



Use of muscle pedicle flaps for failed bladder neck closure in the exstrophy spectrum

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Keywords
Bladder exstrophy; Urinary
incontinence; Urinary
diversion; Urologic surgical
procedures

Received 2 December 2015
Accepted 22 March 2016
Available online 31 March 2016

Summary

Purpose

The authors have reviewed the use of muscle pedicle flaps for the treatment of failed bladder neck closure in exstrophy spectrum patients.

Methods

A retrospective review of all exstrophy spectrum patients who underwent continence procedures with the use of muscle pedicle flaps at our institution during the last 15 years was performed. Patient characteristics, surgical history, and outcomes, including complications, continence, morbidity, and infection, were assessed. The authors utilized muscle pedicle flaps in eight exstrophy patients, including four patients with classic bladder exstrophy and four patients with cloacal exstrophy. Seven of eight patients had failed at least one prior bladder neck closure, and they had undergone a median of three prior urologic procedures. To achieve continence, five rectus muscle flaps and three

gracilis muscle flaps were utilized in combination with bladder neck closure.

Results

There were no major intraoperative or post-operative complications. All patients were initially continent, and after a median follow-up of 18.7 months seven of eight patients were continent. One patient required continent urinary stoma revision and one patient developed perineal incontinence after perineal trauma. No patients required revision of, or additional, continence procedures at the bladder neck.

Discussion

The use of pedicle muscle flaps appears to be a safe and feasible option for exstrophy spectrum patients with failed bladder neck closure. Although achieving continence can be difficult in this population, use of muscle flaps and bladder neck closure is a viable and effective option in this challenging subset of patients.

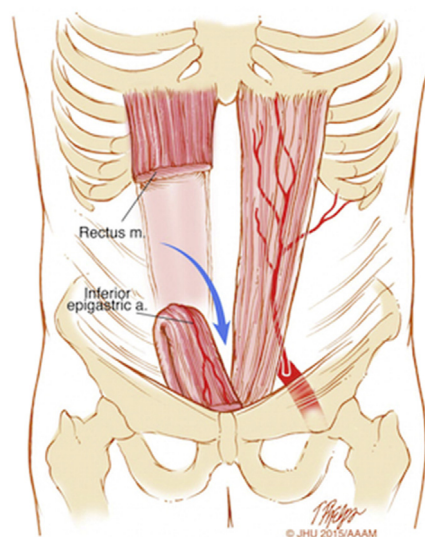


Figure Rectus muscle flap with vascular pedicle via the inferior epigastrics.

Introduction

Obtaining urinary continence remains a major goal in the treatment of bladder and cloacal exstrophy. Towards this goal, patients undergoing the modern staged repair of exstrophy (MSRE) approach undergo bladder neck reconstruction (BNR) at 4–5 years of age. Likewise, patients undergoing the complete primary repair of exstrophy (CPRE) who remain incontinent may require BNR [1]. Overall, contemporary continence rates using either approach range from 70% to 90%, depending on patient factors, including success and timing of initial bladder closure [2–4]. A subset of patients with exstrophy can be especially challenging, and often require multiple continence procedures [5,6]. In patients with refractory incontinence following BNR, or bladder templates too small for BNR, bladder neck closure (BNC) with continent urinary diversion can be utilized to attain urinary continence [7]. Here the authors present their experience with muscle pedicle flaps in the exstrophy population undergoing surgery for failed BNC.

Materials and methods

The medical records of exstrophy patients who had failed prior continence procedures and underwent surgery with the use of pedicled muscle flaps between 2000 and 2015 were retrospectively reviewed from an institutionally approved database. All previous and subsequent surgical procedures, urinary continence rates, renal function and renal ultrasound results, surgical complications, urinary tract infections, fistula formation, success rates, functional deficits, and cosmetic outcomes were analyzed.

