# MANAGEMENT OF RENAL TRAUMA

ESSAY

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In

UROLOGY



By

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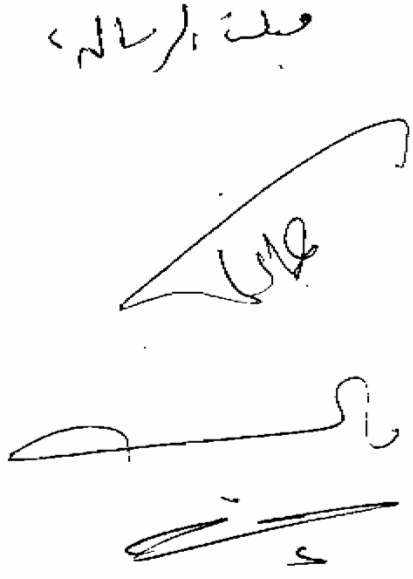

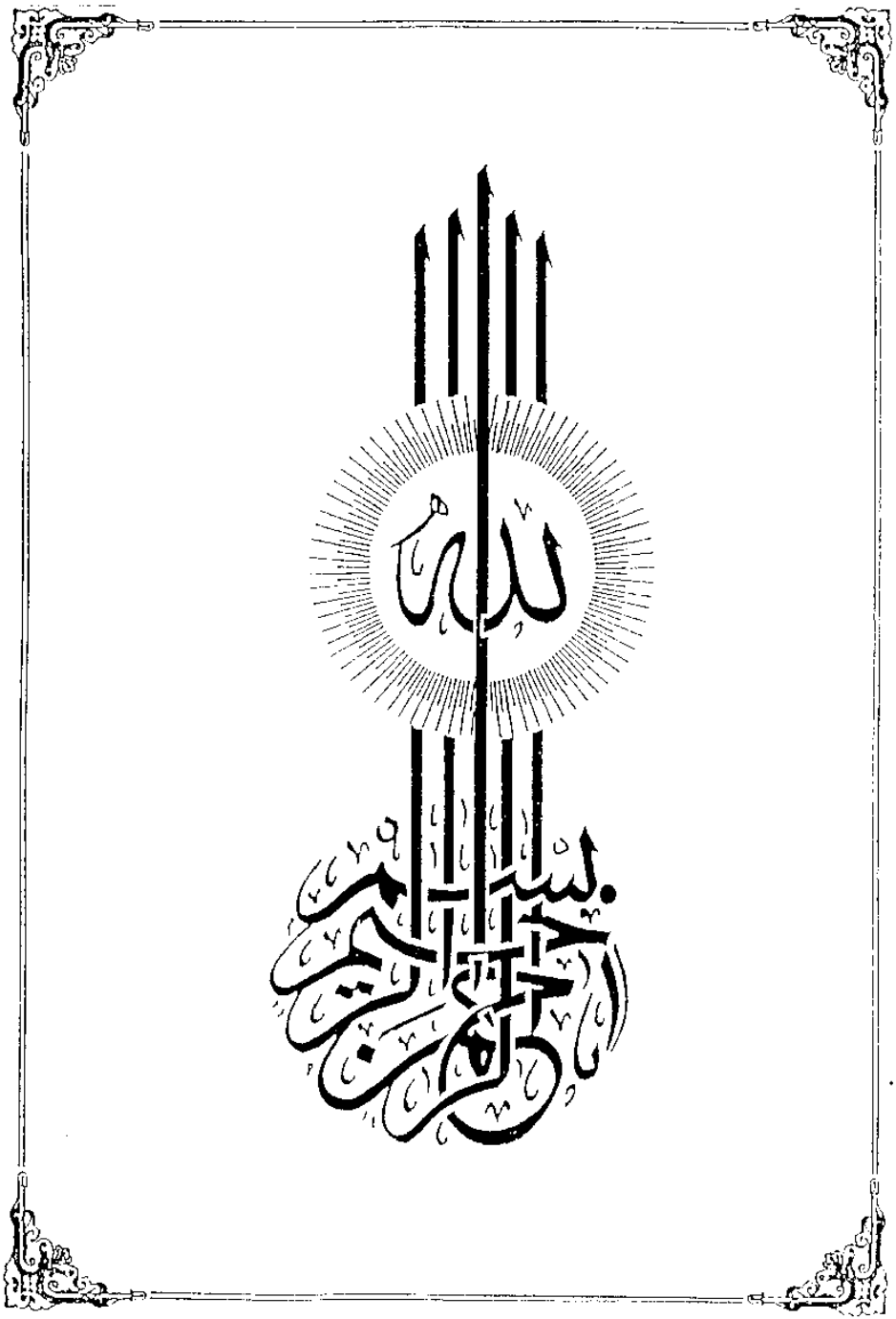

# C O N T E N T S



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# INTRODUCTION

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The Kidneys are essential for life as they perform vital functions to the body to keep the internal environment constant.

Being so important for life, they are located on the posterior abdominal wall, well protected by abdominal muscles, lower ribs, strong vertebral muscles and the general bulk of the abdominal viscera.

This area is well protected from injury, but the relation of the Kidneys to inferior vena cava, colon,spleen, pencreas and liver may produce a catastrophy when the Kidneys are injuried in association with injuries to these other organs. (Scholl, 1970).

The Kidney is enclosed in a dense fibrous capsule which is readily stripped from its surface.

The Kidney with its fibrous capsule is surrounded by a fatty capsule (perirenal fat), and this fills the space inside the loosely fitting sheeth of renal fascia which encloses it with the Kidney and suprarenal. (Gunningham's, 1967).

The renal fascia which covers the posterior surface of the kidney is called (Zuckerkandle fascia) and that which covers the anterior surface and pelvis is called Gerota's fascia.

The Kidneys are connected to aorta and inferior vena

cava through the renal artery and vein and to the urinary bladder by the ureter. Thus the Kidney may be easily torn by sudden acceleration or deceleration, and these forces may in themselves produce variable degree of injury, such as tearing of the intima of the renal artery, injury to the collecting system and partial or complete avulsion of the renal pedicle. (Newoom and Buist, 1980).

In children renal injuries are more common due to lesser amount of perinephric fat, relatively lower loaction, relatively larger size of the Kidney and the lack of strong muscles and a rigid thoracic cage result in less protection of the retroperitoneal space from external blunt trauma. Also the fascial investiments, which serve as a buffer are not well developed, and the Kidneys being more related to peritoneum thus predisposes the Kidney to more trauma along with injury of peritoneum. (Scholl, 1970).

