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# Abdominal wall closure in bladder exstrophy complex repair by rectus flap

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## Abstract

**Background and Objectives:** The Exstrophy Complex (EC) is a serious malformation of midline abdominal wall. Wide pubis prevents approximating the lateralized rectus muscle and leads to dehiscence and fistula formation. Our aim was to recommend an easier method for abdominal wall closure in the Bladder Exstrophy (BE) complex repair.

**Materials and Methods:** From November 2007 to April 2010, we had three case of Cloacal Exstrophy (CE) and 10 BE, in which early bladder closure and coverage were performed by wide mobilization of bladder and rectus muscle flap closure in the midline without pubic closure.

**Results:** Two cases of CE had only minor wound dehiscence and bladder prolapsed later. One of the 10 BE cases developed vesicocutaneous fistula and the other two had minor wound dehiscence.

**Conclusions:** Our Technique reconstructed the abdominal wall with less morbidity and hospitalization because of tensionless closure.

**Keywords:** Abdominal wall closure, bladder exstrophy, rectus flap

## Résumé

**Contexte et objectifs:** Exstrophy le complexe (EC) est une grave malformation de la paroi abdominale de la ligne médiane. Large pubienne empêche de se rapprocher du muscle rectus latéralisation et conduit à la formation de fistule et de déhiscence. Notre objectif était de recommander une méthode simplifiée de fermeture de la paroi abdominale dans la réparation complexe de la vessie Exstrophy (BE).

**Méthodes et matériaux:** De novembre 2007 à avril 2010, nous avons eu trois cas de cloacaux Exstrophy (CE) et 10 BE, dont la couverture et la fermeture anticipée de la vessie ont été effectuées par large mobilisation de la vessie et rectus fermeture de Rabat musculaires dans la ligne médiane sans poils pubiens fermeture.

**Résultats:** Deux cas de CE avaient déhiscence plaies mineures et la vessie prolabées plus tard. L'un des 10 cas BE développé vesicocutaneous fistule et les deux autres avaient une blessure mineure déhiscence.

**Conclusions:** Notre Technique reconstruit la paroi abdominale avec moins de morbidité et hospitalisation en raison de la fermeture de tensionless.

**Mots clés:** Fermeture de la paroi abdominale, Exstrophy de la vessie, rectus flap

## Introduction

The Exstrophy Complex (EC) is a serious malformation of the abdominal wall. The main purpose of early surgery is to secure abdominal wall

for achieving bladder closure, which subsequently leads to urinary continence with preservation of renal function.<sup>[1]</sup> Delayed closure leads to further inflammatory or mechanical alterations; meanwhile, not closing the pubic bone by osteotomy may

predispose the patients to rectal prolapse, anal incontinence, and uterine prolapses occasionally.<sup>[2,3]</sup> The important steps in the repair of EC is a secured closed and growing bladder, without damaging the tiny pelvis of small neonate with improper osteotomy.

## Materials and Methods

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During November 2007-April 2010, three cases of EC (one boy, two girls) and 10 cases of Bladder Exstrophy (BE) [seven boys, three girls] with median age (range, 3 days to 26 years) were referred to our center. Our method was approved by university ethics committee and written consent was taken from the parents of the children. Bladder closure were performed as earlier methods in all patients.<sup>[1,2]</sup> However, we deferred from pubic closure in the abdominal wall closure by incising the inferior attachments of rectus muscles with a slice of pubic bone that was cut with diathermy from the pubis and performing an upper relaxing incision on the fascia of upper parts of both rectus muscles after mobilizing bilateral large skin flaps. Later, relaxed fascia and muscles of the abdominal wall were closed with heavy nonabsorbable suture in the midline over the bladder and posterior urethra.

All patients received local cleansing and antibiotic ointment until full healing occurred along with sufficient pain medication. There was no traction during the care and the infants accessed free movement that gave their mothers better cooperation in caring for them. The ureteral catheter was removed 3-4 weeks after surgery. The patients were followed by sonography for hydronephrosis and size of bladder for 6 months until adequate size of bladder reached for the second stage of operation [Figures 1 and 3].

