# RENAL TRAUMA: A LOCAL EXPERIENCE

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## SUMMARY

*40 cases of major renal trauma over a period of five years in a peripheral hospital in Singapore were reviewed. 90% were due to blunt trauma with motor-cycle accidents forming the majority. There were five cases of superficial cortical injury, three cases of shattered kidneys, six cases of parenchymal injuries, one case of pedicle injury and one case of combined pedicle and parenchymal injury. Nephrectomy rate was 22.5% in this series. This is felt to be unduly high. Half of all the cases operated upon ended up with an immediate total nephrectomy. There was no mortality in this series. We recommend a more conservative policy of watchful waiting to achieve better chances of organ preservation without increasing mortality.*

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## INTRODUCTION

The management of renal injuries has always posed a challenge to the trauma surgeon. Apart from clinical vigilance and sound judgement, he has to strive for maximum preservation of renal tissue but at the same time not introducing risks of mortality. It is conceivable therefore, that surgeons will vary considerably in their degree of conservatism. Comparison of results from various series are often rendered difficult if not impossible by the wide variation in the type and degree of the kidney injuries. It is the purpose of this study to review our own experience, highlighting certain aspects, and to provide a more uniform and rational approach to this problem in future.

## MATERIALS AND METHODS

40 patients admitted to the Department of Surgery, Tan Tock Seng Hospital between 1978 and 1983 were included in this study. Only those cases with major renal trauma were included in this study. All patients had a definite history of injury to the loin and haematuria. All those cases with minor renal contusion with microscopic haematuria were omitted for the purpose of this study.

## RESULTS

The age of the patients ranged from six to 61 years with a peak in the third decade. A sex ratio of five males to one female was noted.

The average duration of hospital stay was 19 days, ranging from two to 80 days. Only 10% of the injuries were caused by penetrating stab wounds while the rest were from blunt trauma. Motor-cycle accidents was a leading causative factor (Table I).

Immediately after the accidents, 57.5% of the patients had pain localised to the injured loin while the rest experienced vague pains referrable to the lower chest, epigastrium and various parts of the abdomen. 73% of cases presented with gross haematuria while 23% had only microscopic evidence of red cells in the urine. Two cases had clear urine despite the fact that one of them suffered multiple stab wounds with cut renal vein and parenchyma (Table I).

Associated injuries include musculoskeletal injuries (42.5%) and ruptured spleen (15%).

Seven patients were admitted in a state of shock and all of them were operated on immediately (Table II). Five of them were explored surgically even before radiological investigations could be done. Only two of them had time for intravenous urogram of which one was performed intra-operatively on the table. In all these seven cases of shock states, none of them were pure renal injury alone. One of them had compound fracture of the tibia and fibula while the remaining six had, other concomitant visceral organ injuries.

**TABLE I**
**ACCIDENTS CAUSING RENAL INJURY**

| Accidents | No. of cases | (%) |
|---|---|---|
| Motor-cycle passengers | 15 | 37.5 |
| Motor-car/van passengers | 4 | 10.0 |
| Pedestrians | 6 | 15.0 |
| Stab wound injuries | 4 | 10.0 |
| Fall from heights/hit by blunt objects | 11 | 27.5 |
| Total | 40 | 100.0 |

## Radiological Findings

17 cases had normal radiological findings on the intravenous urogram (Table III). Three cases showed non-function of the involved kidney and these eventually turned out to be renal vascular

**TABLE II**
**IVU FINDINGS IN RENAL TRAUMA**

| | Operated | Not operated | Total |
|---|---|---|---|
| **Normal** | 0 | 17 | 17 |
| **Abnormal:** Non-functioning | 3 | 0 | 3 |
| Extravasation | 3 | 2 | 5 |
| Filling Defects | 1 | 1 | 2 |
| Impaired excretion | 2 | 0 | 2 |
| Combination of above | 1 | 1 | 2 |
| **Incidental Finding** | 1 | 3 | 4 |
| **IVU not done** | 5 | 0 | 5 |
| Total | | | 40 |

TABLE III

SHOCK IN RENAL INJURIES

| | In shock | Not in shock |
|---|---|---|
| Operated | 7 (17.5%) | 9 (22.5%) |
| Not operated | 0 | 24 (60%) |
| Total | 7 (17.5%) | 33 (82.5%) |

pedicle injuries on subsequent angiography. Five cases had extravasation of dye but of these only three of them needed surgical intervention because of deterioration of clinical state. Four patients had unrelated incidental findings. These included ureteric calculi, polycystic kidneys and chronic pyelonephritis.

