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A STUDY ON FACTORS WHICH PREDICT THE FAILURE OF CONSERVATIVE MANAGEMENT IN HIGH GRADE RENAL TRAUMA

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ABSTRACT

Introduction and objectives:

In major trauma with renal injury , surgical exploration will often lead to nephrectomy. The aim of this study is to identify the factors predicting the need for surgery in patients with High grade (III—V) renal trauma who were initially managed conservatively.

Materials and methods:

We retrospectively reviewed data from patients with Grade III—V kidney injury between June 2022 and June 2024. Demographic, clinical and bio-radiological characteristics at admission and follow-up, as well as management and complications, were recorded. Patient data, including conservative treatment, was a success without recourse to nephrectomy, and those patients who needed surgery were analysed.

Results:

Thirty-one patients were included in this study. Grade III accounted for 42%, Grade IV: 32% and Grade V: 26%. The success rate for conservative treatment was 80.6%: 13 patients grade III (100%), 9 grade IV (90%) and n3 grade V (37.5%) patients. hypotension at admission (P = 0.001), grade V (P = 0.002) and anaemia (P = 0.001) are the factors considered as predictive of failure of conservative treatment.

Conclusion:

In III—V grade renal trauma, Conservative management is the treatment of choice and the prognostic factors found in this study make it possible to better select patients

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INTRODUCTION

Renal trauma is the most common urological trauma. It accounts for about 10 % of all abdominal traumas [1,2]. The evolution of the management of grade III-V trauma in recent years has moved towards an increasingly conservative approach due to progress in interventional radiology techniques, endourology and reception means in emergency rooms and resuscitation [3,4]. The aim of this work was to identify the predictive factors of failure of conservative treatment in patients with grade III-V renal trauma, to predict lesions requiring increased monitoring or requiring immediate surgical exploration.

MATERIALS AND METHODS

This is a retrospective, descriptive and analytical study of a series of patients with kidney trauma, treated in the urology department of the Government Stanley medical college, Chennai between June 2022 and June 2024.The patients included in this study were/those with grade III, IV and V trauma according to the classification of the American Committee for Trauma Surgery (AAST) [5,6] and initially treated conservatively.

Conservative treatment was considered as absence of any surgical intervention on admission (nephrorrhaphy, partial or total nephrectomy). The need for endourological intervention or embolization is not considered a failure of conservative treatment. Failure of this treatment was defined by the need for surgery or death during renal trauma monitoring.

We studied **age, sex, injured side, mechanism of trauma** (direct, indirect or deceleration), **aetiology, presence of associated lesions** (visceral, orthopaedic,.), **clinical and biological signs at admission** (haematuria, blood pressure, haemoglobin, haematocrit and serum creatinine), **CT Urogram** which made it possible to define the lesional grade, **The treatment adopted:** conservative treatment, differentiated surgery, the cause of delayed surgery, and evolution.

We excluded and those whose records included missing data from the study. Our method consisted in classifying patients upon admission as stable and unstable according to haemodynamic status. Haemodynamic instability is defined globally by a systolic pressure below 90 mmHg despite adequate resuscitation [5]

In the intensive care unit of the emergency department, the traumatized person was put in intensive care, a biological assessment with a chest X-ray and an abdominal ultrasound were carried out systematically. Patients who remained haemodynamically unstable, after hydro-electrolyte resuscitation measures and possibly blood transfusion, were sent directly to the operating room for urgent laparotomy. Patients who were stable or who were haemodynamically stabilised received additional biological examinations: blood count, urea and creatinine, haemostasis assessment, blood grouping and a CT Urogram which specified the grade of the renal lesion and showed the associated lesions.

Conservative treatment consisted of strict bed rest with close monitoring of vital constants, 2-way bladder catheterization outside contraindications in case of haematuria, adequate fluid intake, prescription of analgesics and antibiotics and compression stockings as well as blood transfusion if necessary.

