

## Case Series

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# Exstrophy epispadias complex with adenocarcinoma in adults: a case series and repair technique

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## ABSTRACT

The exstrophy-epispadias-complex (EEC) is a rare congenital malformation with a spectrum of abdominal-pelvic fusion abnormalities, with an incidence of 1/46,000 LB. Recurrence is 1 in 100 & the male-to-female ratio is 2.3:1. Patients rarely may present in adulthood due to a lack of knowledge or financial constraints; it increases the risk of bladder carcinoma mostly adenocarcinoma or squamous carcinoma, due to chronic inflammation, infection, and metaplasia. It has a significant physical, functional, social, sexual, and psychological burden. Three patients have been operated on in our institute. A 37-year-old male, A 19-year-old male, and A 23- year-old female patient. The operation planned was a radical cystectomy with an ileal conduit and an expanded local lymphadenectomy in all three patients. The pelvis and abdominal wall defects were repaired differently post-radical cystectomy in all 3 patients using different techniques. The first patient went through primary tension closure, in the second patient bilateral rectus muscle was used as a flap and reinforced with mesh, and in the third patient, we used a rotation skin flap. All three patients were followed for 1 year. The first patient developed wound dehiscence followed by fecal fistula during follow-up and succumb due to sepsis, the second patient recovered well with a muscle flap in the postoperative period, unfortunately, developed recurrence locally and succumb due to multiple metastases, and the third patient develops flap necrosis at the tip postoperative on day 5, however, recover well after dressing, no recurrence seen on 1 year of regular follow up. As a result, the bilateral rectus flap with mesh recovers better than the rotation skin flap, which is better than primary tension closure.

**Keywords:** Exstrophy-epispadias complex, Radical cystectomy with an ileal conduit, Bilateral rectus muscles flap, Skin rotation-advancement flap repair, Adenocarcinoma

## INTRODUCTION

Exstrophy-epispadias complex (ECE) is the most severe form of midline abdominal malformation and can be considered one of the most difficult entities encountered by urologists. Characteristic ECE defects include the urinary system, musculoskeletal system, pelvis, pelvic floor, abdominal wall, genitals, and sometimes the anal spine.<sup>1</sup> Currently, the diagnosis of bladder exstrophy is usually made by prenatal ultrasound or during the postpartum examination. In classic bladder exstrophy, the

bladder opens fully in the lower abdomen. The edges of the inner surface of the bladder are fused with the abdominal skin. The bladder templates are different sizes. The mucous membrane of the bladder has a reddish tint, and polyps may appear. The symphysis is broadly divided.<sup>2</sup> The ECE, which has different severity levels, covers a spectrum, ranging from epispadias (E), representing the mildest form, with lower and upper fissures, to full classical bladder exstrophy (CEB) and exstrophy of the cloaca (EC), and, as the most severe form called the OEIS (omphalocele, exstrophy,

imperforate anus, and spinal defects) complex. The estimated national incidence of bladder dystrophy among live births born in the United States from 1988 to 2000 was 2.15 per 100,000 people.<sup>3</sup> The incidence of bladder dystrophy was found between 1 in 10,000 and 1 in 50,000 live births.<sup>4</sup> The risk of neoplasia in adults born with classical dystrophy is 17.5%. The major risk for people exposed to a mixture of urine and feces in the colonic reservoir (38%) is the risk of bladder neoplasia in patients treated with bladder exstrophy is 4%. The risk is 700 times higher than in the general population.<sup>5</sup> Adenocarcinomas (75-85%) and SCC (5%) are the most common cancers. On the other hand, only 0.5-2% of bladder cancers in the normal population are adenocarcinomas.<sup>6,7</sup>

The bladder adenocarcinoma's histological subtypes can be mixed, enteric, mucinous, signet-ring cell, or non-specific. McIntosh and Worley found that bladder exstrophy glandular metaplasia was due to persistent infection of the bladder and environment and also due to the production of protective mucus; it was the site of a malignant transformation.<sup>6</sup> Adenocarcinomas of the external bladder also have the epithelium of the colon, which covers the mucous membrane of the organ. Smeulders found that chronic irritation and infection lead to the metaplastic transformation of the urothelium. Malignant changes are most likely.<sup>5</sup>

It is usually surgically corrected in the neonatal period, so presentation in adults with untreated bladder exstrophy is much rarer. It can exist in both developing and developed countries. In developing countries, lack of knowledge, financial constraints, and many other social factors cause health care to fail due to social neglect and a lack of support. A very small subset of these presents with primary bladder cancer at admission.

