diverticulum excision and right ureteroneocystostomy were performed laparoscopically. Pathological diagnosis of all patients compatible with bladder diverticula.

Technical details of the surgical procedure are presented in the video. A ureteral stent was placed by cystoscopy, as shown in the video. A Fogarty catheter was placed in the diverticulum. While the ureteral stent provided safe dissection of the ureter, the Fogarty catheter provided ease of dissection. Diverticulum excision was performed using a tissue-sealing instrument. Detrusor repair was performed using absorbable, synthetic, braided, and monofilament continuous sutures. The ureteral stent was removed postoperatively.

Discussion

Bladder diverticula in the pediatric age group are usually congenital. Bladder diverticula are rare clinical findings in pediatric populations. The frequency of bladder diverticula diagnosis has increased from 0.7% to 1.7% since urinary infections have been systematically studied (4). Bladder diverticula are predominantly seen in males rather than females.

Although the etiology is not clearly explained, it is associated with higher bladder pressure in the in utero and early postnatal period in boys, depending on micturition physiology (5).

Congenital bladder diverticula are typically diagnosed when patients are aged between 3 and 7 years (6). Likewise, the patients in the present cases were diagnosed at 3, 8, and 9 years during the investigation for urinary tract infections and abdominal pain.

The main factors that cause these patients to develop clinical findings and therefore to be diagnosed with BD are urinary tract infection and associated fever, abdominal pain, and hematuria. The cause of urinary tract infection is urinary stasis in the diverticulum and associated VUR.

The first pathology to be considered in patients who are examined for urinary tract infection is VUR. When performing US and VCUg, which are imaging methods used in reflux research, BD may occur. (7). In patients with suspected BD on US and VCUg imaging, urodynamic examination should be performed for neurogenic bladder exclusion. However, these patients should undergo cystoscopy to confirm the diagnosis and plan the treatment properly (8). All cases in the series underwent cystoscopy to confirm the diagnosis of diverticula.

Accepted indications for surgical intervention include voiding dysfunction, urinary stasis, stone formation, and large diverticulum size, which are predisposing to urinary tract infection (7).

However, because there is a risk of urinary stasis, stone formation, and malignancy in the later stages of life, surgical correction is recommended in asymptomatic cases (9).

Because of bladder detrusor defects in these patients, surgical correction is required. Surgery can be performed intravesically or extravesically. If diverticulum is associated with reflux, reimplantation can be performed using both methods.

However, with the development of technology, we believe that extravesical and laparoscopic correction of surgery in these patients is more appropriate in terms of patient comfort and surgical time.

Two of our patients had VUR. Diverticulectomy with laparoscopic ureteroneocystostomy was performed. In one patient, only laparoscopic diverticulum excision was performed because he did not have reflux. No complications were observed during the 6-month postoperative period.

Conclusion

It is characterized by BD, urinary tract infection, lower urinary tract symptoms, and bladder storage or emptying disorders. The aim of surgical repair of these diverticulums is to improve voiding dysfunction and prevent urinary tract infections. We suggest that the laparoscopic method can be successfully performed in selected cases.



Video 1. <https://youtu.be/afiBPmXBOdo>

Ethics

Informed Consent: Informed consent was obtained from the patient.

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: S.Y., Z.İ., Concept: S.Y., Z.İ., Design: S.Y., Z.İ., Data Collection or Processing: S.Y., Z.İ., Analysis or Interpretation: S.Y., Z.İ., Literature Search: S.Y., Z.İ., Writing: S.Y., Z.İ.

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