During hospitalization, regular monitoring was provided for pain, temperature, hydration and urine colour, as well as daily haemoglobin-haematocrit monitoring, with a systematic control CT

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scan between 3 and 7 days of admission. The diversion of the upper excretory urinary tract by double J stents has not been systematic, except in the situation of significant and non-limiting urinary extravasation [7].
The decision to nephrectomy during surveillance was made in patients with haemodynamic instability resistant to resuscitation. We assessed renal function in our patients by serum creatinine assay. We used SPSS software version 19.0 for statistical analysis of the data. The descriptive analysis consisted of calculating absolute and relative frequencies for qualitative variables and positioning and dispersion parameters for quantitative variables (mean, standard deviation). Univariate logistic regression analysis was used to identify predictors of conservative treatment failure for major kidney trauma. The materiality threshold is used for a value of less than 0,05.

RESULTS

During the study period, 31 cases of major renal trauma were included. 23 men (74.2%) and 8 women (25.8%). The mean age of patients was 32 years (19 –48). The aetiologies were dominated by Road Traffic accidents (77.4%) and fall from height (19.4%). All 31 patients consulted on the same day of the trauma (Table 1). Hypovolaemic shock at admission was detected in 6 cases (19.4%). Vascular filling with blood transfusion corrected haemodynamics in all patients. The Clinical symptomatology was dominated by low back pain (93.5%) and haematuria (61.3%). 13 patients had grade III (41.9%), 10 patients had grade IV (32.3%) and 8 grade V (25.8%). 6 cases of urinary extravasation were observed, 6 of which required urinary tract drainage by tube double J and 1 had spontaneous resolution of urinoma. 16 patients (51.6%) had associated visceral lesions. Blood transfusion was required in 19 cases (61.3%), of which 6 (31.5%) were performed upon admission to the emergency department to correct bleeding shock or deep anaemia. The CT scan between Day 3 and Day 7 of admission showed improvement or stability of initial lesions in 98% and worsening in 2% of cases. Thirteen patients experienced a short-term complication, at a rate of 41.9%: secondary or persistent haematuria in 7 patients (22.6%) while it disappeared after an average of 4 days in the rest of patients, deterioration of haemodynamic status during monitoring in 1patient (4 %) and urinoma in 6 patients (19.4%). A patient died, in the middle of resuscitation, on Day of admission renal trauma and grade IV renal injury with grade 4 liver injury and gangrenous bowel segment. Conservative treatment failure was observed in 6 patients (19.4%), 1 of whom were grade 4 (16.6%) and 5 grade V patients (62.5%). The statistical study of the data collected showed that failure of conservative treatment is correlated with haemodynamic instability on admission ($p = 0.001$), grade V (AAST) ($p = 0.002$), the presence of anaemia ($p = 0.001$).

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TABLE 1 : SUMMARY OF PATIENT DATA

VARIABLE		NUMBER	%
AGE (Mean & SD)		32	8.5
SEX	Male	23	74.2
	Female	8	25.8
INJURY SIDE	Right	19	61.3
	Left	12	38.7
NATURE OF TRAUMA	RTA	24	77.4
	Fall from height	6	19.4
AAST GRADE	Grade 3	13	41.9
	Grade 4	10	32.3
	Grade 5	8	25.8
CLINICAL SIGNS	Signs of shock	6	19.4
	Haematuria	19	61.3
	Abdominal tenderness	29	93.5
ASSOCIATED INJURIES	Liver	7	22.6
	Spleen	4	12.9
	Lung	9	29
Haemoglobin < 10 g/dL		6	19.4
Haematocrit < 25 %		6	19.4
Renal insufficiency		0	0
Blood transfusion		19	61.3
COMPLICATIONS	Persistent Haematuria	7	22.6
	Urinoma	6	19.4
	Death	1	3.2
CONSERVATIVE MANAGEMENT	Successful	25	80.6
	Failure	6	19.4

