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Opinion Article

Advancing Bladder Exstrophy Repair for Delayed Elective Reconstruction in Dedicated Units

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DESCRIPTION

Bladder Exstrophy (BE) is a complex congenital anomaly involving both soft tissue and bony structures. At its core, this condition is a challenge of anatomy, physiology, and surgical finesse. Managing it successfully requires not just technical skill but also a well-coordinated, multidisciplinary approach. Since 2007, a dedicated team in the United Kingdom has embraced a Delayed Elective Repair (DER) protocol for Classic Bladder Exstrophy (CBE) and Exstrophy Variants (BEV), and their experience now represents one of the most robust clinical series in modern exstrophy management. Their results speak to the power of focused expertise and a patient-centered strategy.

Historically, many centers have favored early neonatal closure of BE based on the notion that the pliability of the infant pelvis allows for approximation of the pubic bones without osteotomy. This assumption, while valid in isolated cases, does not universally translate into consistent success. Premature closure, especially in resource-limited or non-specialized settings, is often associated with high complication rates including wound dehiscence, bladder prolapse, and long-term incontinence.

In contrast, the DER approach advocates a carefully timed closure, typically around 7 to 8 months of age. At this age, the infant's anatomy is more defined, but still flexible enough to permit surgical manipulation. The real differentiator in this strategy, however, is the integration of dedicated orthopedic techniques namely, the anterior oblique 'L-shape' osteotomy and external fixation, combined with the use of a mermaid bandage rather than traditional lower-limb traction. These elements create a stable pelvic environment that promotes optimal healing of both the abdominal wall and the reconstructed bladder.

The staged DER protocol begins with bladder closure and bilateral ureteric reimplantation, alongside tubularisation of the posterior urethra. The meticulous reconstruction is supported by the orthopedic team through tailored pelvic osteotomy, adjusted to the degree of pubic diastasis. The external fixator, which remains in place for just under a month, ensures maintained alignment during critical early healing. Crucially, epispadias repair is deferred by 6 to 18 months, allowing time for tissue recovery and bladder growth.

This approach has delivered remarkable results: a 100% closure success rate with no cases of major wound breakdown, no significant orthopedic complications, and no ischemic penile injuries a feared consequence of overzealous tissue mobilization during early repairs. The only notable complication was a single superficial wound infection, which was resolved with minor intervention. Such consistency and safety are rarely reported in congenital reconstructive urology, and they deserve attention.

One of the most common concerns in exstrophy repair is the risk of upper tract damage from either high-pressure bladders or vesicoureteral reflux. Here again, the DER technique appears to excel. Short- and mid-term follow-up has shown only mild and manageable hydronephrosis or distal ureteral dilation in a handful of patients. Two required early augmentation due to bladder non-compliance an outcome expected in a subset of cases regardless of the repair technique.

More importantly, renal preservation has been a standout success. With anticholinergic therapy and intermittent catheterization, conservative management has sufficed for nearly all patients, demonstrating the physiological benefits of bladder reconstruction in a well-controlled, staged setting. These outcomes also raise questions about the necessity of aggressive early bladder management, often aimed at "saving" upper tract function but at the cost of high procedural risk. It's no coincidence that these outcomes were achieved in a highly specialized environment. The volume of cases, combined with consistent team composition including dedicated pediatric urologists, orthopedic surgeons, and anesthesiologists has been critical. The same procedures attempted in general pediatric or low-volume institutions may not produce equivalent outcomes. This points to a broader theme in congenital surgery: complex problems demand concentrated expertise.

Furthermore, the data collected over a 16-year period from a prospective database offers a level of integrity and transparency that is sometimes missing in retrospective or anecdotal reports. With 115 patients included 103 with CBE and 12 with BEV the

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series is not only statistically significant, but clinically compelling. These findings could, and should, influence how national and international guidelines are shaped moving forward. In the era of evidence-based medicine, surgical dogma must give way to demonstrable outcomes. The UK team's experience with DER challenges the assumption that early neonatal repair is universally preferable. Their approach instead places patient safety, anatomical realism, and team expertise at the forefront. The success of DER lies not only in what is done but when and where it is done timing and setting matter just as much as technique.

CONCLUSION

While not every center can replicate this model immediately, the case for regionalizing complex congenital urological care into dedicated exstrophy units is stronger than ever. This would allow more children to benefit from proven protocols and reduce the risk of irreversible complications caused by early, poorly executed interventions. In summary, the UK experience with DER demonstrates that thoughtful timing, rigorous technique, and specialized teams are the keys to successful bladder exstrophy repair.