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Research Article

# Diagnosis and Management of Renal Trauma in Two University Teaching Hospitals in Burkina Faso

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## Abstract

Introduction: Renal trauma, resulting from external mechanical injury, impacts both renal and vital prognosis, particularly in severe cases. In Africa, the predominant etiologies are road traffic accidents and falls. This study describes the diagnostic and therapeutic profile of renal trauma in two university teaching hospitals in Burkina Faso. Methods: A descriptive retrospective study was conducted over 5 years (2019-2023), including all patients managed for renal trauma. Sociodemographic, clinical, paraclinical, and therapeutic data were analyzed. Results: Forty cases were collected. The mean age was 25.5 years, with a male predominance (85%). Road traffic accidents accounted for 75% of causes. Clinically, lumbar pain (92.5%) and hematuria (77.7%) were common. All patients underwent CT urography (CTU), classifying lesions according to the AAST scale: grades IV (50%) and III (35%) predominated. Conservative management was applied in 95% of patients, including bed rest, analgesia, antibiotic therapy (57.5%), and blood transfusion (27.5%). Nephrectomy (5%) was required for hemodynamic instability or persistent life-threatening hematuria. The outcome was favorable for the majority, with complications (persistent urinoma/hematoma, abscess) in a few high-grade patients. Discussion: The patient profile (young active males) and etiology (road traffic injuries) are consistent with regional data. CTU is established as the key examination for assessment. The high rate of conservative management, even for grades III-IV, confirms this strategy as the standard for stable patients, allowing preservation of nephron mass without increased morbidity. Nephrectomy remains exceptional. Loss to follow-up limits the evaluation of long-term outcomes. Conclusion: Renal trauma in Burkina Faso primarily affects young males involved in road traffic accidents. Its management, largely conservative thanks to the contribution of CTU, is effective. Road safety prevention constitutes a major focus for reducing the incidence of these injuries.

## Keywords

Renal Trauma, Traumatology, CT Urography, Conservative Management, Burkina Faso

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## 1. Introduction

Renal trauma refers to any injury to the kidney and its immediate surroundings resulting from an external force. The injury mechanism is most often related to direct impact or rapid deceleration [1]. It affects renal functional prognosis and potentially the patient's vital prognosis in high-grade injuries [2]. Etiologies in the African context are dominated by road traffic accidents and falls [1, 3, 4], as well as landslides at artisanal mining sites. It predominantly affects young individuals in their active professional years. The assessment of renal trauma has benefited from advances in imaging, particularly the improved availability and accessibility of CT urography in our setting. The prognosis remains generally good across all grades [1], making conservative treatment the rule to preserve nephron mass. However, nephrectomy remains justified in certain situations such as hemodynamic instability, persistent hematuria, associated digestive injuries, and is associated with mortality reaching 30% [5]. The present study aims to describe the diagnostic, therapeutic, and outcome modalities in two university teaching hospitals in the country's two main cities (Ouagadougou and Bobo-Dioulasso).

## 2. Patients and Methods

This was a descriptive cross-sectional study with retrospective data collection, conducted over a period of five (05) years, from January 1, 2019, to December 31, 2023. The study was carried out in the urology departments of the Yalgado Ouédraogo University Teaching Hospital in Ouagadougou and the Souro Sanou University Teaching Hospital in Bobo-Dioulasso. The study included all patient records from these two hospitals where a diagnosis of renal trauma was made. Sampling was exhaustive. The studied parameters included sociodemographic, clinical, paraclinical, and therapeutic characteristics. Data were collected using standardized individual forms, then entered and analyzed using Epi Info software, version 7.2.4. Quantitative variables were described by their means and standard deviations, while qualitative variables were presented as frequencies and percentages. Authorization for data collection was obtained from the hospital administrations, and anonymity was respected.

## 3. Results

***Table 1.*** *Distribution of patients according to sociodemographic characteristics (N=40).*

| Sociodemographic Characteristics | Frequency (n) | Percentage (%) |
|---|---|---|
| Age Group | | |
| < 10 | 1 | 2.5 |
| [10 - 20] | 14 | 35 |
| [20 - 30] | 17 | 42.5 |
| [30 - 40] | 3 | 7.5 |
| [40 - 50] | 2 | 5 |
| [50 - 60] | 1 | 2.5 |
| ≥ 60 | 2 | 5 |
| Gender | | |
| Male | 34 | 85 |
| Female | 6 | 15 |
| Residence | | |
| Urban area | 27 | 67.5 |
| Rural area | 13 | 32.5 |
| Occupation | | |
| Pupil/Student | 15 | 37.5 |
| Merchant | 10 | 25 |
| Farmer | 09 | 22.5 |
| Civil Servant | 02 | 05 |
| Unemployed | 04 | 10 |
| Total | 40 | 100 |

We collected forty (40) cases of renal trauma over the 5-year period, i.e., 8 cases per year. The mean age of our patients was 25.5 ± 12.62 years (range 8 to 65 years). Males represented 85% of patients with a sex ratio of 5.7. Table 1 shows the distribution of patients according to sociodemographic characteristics. The distribution of patients by profession is represented in Table 1.