Renal injuries can occur due to external violence by direct trauma i.e. stabs, bullets. In this later condition an external wound will be present.

In other cases, trauma may be implicated by kiks or violence applied to the lower chest or upper abdomen leading to injury of the Kidney by whip-like action of the last rib.

Spontaneous rupture of the Kidney may occur due to muscular violence especially if the Kidney is enlarged or diseased.

With the introduction of recent instrumentation, i.e.

nephroscopy, percutaneous nephrostomy and ureteric catheter, renal injuries has become more common. (Earl Nation, 1970).

It is of utmost importance to diagnose renal injuries as early as possible.

Diagnosis of renal injury can be based on clinical grounds, plain X-ray films, Excretory urography, renal angiography, renal scan, ultrasound, cystoscopy and retrograde pyelography.

One should not fail to take advantage of the possibility of diagnostic studies being performed on the operating table. If the patient is so unstable that he must be rushed to the operating room, a cassette can be placed under the operating table and a portable machine used to obtain studies sufficient to rule out the possibility of absence or poor function of the opposite Kidney.

Obviously, control of haemorrhage and repair of injuries to vital organs takes precedence over treatment of urologic injury.(William Guerriero, 1982).

Also, the management of renal trauma depends upon the severity of the injury, time of recognition of the injury, and the clinical condition of the patient. Logical selection of patients for surgical treatment can occur only if adequate diagnostic evaluation is performed when the injury is first suspected.

One should not relay on haematuria to diagnose renal trauma, and the surgeon must be aware of the high incidences

of sequelae such as hypertension, haemorrhage and abscess with expectant management of severe renal injuries.

Fortunately, most patients who sustain renal trauma survive their injuries. In most series deaths are usually the result of associated injury rather than renal injuries. (Evins, Thomasson, 1980).