## Results

A total of 13 patients with median age of 2 months (2 days to 26 years) were followed up during study. Male/female ratio was 1.5/1. Three cases had CE and 10 had BE, while other anomalies were observed in 25% (two myelomeningocele, one clubfoot). The mean operation time was  $117 \pm 34$  min (range, 80-180). The mean healing day was  $27.6 \pm 13$  (range, 14-50). Outcome evaluation showed bladder volume  $65.5 \pm 18$  mm (range, 40-100), without pelvic bone traction in all studied cases. Major complications were seen in four cases.

## Discussion

Reconstruction methods have always looked for easier symphyseal approximation, abdominal wall

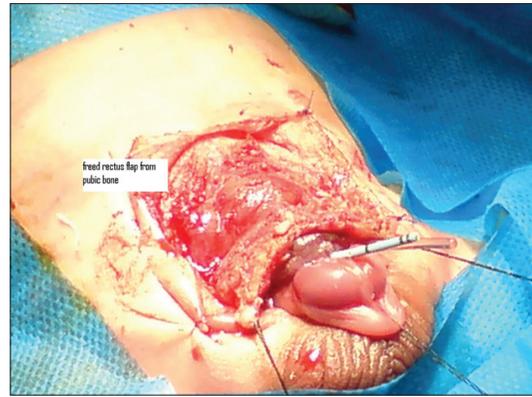


Figure 1: Bladder closed and rectus flap released from attachment

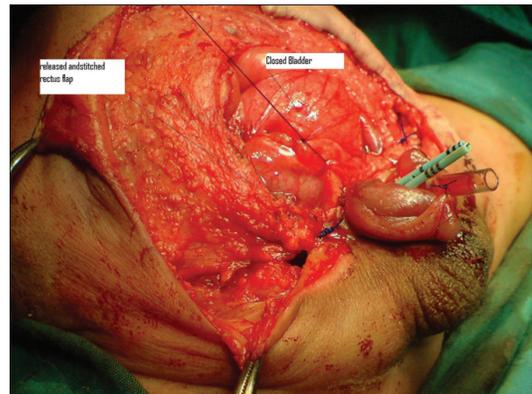


Figure 2: Rectus flap closed in the midline



Figure 3: Two months after closure

closure, placement of the entire bladder deep into the pelvis and re-approximation of the pelvic floor towards the midline.<sup>[1]</sup>

Osteotomy has gained importance in the prevention of uterine prolapse and the overall functional outcome; despite this, the reconstructive methods used to close the pelvis in early childhood, the symphysis will always reopen and influence the reconstructive surgery of pelvic soft tissue.<sup>[2,3]</sup> Rectus fascial flaps have been used in abdominal closure when wide diastasis of the rectal muscles is

present and when the lower abdomen lacks fascial support because lack of support predisposes the bladder to reopening as well as fistula formation.<sup>[4-6]</sup>

Our cases had no pubic closure in the first stage and a tension-free closure was possible for restoration of the abdominal wall. But, Hernandez *et al.*<sup>[7]</sup> reported that 90% of complications were seen in patients that underwent bladder repair and pubic closure without osteotomy. However, in large series effects of osteotomy in outcome bladder repaired were not mentioned, though we did not have to close the pubic bone, and thus the need of osteotomy was postponed.

Rectus abdominus has been used for reconstruction of the abdominal wall in severe cases of bladder exstrophy. Horton *et al.*<sup>[4]</sup> used inferiorly based rectus abdominus muscle flaps for constructing a firm abdominal without osteotomy. Mansour *et al.*<sup>[5]</sup> constructed the abdominal wall from the remaining muscular part of bladder wall and coverage of new urinary conduit, while Celayir *et al.*<sup>[6]</sup> performed augmentation of the small contracted bladder.

Our experience showed that for abdominal wall closure, there was no need for forceful pubic closure or use of osteotomy for protection of closed bladder and posterior urethra in the first stage of operation

and the set goals were achieved successfully.

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