## CASE SERIES

### Case 1

A 37-year-old Christian male patient from Sonitpur, Assam, was referred from a private hospital with the chief complaint of pain and hypersensitivity over a congenital defect in the lower abdomen, leading to an inability to bear any clothing while sleeping. He also complained of developing a painful swelling over the right side of his groin. He also gave a history of tobacco chewing for about 18 years and alcohol consumption for 15 years.

On examination, it was found to have an inflamed hyper granulated bladder base in classical exstrophy with a palpable tender lymph node of size about 4cm in the right inguinal region. The ureteric orifice was not visualized separately, and genital epispadias can be seen. The scrotum is underdeveloped, with small bilateral testicles. The pubis is widely separated by the divergence of the rectus abdominis (Figure 1).



**Figure 1: Case 1, at presentation, no visible growth.**

On investigation, the patient had low hemoglobin (9.1 mg/dl) and a raised serum creatinine (1.7 mg/dl). On contrast-enhanced CT whole abdomen scan, a defect of size about  $5.3 \times 4.5 \times 3.8$  cm was noted in the anterior abdominal wall; the urinary bladder posterior wall protruded through it. A heterogeneously enhancing nodal mass ( $4.6 \times 2.5 \times 5.4$  cm) was noted in the intramuscular subcutaneous plane of the anterolateral abdominal wall. A bladder wall trucut biopsy was taken, showing features of tubular adenoma with low-grade dysplasia. detrusor muscle and a few displaced glands were positive, and the mucosa showed squamous metaplasia. However, a right inguinal trucut biopsy of the right inguinal lymph node showed lymphoid tissue with atypically large nucleolated cells in a polymorphic background, features suspicious of atypia. The patient underwent a simple cystoprostatectomy with bilateral uretersigmoidostomies and a right inguinal lymphadenectomy with a wide skin margin. The closure was done with a primary tension closure with a monofilament suture. The final histopathology reports suggest adenocarcinoma of the urinary bladder. The patient developed a surgical site infection and a fecal fistula on follow-up (Figure 2).



**Figure 2: Case 1, post operative give away suture line.**

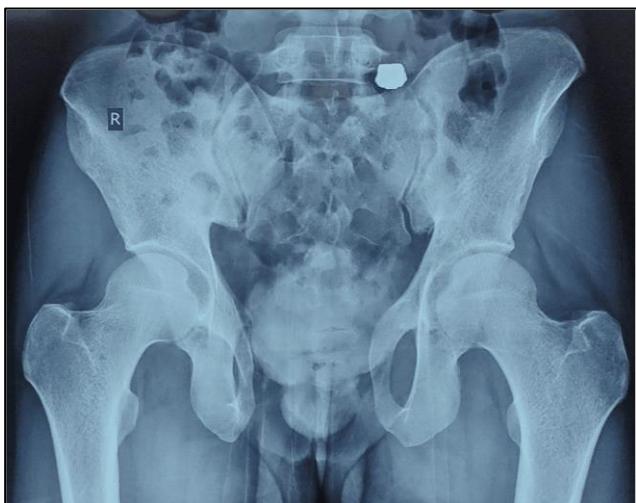
### Case 2

A 19-year-old Hindu male patient hailing from Udaguri, Barpeta, Assam, was referred to our hospital by a local primary health center with the chief complaint of continuous dribbling of urine from a defect in the lower abdomen below the umbilicus since birth. He was an non-alcoholic smoker and a non- tobacco chewer. A visible, non-tender, slow-growing mass gradually developed in the lower abdomen, from which occasional bleeding occurred for 15 days. On examination, the umbilicus cannot be appreciated; however, there is a classical bladder exstrophy defect over the hypogastric region of about  $8 \times 7$  cm, through which hyper granulated fungating growth from the posterior wall of the bladder protrudes and bleeds on touch. The bilateral ureteric orifice was not appreciated (Figure 3).