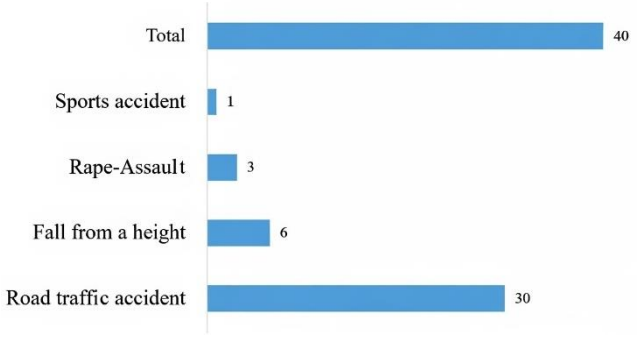


***Figure 1.*** *Distribution of patients according to circumstances of occurrence (N=40).*

Road traffic accidents were the most represented cause in 30 cases (75%), followed by falls with 6 cases (15%), then fights/assaults in 3 cases (7.5%). The mean time to consultation was 2.5 days, with extremes of 1 hour and 14 days. The distribution of patients according to the circumstances of occurrence is illustrated in Figure 1.

In our study, lumbar fossa pain was found in 37 patients (92.5%). Hematuria was present in 31 patients (77.7%). The trauma affected the right side in 62.5% of cases versus 37.5% for the left side. The trauma was blunt in 95% of cases. The distribution of patients according to clinical examination findings is represented in Table 2.

***Table 2.*** *Distribution of patients according to clinical examination data (N=40).*

| Clinical Examination | Frequency (n) | Percentage (%) |
|---|---|---|
| Symptoms | | |
| Pain | 37 | 92.5 |
| Hematuria | 31 | 77.7 |
| Hemodynamic Status | | |
| Stable | 39 | 97.5 |
| Unstable | 1 | 2.5 |
| Physical Signs | | |
| Lumbar Swelling | 5 | 12.5 |
| Lumbar Wound | 2 | 5 |
| Lumbar Fossa Abrasion | 1 | 2.5 |
| Lumbar Fossa Induration | 7 | 17.5 |
| Lumbar Guarding | 3 | 7.5 |
| Lumbar Fossa Tenderness | 1 | 2.5 |
| Normal Physical Exam | 21 | 52.5 |
| Total | 40 | 100 |

Regarding laboratory tests, 29 patients presented with anemia with a hemoglobin (Hb) level between 4 and 11 g/dL. Among these patients, 11 had a hemoglobin level between 4 and 7 g/dL and received iso-group, iso-rhesus blood transfusions. Elevated serum creatinine was found in five patients.

Regarding medical imaging, 25 of our patients had undergone an abdominal ultrasound. The distribution of patients according to abdominal ultrasound results is represented in Figure 2.

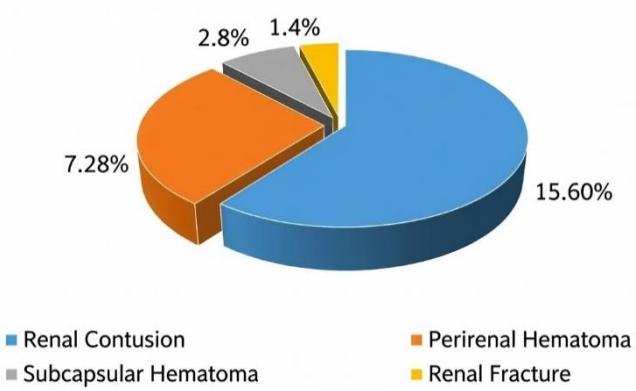


***Figure 2.*** *Distribution of patients according to abdominopelvic ultrasound results (N=25).*

CT urography was performed on all our patients. It was used for the AAST (American Association for the Surgery of Trauma) classification of renal trauma. The most represented grade was grade IV found in 20 patients (50%), followed by grade III in 14 patients (35%). Two patients (5%) had AAST grade 5 trauma and 4 patients (10%) grade II.

Some additional examinations had been requested, such as a craniofacial CT scan, a clavicle radiograph, and a pelvic radiograph in one case each of frontal sinus and orbital roof fracture, one case of clavicle fracture, and one case of left iliac wing fracture, respectively.

Regarding treatment, thirty-eight patients (95%) received conservative management only. The 2 other patients underwent nephrectomy. Table 3 summarizes the different therapeutic modalities performed.

