

Posterior iliac osteotomy in modern neonatal bladder exstrophy repair: a case report

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Introduction and importance: Pelvic osteotomy remains an important adjunct in selected cases of bladder exstrophy to facilitate tension-free closure. Although posterior iliac osteotomy was widely used in earlier decades, contemporary practice has largely shifted toward anterior osteotomy or selective non-osteotomy approaches. Its role in neonates remains debated, particularly in relation to long-term functional and aesthetic outcomes.

Presentation of case: We report the case of a female neonate with classic bladder exstrophy who underwent bilateral posterior iliac osteotomy, followed by primary bladder closure, bilateral inguinal hernia repair, and abdominal wall reconstruction with umbilical reconstruction. Postoperative management included 3 weeks of immobilization, short-term neuromuscular blockade, prophylactic antibiotics, anticholinergic therapy, and structured physiotherapy. At a 17-year follow-up, the patient achieved sustained urinary continence, with dry intervals exceeding three hours, preserved renal function, absence of recurrent urinary tract infections, and excellent cosmetic outcomes of the abdomen and external genitalia.

Clinical discussion: Posterior iliac osteotomy allows pelvic realignment and facilitates tension-free abdominal closure in neonates with wide pubic diastasis and rigid pelvic configuration. Although infrequently used in current practice, it may remain a valuable option in anatomically selected cases when alternative reconstructive strategies are unlikely to provide adequate approximation.

Conclusion: Posterior iliac osteotomy can be a safe and effective option in selected neonates with bladder exstrophy, providing durable, functional, and aesthetic outcomes, as demonstrated by this long-term follow-up case.

Keywords: bladder exstrophy, case report, neonatal surgery, pelvic osteotomy, posterior iliac osteotomy, urinary continence

Introduction

The exstrophy–epispadias complex represents one of the most challenging congenital anomalies in pediatric urology. Surgical management aims to achieve bladder closure, preserve renal function, promote urinary continence, and optimize cosmetic and psychosocial outcomes.

Pelvic osteotomy has historically played a role in facilitating tension-free closure by reducing pubic diastasis and improving pelvic floor alignment. While posterior iliac osteotomy was widely adopted in the mid-20th century, contemporary

HIGHLIGHTS

- Posterior iliac osteotomy may still be indicated in selected neonatal bladder exstrophy cases.
- This report presents a 17-year follow-up with sustained continence and preserved renal function.
- The procedure facilitated tension-free closure without external fixation.
- Long-term functional and aesthetic outcomes were favorable.
- Individualized anatomical assessment remains essential in surgical planning.

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reconstructive strategies more frequently employ anterior innominate osteotomy or selective non-osteotomy approaches within complete primary repair or staged protocols^[1–3].

Recent literature emphasizes individualized surgical planning based on pelvic morphology, the degree of pubic diastasis, and tissue compliance^[2,4]. In addition, patient-reported outcome measures have highlighted the importance of aesthetic results and genital appearance in long-term quality of life^[5].

Recent multicenter studies and long-term outcome analyses have reinforced the importance of individualized surgical strategies and multidisciplinary follow-up in optimizing continence and renal outcomes in patients with bladder exstrophy^[6,7].

We report a neonatal case managed with posterior iliac osteotomy, emphasizing anatomical indications, as well as long-term functional and cosmetic outcomes after 17 years of follow-up.

Methods

This work has been reported in line with the SCARE 2025 criteria^[8].

Case presentation

A female neonate was referred to our tertiary referral center on the first day of life with a diagnosis of classic bladder exstrophy. Clinical examination demonstrated wide pubic diastasis and a relatively rigid pelvic configuration, raising concerns regarding the feasibility of tension-free abdominal closure without pelvic realignment.

On the second day of life, the patient underwent bilateral posterior iliac osteotomy, followed by primary bladder closure, bilateral inguinal hernia repair, and abdominal wall reconstruction with umbilical reconstruction (Figs 1 and 2). The posterior approach was selected due to the degree of pubic separation, intraoperative assessment of pelvic rigidity, and the anticipated difficulty in achieving adequate approximation using soft-tissue mobilization alone.