## Surgical Treatment

16 patients underwent surgical exploration (Table IV). Of these, 11 of them were operated within 12 hours of admission. Half of all the cases operated upon ended up with an immediate total nephrectomy. All cases with pedicle or hilar injuries and cases with shattered renal parenchyma obviously had little chance of organ preservation. One patient had polar injury to the kidney only but still ended up with a delayed nephrectomy. Two attempts at organ conservation, initially a clot evacuation and underrunning, and later a polar nephrectomy did not spare him the need for a third operation. Due to continuing haemorrhage and added sepsis, a subsequent nephrectomy had to be performed.

The transperitoneal approach was most commonly used. Of the 10 cases explored in this manner, eight had other associated visceral injuries while two had pure renal damage. Five cases were explored through the loin and of these, four had isolated renal injury.

Postoperative complications were varied. One patient had problems from massive blood transfusion, another developed shock lung syndrome, while four others had infective complications in the wound, the chest, the subphrenic space and in the abdomen.

TABLE IV

CLASSIFICATION OF RENAL INJURIES

| Nature of Injury | Total Nephrectomy | Partial Nephrectomy | Simple Suture | Explor Lapar. |
|---|---|---|---|---|
| **Major:** | | | | |
| Pedicle injury | 1 | 1 | 0 | 0 |
| Parenchymal: | | | | |
| – at either pole | 1 | 1 | 0 | 1 |
| – at hilum | 3 | 0 | 0 | 0 |
| Shattered kidneys | 3 | 0 | 0 | 0 |
| Both pedicle & parenchyma | 1 | 0 | 0 | 0 |
| **Minor:** | | | | |
| Superficial cortical laceration | 0 | 0 | 4 | 0 |
| Bleeding from parenchymal surface | 0 | 0 | 0 | 1 |
| Total | 9 | 2 | 4 | 2 |

## DISCUSSION

The results of this study show a high overall nephrectomy rate of 22.5% (Table III.) There is however no mortality. It is difficult to compare this with other available series as there is no homogeneity in the degree of trauma amongst these series. Osias[1] reported a seemingly low nephrectomy rate of 5% in his series, but his study was confined to patients with blunt trauma and he had included all minor renal contusions too.

The presence of a shock state or of a penetrating wound are definite common-sense indications for surgical intervention. Penetrating wounds in partioular, require immediate surgical intervention because of the high incidence of severe injuries, tendency to infection, delayed haemorrhage and development of arterio-venous fistulae.

The intravenous urogram is useful both for diagnosis as well as assessment. It provides not only information on the injured kidney but also as to any pre-existing disease of the opposite side and may thereby influence the mode of management. The study is indicated in all patients having haematuria unless life-threatening shock state necessitates immediate surgical exploration and control of haemorrhage. If needed, the urogram can even be done intraoperatively with the help of a portable X-ray machine. Extravasation of dye as seen on the urogram is, in itself not an absolute indication for operative intervention. Two such patients of ours resolved spontaneously on conservative management. Three other such cases proceeded onto surgery because of increasing haematuria, active bleeding seen on arteriography or an associated penetrating wound. It is not unusual to find impaired excretion on the urogram in patients with kidney trauma. This is usually the result of hypotension, generalised vasoconstriction and poor renal perfusion, where surgical control of haemorrhage is indicated anyway (Table IV).

Various claims of the usefulness of arteriography pervade the literature and its use has even been applied as a tool for selection of cases optimally handled by surgical intervention.[2] While it is certainly a great aid to have arteriography in every case, we, in a peripheral hospital, working under suboptimal conditions most of the time would advocate arteriographic studies only when we require more adequate visualisation or when we intend to surgically intervene because of clinical deterioration.

Non-functioning kidneys on intravenous urogram usually indicate severe parenchymal fragmentation or pedicle injuries and arteriography is indicated in such cases. We have three cases where angiograms diagnosed possible pedicle injuries, but two of them turned out to be hilar lacerations on exploration. Whether the hilum or pedicle is torn, immediate exploration is necessary anyway. Some of our cases were delayed for as long as three days after the initial IVU and we believe this to be a contributing factor to the increased nephrectomy rate.

Controversies in the management of blunt renal trauma[3] will continue to loom in the literature. We feel that our nephrectomy rate has been unduly high and recommend a more conservative approach with more vigorous efforts at organ conservation. Where pointers exist as to possible pedicle injuries and where patient deteriorates, surgical intervention should be prompt, to reduce excessive morbidity and mortality. What is emphasised is accurate, careful and repeated clinical assessment of every renal trauma patient, which forms the basis of a policy of watchful waiting.

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