Incidence and Management of Urological Trauma at Targu - Jiu County Emergency Hospital. A Single-Center Retrospective Study

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ABSTRACT

Background: Urological trauma, although relatively rare, represents a critical category of injuries in emergency medicine, requiring prompt diagnosis and management. The growing number of road traffic and industrial accidents has led to an increased incidence of such cases globally.

Objective: This retrospective single-center study aims to evaluate the incidence, etiologies, and management strategies of urological trauma cases treated at the Târgu-Jiu County Emergency Hospital over an 18-month period.

Methods: A total of 98 trauma patients were analyzed between January 2023 and July 2024, of which 15 (15.3%) presented with urological injuries. Data were collected on the mechanism of injury, type of lesion (renal, bladder, or urethral), diagnostic modalities used, therapeutic interventions, and outcomes.

Results: Renal trauma accounted for 53.3% of urological injuries, primarily caused by road traffic accidents. Conservative treatment was effective in most cases, except for one nephrectomy due to hemodynamic instability. Bladder ruptures (40%) were exclusively linked to pelvic fractures from traffic accidents and required surgical repair. A single case of complete urethral rupture (6.6%) was managed through multidisciplinary surgical intervention. Favorable outcomes were achieved in all cases.

Conclusion: Urological trauma constituted a significant portion of trauma cases in this regional center, with road traffic accidents as the predominant cause (93%). Early diagnosis, proper classification, and a multidisciplinary approach were key factors in achieving successful outcomes. These findings emphasize the importance of trauma pattern recognition in areas with specific geographical and touristic characteristics.

Keywords: Urological trauma; renal injury; bladder rupture; urethral rupture; road traffic accidents; emergency urology; trauma management; retrospective study; multidisciplinary approach; CT cystography

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Introduction

The rapid economic development has brought, along with numerous benefits, a significant increase in the number of road and industrial accidents, thereby leading to a rise in the incidence of various types of trauma [1]. Among these, urological trauma holds a significant position, accounting for approximately 10% of the total trauma cases presented in emergency services [2].

Urological trauma can range from minor injuries to complex conditions that require emergency surgical interventions. These injuries are sometimes associated with other severe traumas, necessitating an interdisciplinary approach to ensure optimal treatment and prevent long-term complications.

Objective:

This study aims to analyze the incidence of urological trauma treated at Târgu-Jiu County Emergency Hospital, identify the mechanisms of injury, and evaluate the management strategies applied in such cases.

Materials and Methods:

This retrospective study was conducted over a period of 18 months, from January 1, 2023, to July 1, 2024, and included patients who presented to Târgu Jiu County Emergency Hospital with various types of trauma. Of the 98 recorded trauma cases, 15 were of urological nature.

These urological traumas included: eight cases of renal trauma, six cases of bladder rupture, and one case of complete urethral rupture. For each patient, data were analyzed regarding the mechanism of injury, the type of urological lesion, and the procedures used, such as ultrasound, computed tomography, and cystography. Therapeutic methods were also recorded, including both conservative treatments and surgical interventions, as well as post-treatment outcomes and associated complications.

The results were analyzed to assess the incidence and typology of urological traumas, as well as the effectiveness of the therapeutic interventions applied.

Results:

Renal Trauma

Of the eight reported cases of renal trauma, six were the result of road traffic accidents, one case was caused by a fall from height, and one case was due to physical assault. Seven cases underwent conservative treatment, as they presented with grade 1-3 trauma [4]. In one case (resulting from physical assault), emergency nephrectomy was required due to grade 4 trauma [4] with hemodynamic instability, while the remaining cases were treated conservatively, all showing a favorable outcome.

Bladder Ruptures

All six cases of bladder ruptures were caused by road traffic accidents. These traumas are often the result of severe impact to the pelvic and lower abdominal areas, leading to bladder wall rupture. Of the cases described, five were extraperitoneal ruptures, secondary to pelvic fractures, while one case involved an intraperitoneal bladder rupture. The literature confirms that road traffic accidents are the leading cause of bladder ruptures due to the impact force and associated compression mechanisms [5]. These findings are consistent with data collected at the County Emergency Hospital in Târgu Jiu. All cases were diagnosed via CT cystography and required cystorraphy. Bladder ruptures secondary to pelvic fractures were managed by a multidisciplinary team—urologist and orthopedic surgeon. All cases had a favorable outcome, with the urethral catheter removed following a control cystography.

Complete Urethral Rupture

A single case of complete urethral rupture was reported, caused by pelvic crush and fracture following a road traffic accident. Urethral ruptures are severe injuries, often associated with complex pelvic fractures, and require a prompt and effective surgical approach[6]. These injuries are rare, but when they occur, they are generally linked to major trauma. The surgical approach was multidisciplinary, involving both Urology and Orthopedics. After an external fixator was applied by the orthopedic surgeon for pelvic bone alignment and hemostasis, a urethro-prostatic anastomosis was performed. The recovery was slow but favorable, with the urethral catheter needing to be maintained for up to six weeks.

Discussion

Although urological trauma is less frequent compared to other types of trauma, it can lead to significant complications and often requires a rapid and well-coordinated therapeutic approach. Our study highlights several relevant aspects regarding the incidence, mechanisms of injury, and management of these lesions within a county emergency hospital.

The renal injuries presented in this study were predominantly caused by road traffic accidents. Our observations regarding the predominance of conservative treatment for grade 1-3 renal trauma are supported by current guidelines, which prioritize this approach in the absence of hemodynamic instability. The case of emergency nephrectomy, associated with severe grade 4 trauma and hemodynamic instability, underscores the importance of thorough evaluation and prompt surgical intervention in severe cases.

Regarding bladder ruptures, all six cases were associated with pelvic fractures resulting from road traffic accidents, suggesting a direct correlation between the severity of the impact and the risk of bladder rupture. The combined urologist-orthopedist approach proved effective in managing these cases, all of which had favorable outcomes. The use of CT cystography as a diagnostic procedure was essential for precise evaluation and for determining the appropriate therapeutic strategy.

The sole case of complete urethral rupture, caused by a severe pelvic fracture, confirmed the complexity of these injuries and the necessity for multidisciplinary management. Such injuries require immediate surgical interventions and a rigorous approach to prevent long-term complications. Although the postoperative recovery was slow yet favorable, this case highlights the treatment and recovery challenges associated with these types of severe traumas.

The incidence of only one case of complete urethral rupture during this period is consistent with the generally low frequency of such injuries, as noted in the literature [7]. Complex pelvic fractures, as seen in this patient, are the primary cause of urethral ruptures.

Limitations of the Study

The limitations of this study include the relatively small number of cases, the specificity of the medical center, and the limited time frame, all of which may influence the results. However, the obtained data reflect a relevant reality in the management of urological trauma in regional emergency centers.
When comparing the data collected from the County Emergency Hospital in Târgu Jiu with data from the literature, a notable similarity is observed concerning the mechanisms of urological trauma [7]. Road traffic accidents are predominant in both data sets, being the leading cause of renal injuries and bladder ruptures.

Conclusions

Among the total traumas presented at the County Emergency Hospital in Târgu Jiu, urological injuries accounted for 15.3%. Of the total urological traumas, renal injuries represented 53.3%, bladder ruptures 40%, and urethral ruptures 6.6%.
The study found a 93% incidence of urological trauma caused by road traffic accidents. This situation may be attributed to the characteristics of the region's terrain, including the presence of the mountain resorts Rânca and Runcu, which are frequented by tourists, as well as the mountain road Transalpina.

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