Immediately after surgery, the abdominal wall demonstrated satisfactory alignment without excessive tension (Fig. 2B). Postoperatively, the patient remained immobilized for 3 weeks to allow pelvic stabilization (Fig. 3A). Neuromuscular blockade was maintained for 48 hours, followed by standard neonatal postoperative care.

Prophylactic antibiotics and anticholinergic therapy (oxybutynin) were administered during infancy to reduce bladder pressure and protect upper urinary tract function. Two urinary tract infections occurred during the first year of life and were successfully treated with intravenous antibiotics. No recurrent infections were documented thereafter.

Long-term follow-up involved a multidisciplinary team, including pediatric urology, orthopedics, and physiotherapy. Surveillance included clinical assessment, renal function testing, ultrasonography, and continence evaluation. Structured physiotherapy was implemented throughout childhood and adolescence to optimize pelvic floor function.

The patient later developed small bladder calculi, which were successfully managed endoscopically without recurrence. Seventeen years after surgery, she demonstrates sustained urinary

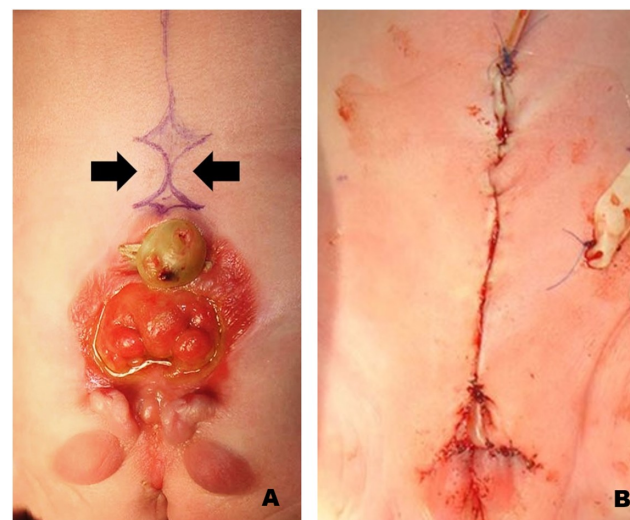


Figure 2. (A) Preoperative marking for umbilical reconstruction (arrows), designed to recreate a natural umbilical contour during abdominal wall closure. (B) Immediate postoperative anterior view of the abdominal region following bladder closure and abdominal wall reconstruction. The abdominal wall is successfully approximated with midline umbilical reconstruction.

continence with dry intervals exceeding three hours, normal renal function, no urinary tract infections for over 15 years, and she reports normal sexual activity. The aesthetic outcome shows a well-formed abdominal wall and umbilicus, with a well-healed midline scar (Fig. 3B).

Discussion

The management of bladder exstrophy has evolved significantly over the past decades, with modern protocols emphasizing early closure, multidisciplinary care, and long-term functional optimization^[1,2]. Pelvic osteotomy remains an important adjunct in selected neonates, particularly when wide pubic diastasis and pelvic rigidity compromise tension-free closure.

Contemporary series most commonly describe anterior innominate osteotomy in conjunction with complete primary repair,