# ETIOLOGY OF RENAL TRAUMA

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(1) Incidence:

Renal injries are the most common injuriesof the urinary system. The Kidney is well protected by heavy lumbar muscles, verterbral bodies, ribs and the viscera anteriorly.

Most injuries occur from automobile accidents or mishaps, chiefly in men and boys.

About 10% of all injuries seen in the emergency room involve the genito urinary system to some extent (McAninch, J.W., 1981).

Injuries to the Kidney is present in 8% of patients with gunshot wounds of the abdomen and in 6% of patients with stab wounds of the abdomen. Penetrating injuries of the Kidney are associated with an 80% incidence of injury to intraperitoneal viscera (Carlton,C.E.,1978).

The incidence of renal injury is increasing because the accident rate increases. Accidents are now the most common cause of death in the first four decades of life and the fourth most common cause for all ages. (Scholl, 1970).

(2) Age and sex:

Trauma most notably occurs in those individuals directly involved in violence and frequent activity. For the most part, these individuals are men in their

20's. The second most common group are individuals between 20 and 30 years old. The third most common group comprise individuals in their 30's. (Mendez, R., 1977).

The age and sex incidence in children as recorded by Cass (1983) are: 12% children up to 5 years of age, 29% from 5 to 10 years, and 54% from 11 to 16 years of age.

Of the whole children 67% are males. In children renal injuries are more common due to marked renal ptosis, relatively large size of the Kidney, and a minimum of protective perirenal fat. Gerota's fascia, which serves as a buffer does not develop early, and the Kidney in young individuals, lies directly against the peritoneum, which at times is quite tense and ruptures easily (A.J. Scholl and Earl F. Nation, 1978).

(3) Predisposing causes:

(a) Congenital anomalies of the Kidneys such as:

i. Ectopic Kidney.

ii. Mobile Kidney.

iii. Horse shoe Kidney.

iv. Polycystic Kidneys are more liable to injury.

The incidence of injured anomalous Kidney is high, about 20% (Newsan, 1980).

Millera and associates found that 17% of hydronephrosis and 27% of Willm's tumours were discovered

by trauma.

Morse and associates also noted that 8 of 89 pediatric renal trauma patients had pre-existing congenital renal anomalies (R. Mondez, 1977).

(b) Pre-existing renal disease:

Diseased Kidneys especially hydronephrosis predisposes to renal damage. Hydronephrosis was the commonest pre-existing cause for renal damage with standard trauma proved experimentally and confirmed clinically. (Scholl,A.J., 1970).

Pre-existing disease states such as hydronephrosis, renal tumour or renal cystic disease make the Kidney more susceptible to trauma and must be suspected when a patient presents with obvious renal injury following minor trauma.

(4) Exciting causes:

Renal injury may be caused by:

(a) External violence (Mechanical trauma).

(b) Internal violence (Surgical trauma):

i. Instruments.

ii. Operations.

(c) Muscular violence.

Renal trauma can be open or closed.

## 1. Open trauma (penetrating trauma to the Kidney)

Penetrating renal trauma is found in 6-8 percent of patients with penetrating abdominal injuries. 80 percent of patients with penetrating renal injuries had associated intra-abdominal visceral injuries. (Carlton,C.E.,1978).

The structures most commonly injured in association with the Kidney are: liver in 42% of cases, the colon in 24%, spleen in 23%, stomach 23%, chest 18%, pancreas 17%, small intestine 13%, duodenum 12% and I.V.C. in 6% of cases. (Scott, Carlton, 1969).

Gunshot and stab wounds cause most penetrating injuries to the Kidney; any wound in the flank area should be regarded as a cause of renal injury until proved otherwise. (Smith, 1981).

Penetrating injuries of the kidney may be present when the patient has a thoracic gun shot or stab wound, and should be suspected when the enterance wound is below the eighth rib

Lower rib fracture should also suggest renal injury with both penetrating trauma and blunt trauma. Determination of the velocity of the missile when the patient has suffered a gunshot wound to the Kidney is extremely important. Small-caliber, low velocity missiles rarely produce significant injury to the Kidney unless they have passed through the renal pedicle or a major portion of the collecting system.