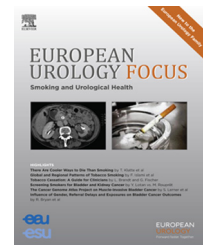


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Review – Reconstructive Urology

Outcomes of Early Endoscopic Realignment Versus Suprapubic Cystostomy and Delayed Urethroplasty for Pelvic Fracture-related Posterior Urethral Injuries: A Systematic Review

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Abstract

Context: The evidence base for optimal acute management of pelvic fracture-related posterior urethral injuries needs to be reviewed because of evolving endoscopic techniques. The current standard of care is suprapubic cystostomy followed by delayed urethroplasty.

Objective: To systematically review the evidence base comparing early endoscopic realignment with cystostomy and delayed urethroplasty regarding stricture rate, the need for subsequent procedures, and functional outcomes.

Evidence acquisition: A systematic search in Medline, Embase, Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Review, and www.clinicaltrials.gov without time or language limitations. Both medical subject heading and free text terms as well as variations of root word were searched. Randomised controlled trials (RCTs), nonrandomised comparative studies and single-arm case series were included, as long as ≥ 10 patients were enrolled. Data were narratively synthesised in light of methodological and clinical heterogeneity. The risk of bias of each included study was assessed.

Evidence synthesis: No RCTs were found. Six nonrandomised comparative studies and met inclusion criteria and were selected for data extraction. Noncomparative studies with more than 10 participants were included resulting in seven eligible studies. From the comparative papers the results of 219 patients were reported: 142 in the realignment group and 77 in the group undergoing cystostomy with delayed repair. The noncomparative studies reported on a further 150 cases. An overall stricture rate of 49% was evident in the endoscopic realignment group. Of these patients, 50% (28.1% overall) could be managed by endoscopic procedures and 40.3% (18.5% of intervention group) required anastomotic repair.

Conclusions: No RCTs were found and the included nonrandomised studies have heterogeneous populations and a high degree of bias. About half of the patients were free of stricture and thus did not undergo delayed urethroplasty in case early endoscopic realignment had been performed.

Patient summary: This systematic review of literature of urethral trauma revealed there are no well conducted comparative studies of newer endoscopic treatments versus standard treatments which include more extensive surgery. The results of the reports we selected based on specific characteristics are often influenced by variable factors. After careful analysis of these results we can conclude that the newer endoscopic techniques might resolve the risk of urethral injury due to pelvic fractures in about half of the patients. Because of various confounders we cannot identify those patients who would benefit from this procedure or who might be possibly harmed.

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1. Introduction

Blunt trauma to the male pelvis with pelvic ring disruption will result in posterior urethral injuries (PUI) in up to 10% of patients [1]. Certain pelvic fracture subtypes have a higher association with urethral disruption. Fractures not involving ischiopubic rami have almost no elevated risk. Koraitim [2] found the subtypes that are at higher risk are straddle injuries, in which all four pubic rami are fractured, or Malgaigne fractures, involving disruption through ischio-pubic rami anteriorly as well as through the sacrum or sacroiliac joint posteriorly. Long-term morbidity of PUIs is substantial, including urethral stricture, erectile dysfunction, and urinary incontinence.

The early management of PUI aims to reduce this long-term morbidity but remains controversial to date. This controversy is based on different treatment options that have been proposed in the early management.

These options include: immediate (<48 h after trauma) or primary delayed urethroplasty (2–14 d after trauma), immediate or primary delayed urethral realignment, or suprapubic cystostomy with delayed (>3 mo after trauma) urethroplasty.

Suprapubic cystostomy with delayed urethroplasty can always be considered in the early phase, but a long period of disability and discomfort due to the suprapubic catheter are clear disadvantages to this treatment strategy. Therefore, this strategy has been challenged by immediate or primary delayed realignment (if possible endoscopic) whenever the clinical condition of the patient allows it.

The aim of realignment is to correct severe distraction injuries rather than to prevent a stricture. Some authors report a lower stricture rate than with suprapubic catheter placement alone [3–5]. If scarring and subsequent stricture formation occurs, the restoration of urethral continuity is easier. For short, nonobliterative strictures, internal urethrotomy can be attempted [3–5]. For longer strictures, or in the case of failure of an internal urethrotomy, urethroplasty is required [3].

The debate against early realignment includes the view that complete urethral disruptions will not result in healing following primary realignment. The reported success rates could be explained by a number of partial urethral injuries which are likely to heal with a suprapubic catheter alone.

Primary realignment in the acute phase is also technically and logistically difficult. In case of failure, it may make subsequent urethroplasty more difficult [6,7].

The European Association of Urology trauma guideline panel conducted a systematic review on this subject to verify the outcomes of early endoscopic realignment (EER) compared to cystostomy with delayed urethroplasty.

2. Evidence acquisition

2.1. Search strategy and selection criteria

The review was performed according to Preferred Reporting Items for Systematic Reviews and Meta-analysis [10]. The search strategy is described in detail in the

Supplementary data. In short, Medline (from 1946), Embase (from 1974), Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews (from 2005), and www.clinicaltrial.gov without time, publication format, and language limitations were searched for all relevant publications. Both medical subject headings and free text terms as well as variations of root words were searched. Key terms related to traumatic urethral strictures were combined using the set operator AND with key terms related to endoscopy realignment or cystostomy or urethral/suprapubic catheterisation. Animal studies, studies in children, case reports, and letters were excluded. We also searched for any systematic reviews or randomised controlled trials related to urethra injury and pelvic fracture even if no treatment interventions were mentioned. As there were only a few comparative nonrandomised studies (NRCS), noncomparative studies (eg, single-arm case series; NCS) were included. A systematic literature search was initially performed in April 2015. An update on the search was done in April 2016.

2.2. Patients, intervention, comparator, and outcomes

Included patients were men with traumatic urethral posterior distraction injuries. An intervention group was formed of patients undergoing EER (<14 d). The comparator group was a patient cohort with cystostomy and delayed (>3 mo) urethral repair.

Primary outcomes were stricture rates and the need for auxiliary procedures. Secondary outcomes were post-traumatic urinary incontinence and impotence.

2.3. Data collection and data extraction

Following deduplication, two review authors (P.J.E. and E.V.) independently screened all abstracts and full-text articles for relevance to the defined inclusion and exclusion criteria. Any disagreements were resolved by discussion or by consulting a third review author (N.L.). The references cited in all full-text articles were also assessed for additional relevant articles. There were no limitations on study design or language and also conference abstracts were included. Studies with less than 10 patients per arm were excluded. No time restriction was used. A standardised data extraction form was used. Surgical data, stricture incidence, functional outcomes (urinary continence, sexual outcomes), and retreatment information were extracted.

2.4. Risk of bias in individual studies

Two reviewers (P.J.E and E.V) assessed the 'risk of bias' (RoB) of each included study independently. A modified version of the RoB assessment tool was used in assessing NRCSs [8]. A list of the five most important potential confounders for harm and benefit outcomes was developed a priori with clinical content experts (EAU Trauma guideline panel). The potential confounding factors were: age, preoperative continence rate, associated injuries, type of intervention and body mass index (BMI). The included studies were assessed

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