***Table 3.*** *Summary of the different therapeutic modalities performed.*

| Therapeutic Modalities | Frequency | Percentages (%) |
|---|---|---|
| Conservative Management | 38 | 95 |

| Therapeutic Modalities | Frequency | Percentages (%) |
|---|---|---|
| Strict Bed Rest | 3 | 7.5 |
| Analgesia | 40 | 100 |
| Antibiotic Therapy | 23 | 57.5 |
| Blood Transfusion | 11 | 27.5 |
| Nephrectomy | 2 | 5 |

The indications for nephrectomy were respectively one case of trauma complicated by severe anemia due to life-threatening hematuria in a patient operated on the third day post-trauma, and one case of hemodynamic instability in a patient operated on the second day post-trauma.

Regarding outcomes, pain and hematuria resolved in all patients. The mean hospital stay was 12.6 days, ranging from 4 to 31 days.

As follow-up imaging at one week, thirty (30) patients (75%) underwent a repeat CT urography, while the other ten (10) patients (25%) underwent an abdominal ultrasound. This follow-up imaging revealed 6 cases of urinoma/hematoma (30%).

At one month post-trauma, there was 1 case of persistent urinoma/hematoma on imaging and 1 case of renal abscess for AAST grade IV traumas. These two cases underwent CT-guided drainage with favorable outcomes.

## 4. Discussion

The present study reports the experience of two reference University Teaching Hospitals in Burkina Faso in the management of renal trauma over a five-year period. The observed frequency of 40 cases remains relatively low, consistent with African literature data where renal trauma accounts for less than 5% of all urogenital trauma [6-8]. This low incidence could be explained by underreporting of minor cases, pre-hospital mortality of severe trauma, and variable accessibility to reference centers.

Epidemiologically, the mean age of 25.5 years and the clear male predominance observed in our series confirm that renal trauma primarily affects young males, in active socio-professional life. This profile is widely reported in African and Western series [8, 9], reflecting greater exposure to high-energy trauma in this age group.

Road traffic accidents were the main circumstance of occurrence (75%), followed by falls and fights. This predominance of road traffic injuries is consistent in the African literature [3, 4, 6, 9], linked to the increase in the motorcycle fleet, non-compliance with road safety measures, and aging infrastructure. In our context, injuries on artisanal gold mining sites deserve special attention in future studies.

Clinically, lumbar pain and hematuria were the most frequently reported signs, as noted by several authors [9, 10]. However, the absence of hematuria does not exclude severe renal injury, hence the importance of systematic imaging in any patient with suspected renal trauma. The majority of patients were hemodynamically stable, explaining the predominant use of conservative management.

The contribution of CT urography was central in our series. Performed on all patients, it allowed precise injury assessment and classification according to AAST. The predominance of grade III and IV trauma contrasts with some African series dominated by grades I and II [9], but aligns with data from Lakmichi et al. [3], suggesting preferential recruitment of more severe trauma in reference centers. CT urography remains the gold standard examination for diagnosing and assessing the severity of renal trauma [1, 10].

Therapeutically, conservative management was observed in 95% of patients, including for high-grade (III and IV) trauma, with favorable outcomes in the majority of cases. These results confirm the central role of conservative management, now recommended even for severe renal trauma in stable patients [1, 3, 9, 10]. This strategy preserves nephron mass without increasing morbidity.

Nephrectomy was indicated in only two cases (5%), due to hemodynamic instability and persistent life-threatening hematuria. This low rate aligns with literature data showing that radical surgery has become exceptional and reserved for well-defined situations [2, 5]. Bergerat et al. showed that emergency nephrectomy remains associated with high mortality, reaching 30% [5].

The overall outcome was favorable, with resolution of pain and hematuria in all patients. The complications observed in the short and medium term, notably persistent urinoma/hematoma and one case of renal abscess, mainly concerned grade IV trauma, as reported by Freton et al. [10]. However, medium- and long-term follow-up remains insufficiently documented in our series, due to loss to follow-up of many patients, constituting a major limitation of the study.

## 5. Conclusion

Renal trauma remains a relatively uncommon condition in hospital settings in Burkina Faso, predominantly affecting young males and occurring most often following road traffic accidents. Beyond hospital management, primary prevention, particularly through strengthening road safety measures and raising awareness among at-risk young populations, constitutes a major focus for reducing the incidence and severity of renal trauma in our context.

## Abbreviations

| | |
|---|---|
| AAST | American Association for the Surgery of Trauma |
| CTU | Computed Tomography Urography |
| Hb | Hemoglobin |
| CT | Computed Tomography |

## Author Contributions

**Abdoul-Karim Ouattara:** Conceptualization, Investigation, Methodology, Supervision, Validation, Writing – original draft, Writing – review & editing

**Brahima Kirakoya:** Conceptualization, Investigation, Methodology, Supervision, Validation, Writing – original draft, Writing – review & editing

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## Conflicts of Interest

The authors declare no conflicts of interest.

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