Risk Factors for Mortality in Patients with Renal Injury

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Abstract

Introduction: renal trauma is the most common urologic trauma and occurs in 3% of all admissions and as many as 10% of patients who sustained abdominal trauma.
Patients and methods: 36 patients had renal injury**, 28 patients** injured during explosion due terrorist's attacks. 30 males and 6 females, age 11-50 years.
All underwent emergency resuscitation then the patients either admitted to the ward for further evaluation or underwent emergency exploration if indicated.

Results:

The mechanism of injury was blunt trauma in 18 patients 50%, penetrating trauma in 14 patients 38.9% and combined in 6 patients 11.1%.
The grades of injury were grades I & II in 16 patients 44.4%, grade III in 8 patients 22.1%, grade IV in 9 patients 25% and grade V in 3 patients 8.3%. Other organs involvement was found in 20 patients 55.5%, 4 patients 20% had blunt trauma, 15 patients 75% had penetrating trauma and one patient 5% had combined trauma.
Death occurred in 9 patients 25%, 8 (44.4%) had penetrating trauma and one patient 5.5% had blunt trauma .The commonest causes of death were septicemia and renal failure.

Conclusions:

Type and severity of injury and other organs involvement are important factors in mortality of patients with renal injury.

Key wards: renal, injury, complication, mortality.

الخلاصة

تمت دراسة أصابات الكليه في مستشفى الحله التعليمي وكان عدد المصابين(36) مصابـــا" (28)مصاب كانت أصابتهم بسبب العمليات الارهابيه والباقي كانت أصابتهم نتيجة حوادث مدنيه أخرى تمت دراسة العوامل المؤثره على الوفاة حيث ان نوع الاصابه ودرجة الاصابه مع وجود أعضـــاء أخرى مصابه في البطن من العوامل الاساسيه في تحديد الوفاة وكان من اهم أسباب الوفاة هو تسمم الدم الجرثومي وعجز الكليتين .

Introduction

Renal trauma is the most common urologic trauma and occur in 3% of all trauma admission and as many as 10% of patients who sustain abdominal trauma (Barer stock, 2001, Sagalowsky, 1983). Most renal traumas, occurring as a result of blunt trauma, are minor in majority while penetrating wounds usually complicated by perforation of other structures. (AL-Shuusen AF, 1988) Renal trauma divided into renal contusion, laceration and vascular injury. Most renal injuries are associated with haematuria 95% which can be profuse in more

sever renal trauma, however, in vascular pedicle injury as avulsion of uretropelvic junction haematuria may not present (Moundani,2001, Santucci 2001) Among patients with gross haematuria, noticeable renal trauma is present in 25% of patients, however less than 1% of patients, microhaematuria have sustained renal injury (Nicolaisen 1985, McAndrew 1994).

Mortality & morbidity rates for renal injuries vary with the severity of injury, the degree of injury to other organs and treatment plan utilized. Treatment options must be weighed against related mortalities and morbidities. (Santucci, 2001)

Materials and Method

From October 2003 to November 2005, 600 patients sustained different types of trauma 36 patients had renal injury underwent this study. 30 males and 6 females, age from 11-50 years, with a mean of 25 years they sustain different types of trauma 28 patients had terrorist's attacks during explosions, 12 patients had blast injury, 12 shells and 4 patients had bullets.Other 8 patients had civilian injury, 5 RTA, 2 bullets and one patient FFH.

All patients underwent emergency resuscitation in emergency room in AL-HILLA surgical teaching hospital, Then the patient either admitted to the ward if his/her condition was stable and underwent full investigations including general urine examination, haemoglobin level and packed cell volume, blood urea and serum creatinine, abdominal ultrasound, intravenous
pyelography or computerized tomography.

Other group of patients who need urgent exploration, the blood was prepared and underwent urgent exploration. Follow up period accordingly depend on the patient condition.

Results

Six hundred patients had different type of trauma, 330 had abdominal injury, and 36 had renal injury received in Al-Hilla teaching hospital from October to November 2003. (Table 1, 2).Twenty eight patients sustained terrorist's attacks during explosions.

The mechanisms of injury were blunt trauma in 50%, penetrating trauma in 38.9% and combined blunt and penetrating in 11.1 %.(table 3).

The grades of renal injury were grade I, II in 44.4%, grade III in 22.2%, grade IV in 25% and grade V in 8.3%. (Table 4). The grading depends on the radiological investigations and the operative findings.

Renal injury associated with other organ involvement in 20 patients 55.5% [9] .4 patients 20% had blunt trauma and 15 patients 75% had penetrating trauma and one patients 5% had combined trauma. (Table 5, 6).

Treatment either conservative or operative, 14 (85.7%) patients with penetrating trauma underwent operation. While 5 patients (27.7%) with blunt trauma underwent operative exploration. The types of operations were 12 total nephroctomies, 4 partial nephrectomies and 4 repairs of lacerations.