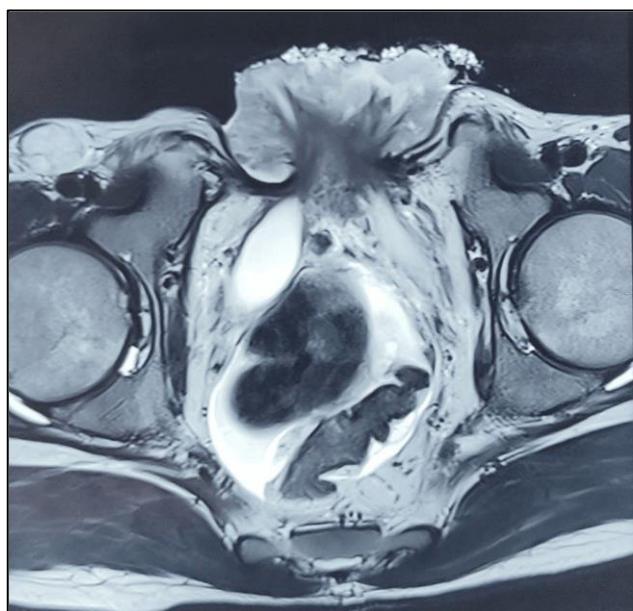
**Figure 3: Case 2, at presentation a visible growth can be seen.**

Routine blood investigations were normal. However, an X-ray of the hip region shows a diversion of the pubic bone along with the external rotation of hip (Figure 4).



**Figure 4: Case 2, X-ray hip.**

Ultrasound shows right-side hydronephrosis and herniation of the urinary bladder through the anterior abdominal wall defect, forming a mass-like lesion measuring  $5 \times 5.9$  cm. Contrast-enhanced MRI shows irregular asymmetrical wall thickening with gross attenuation of the lumen involving bilateral VUJ with hydronephrosis. It shows diffusion restriction with post-contrast enhancement (Figure 5).



**Figure 5: Case 2, MRI pelvis, axial view.**

Radical cystoprostatectomy with total penectomy followed by an ileal conduit and an expanded local lymphadenectomy with a 1 cm skin margin the defect in the pelvis and abdominal wall was repaired using bilateral rectus muscles as a flap and reinforced with mesh to fill the gap (Figure 6 and 7).



**Figure 6: Case 2, post operative specimen.**



**Figure 7: Case 2, bilateral rectus muscle flap.**

On follow-up, the patient developed a gap over the mesh along the suture line, which healed by secondary intension.

However, the patient developed metastatic growth at the healing suture line after 6 months (Figure 8).



**Figure 8: Case 2, suture line recurrence.**

The final histopathology report confirms adenocarcinoma of the urinary bladder with positive iliac lymphadenopathy. The patient was transferred to the department of oncology for further management.

### **Case 3**

A 26-year-old Hindu female from Sonitpur, Assam an ill-defined mass protruding from the lower abdomen with urine leakage. midline lower abdomen in hypogastrium with the passage of urine from two orifices, associated with non-radiating intermittent pain. She was a non-alcoholic, a non-smoker, and a non-tobacco chewer. She was having a regular 28-day menstrual cycle (Figure 9).



**Figure 9: Case 3, at presentation no visible growth.**

Her routine blood investigations were in the normal range. Her X-ray hip shows a widening of the pubic symphysis and a gap between two pubic bones-pubic diastases. Her contrast-enhanced CT of the whole abdomen shows exteriorization of the urinary bladder (54×56 mm) in the anterior abdominal wall and associated wall thickening, which shows post-contrast enhancement. A simple cystectomy with ileal conduit and wide local excision (1 cm margin of resection) of skin rotation-advancement flap repair of the lower abdominal defect was done. On follow-up after 1 week, a small necrotic lesion on the incision site at the tension point healed by secondary intension after regular dressing for 10 days (Figure 10).