Rectus and gracilis pedicled muscle flaps were developed using standard techniques. No patients required preoperative imaging. For rectus flaps, a unilateral myofascial rectus muscle flap of sufficient length to reach the bladder neck was transected superiorly and separated from the anterior rectus sheath to the level of the pubis, with care taken to preserve blood supply via the inferior epigastrics (Fig. 1). Gracilis muscle flaps were developed through a medial thigh incision, transected near the point of distal and proximal insertions, with care to preserve the gracilis vessels, and then tunneled superiorly to reach the bladder neck. BNC was performed in the manner of Khoury et al. [8]. After transection, the posterior bladder neck was dissected off of the rectum to elevate the bladder neck suture line anteriorly. Both the urethra and bladder neck were then closed in two layers. The pedicled muscle flap was then developed and interposed between the bladder neck and urethral suture lines. It is our practice to commonly perform continent urinary diversion (CUD) via Monti or Mitrofanoff procedures, with enterocystoplasty (bladder augmentation – BA) if needed, at the time of initial BNC. Many patients, in our experience, do not require revision of their existing CUD or augmentation at the time of repeat BNC with muscle flaps.

Results

A total of eight patients underwent surgery for pedicle muscle flaps during our study period, with seven performed

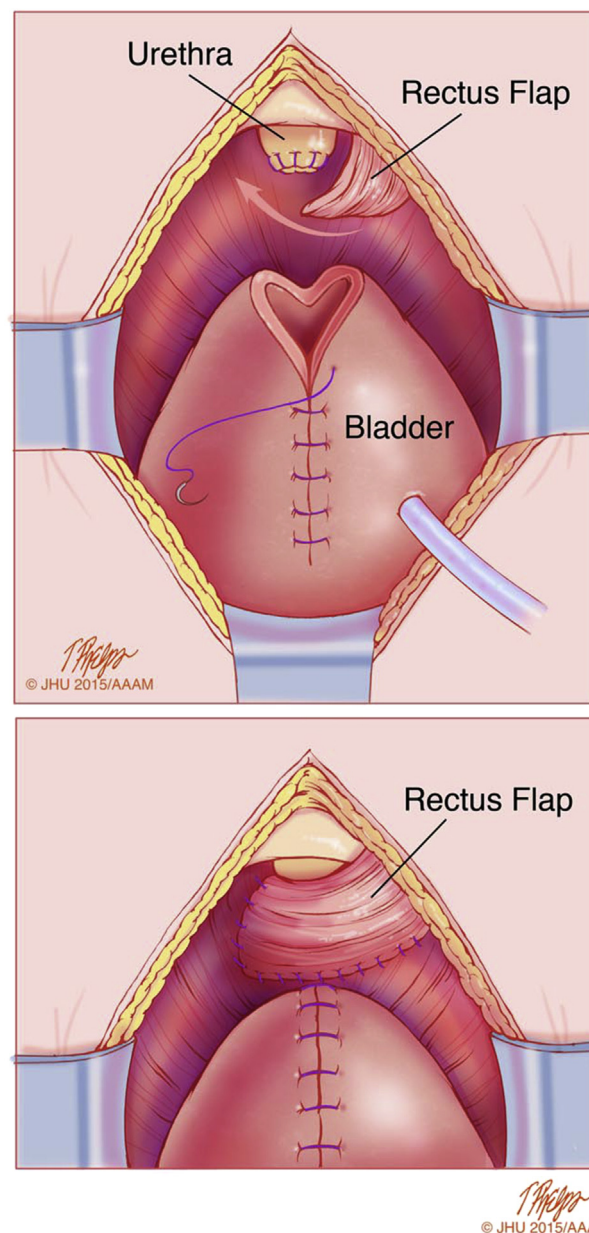


Figure 1 Rectus muscle flap with inferior epigastric pedicle providing coverage of transected urethra and bladder neck.

for failure of prior BNC. Our population included four male patients born with classic bladder exstrophy (CBE) and four female patients with cloacal exstrophy (CE). Overall, patients underwent a median number of three genitourinary surgeries prior to their muscle flap procedure. All patients underwent successful primary exstrophy repairs in infancy, with six patients undergoing MSRE and two CPRE. Three of four male patients underwent epispadias repair prior to their initial BNC. Seven patients had BNC as their initial continence procedure, at a median age of 9.7 years of age. All patients had poor bladder growth prior to their initial BNC, with an average bladder capacity 20% of that expected for their age. As such, six patients had bladder augmentation with enterocystoplasty with their initial BNC. As necessitated by BNC, all patients underwent CUD with

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