Death occurred in 8 (44.4%) patients with penetrating trauma while one (5.5%) patient died with blunt trauma, the causes of death were mainly secondary to septicemia and renal failure.(table 7).

Table-1: Frequency of regions of body and organs involved in all patients.

Organ	Number of patients
Abdomen	**330**
Limb	**252**
Chest	**150**
Head and neck	**123**
Back	**24**
Ear	**21**
Eye	**15**

Table- 2: Organs involved in patients with abdominal injury

organ	Number of patients
Colon	**75**
S.I	**64**
Spleen	**61**
Liver	**58**
Kidney	**36**
Mesentery	**27**
Stomach	**15**
Duodenum	**12**
Bladder	**9**
Testis	**9**
Pancreas	**6**
Ureter	**3**
Aorta	**1**
total	**330**

Table -3: Shows mechanism of injury.

Type of trauma	number of patients
Blunt	18 (50%)
Blast	12
RTA	5
FFH	1
Penetrating	14 (38.9%)
Shell	10
Bullets	4
Combined	4 (11.1%)

Total 36

Table -4: Grades of injury to the kidney.

Grade	***number of patients***
I, II	16 (44.4%)
III	8 (22.2%)
IV	9 (25%)
V	16 (44.4%)
Total	***36***

Table -5: Number of organs involved in renal injury for each patient.

Number of patients	**No. of organs involved**
5	1
7	2
5	3
3	4

Table- 6: Other organs involved in association with renal injury.

organ	Number
Colon	10
Spleen	7
Liver	6
S.I	5
Lung	5
Pancreas	3
Diaphragm	3
Mesentery	2
Stomach	2
Duodenum	2
aorta	1

Table -7: Causes of death in patients with renal injury.

cause	Number of patients
septicemia	3
Renal failure	2
Uncontrolled bleeding	2
ARDS	2
Pancreatic & duodenal fistula	2

Discussion

The mechanism of injury is an important predictor of severity of renal trauma, the need for surgery and the risk of associated non renal injuries. Renal injury is present approximately in 10% of abdominal trauma, blunt trauma predominates in civilian population and accounts for nearly 90% of renal injury, penetrating trauma produces the majority of major renal injury requiring surgery (Moore, 1989). In present study, we had two types of patients one group had terrorist's explosions leading to sever type of injury either blunt trauma in form of blast injury 50% or penetrating trauma in 38.9% and combined in 11.1% (table 3). With grading of injury: grade I, II in 44, 4%, grade III in 22.2%, grade IV in 25% and grade V in 8.3% (table 4) .With other organ involvement in group with blunt trauma in 22,2% and 88.8% in patients with penetrating trauma these result in high operative intervention, in penetrating trauma 85.7% underwent exploration while 27.7% with blunt trauma underwent exploration, this matches with the work of Parkland hospital series of 185 consecutive cases of renal trauma requiring surgery 66% due to gunshot and 16% due to blunt trauma (Sagalowsky, 1983).The higher incidence of operative intervention may be attributed to the severity of injury and the more frequency of other organ involvement. These two factors are important in the decision of the operative intervention. The high incidence of blast injury 55.5% and shells in 78.5% due to terrorist's attacks and low incidence of civilian injury due to RTA 31.2% and FFH 6.25% add to the mortality reported in our patients which account for 44.4% in patients with penetrating trauma and 5.5% in patients with blunt trauma due to civilian injury. The frequency and type of associated non-renal injury are related to the mechanism of trauma .Penetrating wounds to the kidney usually complicated by perforation of other structures, liver and colon may be inured in up to 60% of patients with injury to the right kidney. Injury to the left kidney is associated with injury to the spleen and stomach or pancreas in 20 %(Gaslton et al 1968, AL-Shuunsen, 1988).this matches with our results, colon and liver commonly affected in right side and spleen and stomach or pancreas, on left (table 6). Mortality rate for renal injury vary with renal injury vary with the severity of renal injury , the degree of injury to the other organ (Santosi, 2001).the degree of injury to the kidney were sever grade IV,V in 33.3% (table 4).this reflects the severity of injury which

increases the operative intervention . Since there is no role of conservative treatment in these patients, which add to the mortality rate because of the sever bleeding result in shock and affect the function of the remaining kidney.

The commonest causes of death were due to septicemia and renal failure (table7). This may be explained because of that colon was commonly involved in our patients lead to higher incidence of septicemia. The degree of injury to the kidney was sever in 33.3% this lead to high incidence of nephrectomy also result in sever bleeding and shock. In addition, any other insult in the remaining kidney like septicemia adds risks of developing renal failure and death.

Conclusion

The mortality in patients with renal injury affected by: the type of injury, penetrating trauma carry higher mortality, severity of injury grade IV,V had higher operative indication and death rate and associated other organ involvement, colon, pancreas, duodenum and great vessels carry higher mortality.

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