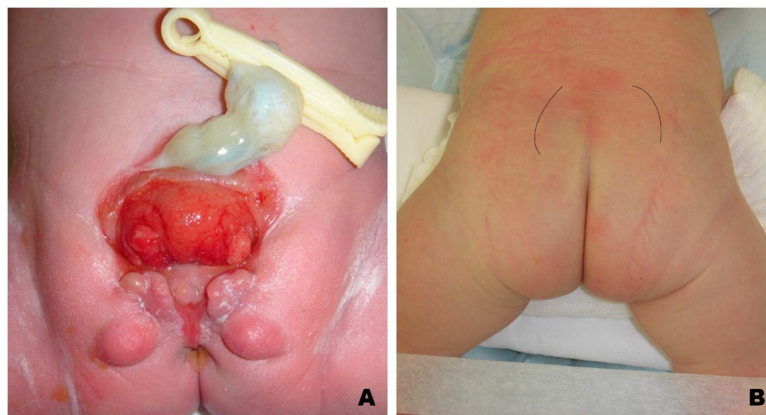


Figure 1. (A) Preoperative anterior view of the abdominal and pelvic region in a newborn female with classic bladder exstrophy. The bladder plate is completely exposed with wide pubic diastasis and normal umbilical cord insertion. The urethral plate and genital folds are visible prior to reconstruction. (B) Patient in prone position demonstrating the bilateral skin incisions over the posterior iliac crests for posterior iliac osteotomy before bladder closure.



Figure 3. (A) Postoperative immobilization with lower limb casting following pelvic osteotomy, maintaining alignment during the three-week stabilization period. (B) Anterior view of the abdominal and pelvic region at 17-year follow-up, demonstrating a well-healed midline scar and satisfactory cosmetic outcome.

while some centers report successful closure without osteotomy in selected newborns^[3,4]. Nevertheless, pelvic morphology is heterogeneous, and individualized anatomical assessment remains essential.

Recent comparative studies suggest that the decision to perform pelvic osteotomy should be individualized, as selected neonates may achieve successful closure without osteotomy, whereas others with significant pubic diastasis benefit from pelvic realignment to reduce closure tension and improve long-term outcomes^[7,9].

Posterior iliac osteotomy offers certain theoretical advantages in neonates. It allows pelvic mobilization without the need for external fixation and may be technically straightforward in experienced hands. In this case, the combination of marked pubic separation and limited pelvic compliance justified its use.

Beyond technical closure, long-term outcomes must consider urinary continence, renal preservation, and aesthetic appearance. Recent patient-centered research underscores that cosmetic results significantly influence psychosocial well-being and quality of life in adolescents and adults with exstrophy^[5]. The favorable abdominal and genital appearance observed 17 years after surgery supports the importance of integrating functional and aesthetic goals.

This report does not advocate the routine use of posterior iliac osteotomy; rather, it illustrates that the technique may remain relevant in anatomically selected neonates when alternative strategies may not ensure optimal closure.

Limitations

This report describes a single patient and, therefore, does not permit generalization of outcomes. However, the exceptionally long follow-up and comprehensive functional and aesthetic evaluation provide valuable insight into the potential durability of posterior iliac osteotomy in selected cases.

Conclusion

Posterior iliac osteotomy remains a valuable option in neonatal bladder exstrophy when anatomical characteristics favor its use.

In selected cases, it may facilitate tension-free closure, optimize pelvic alignment, and contribute to durable urinary continence and satisfactory cosmetic outcomes.

Long-term follow-up, as demonstrated in this case, reinforces the importance of individualized surgical planning and multidisciplinary management.

Ethical approval

This case report was approved by the Ethics Committee of Hospital Santa Marcelina (Approval Number: HSM-122-2025). The study was conducted in accordance with international guidelines for case reports.

Consent

Written informed consent was obtained from the patient's legal guardians for the publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal upon request.

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Conflicts of interest disclosure

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Author contributions

F.F.L.G.: conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, supervision, validation, writing. K.F.M.: conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources. V.G.: conceptualization, data curation, funding acquisition, project administration, resources. B.S.R.: conceptualization, data curation, formal analysis, funding acquisition, project administration, resources. M.F.B.R.: conceptualization, data curation, formal analysis, funding acquisition, project administration, resources. M.C.G.A.: conceptualization, data curation, formal analysis, funding acquisition, project administration, resources.

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Data availability statement

No datasets were generated or analyzed during the current study. All relevant clinical information supporting the findings of this case report is included within the article. Additional information is available from the corresponding author upon reasonable request, subject to the protection of patient confidentiality.

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