**Figure 10: Case 3, skin rotation flap.**

The final report of histopathology suggests signet-ring cell type adenocarcinoma of the bladder, with all margins free of tumor and no lymph node involvement. The ureteric margins were also free of tumors. No adjuvant therapy was given.

## DISCUSSION

In the search to develop a model that accommodates holistic care in bladder exstrophy, highlighting the challenges faced in various aspects of management that affect the outcome is warranted. In this case series, we outline the journey of three patients with classical bladder exstrophy with adenocarcinoma in adulthood treated in a tertiary hospital, Gauhati medical college, Guwahati, Assam, which is the largest teaching and referral center in the states of the North East region of India, with particular emphasis on the various factors that require attention during the management of this complex anomaly. Bladder exstrophy is extremely rare in adulthood because definitive treatment with primary reconstruction is possible in infancy. When untreated, this condition has malignant potential.<sup>8</sup> Previously, uretersigmoidostomy was the form of urinary diversion performed in these patients. Matsuda et al reported the first case managed by a continent pouch. The Kock ideal neobladder overcomes the difficulties associated with uretersigmoidostomy: upper tract infection, hydronephrosis, metabolic and electrolyte disturbances, fecal incontinence, and colonic neoplasia.<sup>9</sup> Cystectomy and urinary diversion are recommended because the bladder plate is thick, scarred, and inflamed by long-standing irritation. The goal of successful treatment of bladder exstrophy is successful bladder closure and reconstruction of the penis to ensure proper function and good performance of the low-pressure reservoir. The aesthetic appearance of a fully functional genital organ ultimately preserves renal function. With utmost distress to the patient and family due to the apparent physical anomaly and constant urine dribbling, which is socially unacceptable due to the complex anatomy of bladder exstrophy.<sup>10</sup> Primary surgical treatment in such cases remains the management of choice. However, surgeons cannot give complete assurance of repair and complications. It requires a systematic approach to address all patient components, namely, anatomic, functional, cosmetic, sexual, reproductive, and psychosocial aspects. Urinary diversion using a uretersigmoidostomy was the conventional therapy up until the late 1950s. The first staged reconstruction for exstrophy done was modern staged repair (MSRE) in the 1970s.<sup>11</sup> The radical mobilization of soft tissues (RMST) and complete primary repair of exstrophy (CPRE) were developed sequentially.

Studies show systemic chemotherapy is ineffective for non-urothelial carcinoma cases like adenocarcinoma and SCC.<sup>12,13</sup> After ruling out other potential sites of primary cancer, the best treatment for such instances is radical cystectomy with broad local excision of the skin margin followed by an ileal conduit.<sup>14</sup> Because of the often-big defect and the widely separated rectus in these patients due to pubic dilatation, lower abdominal defect repair following exstrophy bladder excision is difficult. Therefore, the rectus abdominis rotation flap, fascia-cutaneous M-plasty, and Cardiff repair with Onlay mesh

repair were the possibilities for repairing the defect.<sup>15,16</sup> Abdominal wall closure without an osteotomy is challenging.<sup>11</sup> We have tried different methods for the closure of abdominal defects after radical cystectomy in all three cases presented. We recommend the rectus abdominis rotation flap as it is based on the inferior epigastric artery and may be locally raised without mesh placement, which has its postoperative complications. After one year of follow-up, my first two patients died due to complications of sepsis and metastasis, with the immediate cause being sudden cardiac arrest. In the third case, we used skin rotation- advanced flap repair on regular follow-ups without any major complaints.

## CONCLUSION

An adult reporting bladder exstrophy should be immediately examined extensively with contrast-enhanced radiography (CECT), a biopsy should be taken, and counselling should be done to go for radical cystectomy with lymphadenectomy with skin rotation-advancement flap repair for the abdominal defect. Most important is community education and awareness about congenital disabilities and their time management. However, it requires further extensive studies for best management.

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