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TABLE 2 : UNIVARIATE ANALYSIS OF PREDICTIVE FACTORS FOR FAILURE OF CONSERVATIVE TREATMENT OF RENAL TRAUMA

VARIABLE	O.R	IC 95%	P Value
Polytrauma	6.36	0.64 - 62.69	0.2
Nature of trauma (RTA)	0.38	0.05 - 2.82	0.69
Hypotension at admission	48	3.48 - 61.64	0.001
Liver injury	5.25	0.76 - 35.97	0.21
Spleen injury	1.46	0.12 - 17.21	1
Lung injury	3.16	0.5 - 20.03	0.44
Grade 5 renal injury	0.002	0 – 0.32	0.002
Anaemia	20	6.37 - 22.5	0.001
Persistent Haematuria	0.63	0.06 - 6.54	1
Evolution of scan – urinoma	0.8	0.07 - 8.47	1

DISCUSSION

The objectives of renal trauma management are to avoid morbidity and mortality and to preserve renal function. It has been considered by several studies that major renal trauma includes only IV and V guard, however several other studies extend this definition to include grade III [5,8,9]. In our study, we also involved patients with grade III renal trauma, given the risk of morbidity and mortality that this grade III may present.

In the therapeutic management of major renal trauma patients, the initial decision to monitor or surgically explore the kidney remains controversial, despite a significant number of published studies that support conservative treatment [10]. Indeed, many authors apply conservative treatment in grade III-V renal trauma because surgical exploration often leads to nephrectomy [11,12], so the success rate is very high for this attitude and varies between 80% and 100% [13]. Grade III and IV renal lesions are the interest of conservative treatment [14,15]; the latter can even be applied to closed trauma grade V [16], whereas grade V penetrating injury requires surgical exploration [17].

The availability of a technical angioembolization platform and experienced interventional radiologists is an important element in the conservative attitude [18] and would have further increased the success rate of conservative treatment in our patients. In our experience,

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management of kidney trauma was based on the haemodynamic state at admission of the patient and its response to initial resuscitation. All haemodynamically stable patients were initially treated conservatively regardless of the grade of trauma. Several studies have been conducted and several ways have been developed to predict the need for surgical exploration after grade III-V kidney injury.
Indeed, Maarouf et al. [5], in their study, studied data from 206 patients with severe closed kidney trauma. The predictors of surgical exploration they found were: trauma secondary to road accidents (AVP), hypotension on admission, associated lesions, grade V, presence of medial laceration, haematoma > 3.5 cm, and intravascular extravasation. In another retrospective study, Yanget al. [19] report that an ISS (Trauma severity score) greater than or equal to 12 and an AAST grade greater than or equal to IV, are predictive factors. In the multivariate study by Shariat et al. [20], surgery for non-urological lesions is a predictor of surgical attitude. Figler et al. [21] showed that the presence of associated hepatic or splenic lesion is an important co-variable in their analysis looking for predictive factors of urological intervention for hemodynamic instability in grade IV. Recently, Lanchon et al.[22], in a prospective analysis of a series of 151 high-grade renal trauma cases, identified two independent predictive factors of surgery that are high grade and hemodynamic instability.
In our series, the predictors of conservative treatment failure after univariate study are: hypotension on admission, grade V, anaemia. Regarding the fragment DE-vascularized, its isolated presence is not an indication of surgical exploration. Numerous studies have demonstrated increased morbidity and secondary nephrectomy rates when these invasive fragments have been combined with other abdominal lesions or urinoma [3,4]. The retrospective nature of our study and the group of small patients, whose conservative treatment failed, represent limitations of significance of our results. Another important limitation is the lack of long-term follow-up data to assess the renal function of successfully conservatively treated patients as well as complications of kidney disease and hypertension.

CONCLUSION

The conservative attitude was the rule in our management of grade III-V renal trauma with a high success rate. The prognostic factors for failure of conservative treatment according to this study make it possible to predict the need for nephrectomy.

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