CLOSED ABDOMINAL INJURIES

ESSAY

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OF THE MASTER DEGREE IN

(GENERAL SURGERY)

BY

ZAKARIA EL SAYED ABOU EL HASSAN

M.B., B.Ch.

SUPERVISED BY

Dr. REDA MAHMOUD MOUSTAFA
Assist. Prof. of General Surgery
Faculty of Medicine
Ain Shams University

Dr. IBRAHIM SHAMEKH
Lec. of General Surgery
Faculty of Medicine
Ain Shams University

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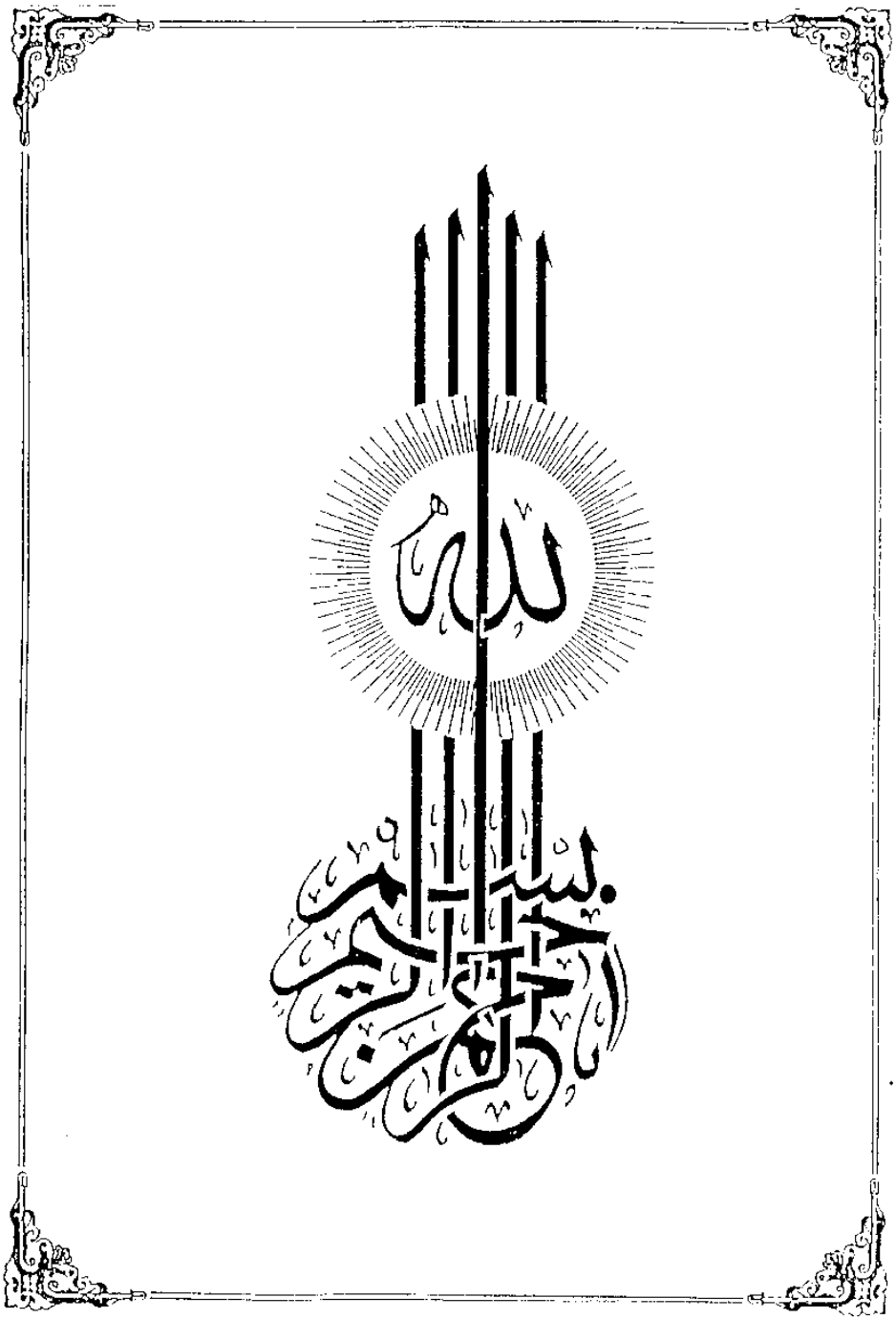

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INTRODUCTION

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Trauma represents a major cause of disability and death at all ages and it is a leading cause of death in young people. (Hardy, 1977).

Injuries to the abdomen and its conents account for approximately 10% of the 130,000 trauma deaths occuring annually in the United States of America. Though less often fatal than injuries to the head or thorax, their improtance rests with the fact that abdominal injuries are largely correctible, and that even slight delay in their recognition often greatly impair the chance of recovery (Freeark, 1977).

Accident patients occupy up to 22 million hospital bed days a year in the United States of America - more than are needed to take care of the delivery of all the babies in a given year, more than are needed by all the heart patients, and four times more than are needed by all cancer patients. Even during wartime, deaths from accidents always exceed battle deaths (Shires and Jones, 1974).

Experience both in Vietnam and, subsequantly, in civilian trauma centers has demonstrated that physicians who deal with the injured patients on a regular bases

achieve better results. In Illinois the establishment of regional trauma centers resulted in a 29 per cent decrease in vehicular accidental deaths and a 28 per cent decrease in the death to - injury ratio (Boyd et al., 1975).

Delivery of the most up-to-date care of the trauma patient requires the presence of a trained team of trauma specialists. A team of four surgeons and four nurses must be available for the management of a single patient. (Schenk et al ., 1977).

A E T I O P A T H O L O G Y

AETIOPATHOLOGY

Abdominal injuries are relatively frequent in both military and civilian experience. Blunt abdominal injuries often do not immediately declare the need for surgical repair and frequently are associated with injuries to other organ systems that may mask the diagnosis and complicate the treatment. (Rodkey and Welch, 1974).

Either sudden deceleration or sudden compression of the abdomen may result in injury to abdominal viscera. When the body is travelling forward at a high rate of speed and stops suddenly as a result of impact with a stationary object, organs that are loosely fixed continue to travel forwards. Such stress frequently results in severe injury of many abdominal structures specially the renal pedicle, the root of the mesentery and the sites where the duodenum and colon pass from free-hanging intraperitoneal positions to fixed retro peritoneal positions. This shearing effect may also lead to injury of the superior mesenteric artery. (Litwin and Drapanas 1977).

Parenchymatous visceral organs may also be injured due to the transmitted energy caused by the trauma (Blumgart, 1974)

Mechanism of blunt abdominal trauma:

1. Direct blow by a hard object in motion or by propelling of the body against a hard object. This category includes most street accidents, those produced by deceleration included, i.e. by sudden putting on of the brakes, when the body may be thrown against the steering wheel. this category also includes blows, kicks, thrusts, etc. (Fagarasanu, 1972).

2. Indirect injury caused by falls on the feet, buttocks or shoulders. Injury in such cases results from the sudden snap stop or body jerk, a fall from a height is a fairly frequent occurrance on building sites, in faulty landing with the parachuts, etc. (Scholl and Nation, 1970).

3. Abdominal organs may be injured as a consequence of shock waves or of direct compression of a viscus against a bony prominence. Crushing is due to a direct blow, when the injured organ is caught between two hard planes of which one at any rate is mobile. In crushing the force of the missile depends especially upon its mass, whereas in direct blows the force depends especially upon the velocity of the impact. (Dudley, 1977).

4. An under water explosion with its shock wave, may produce more or less severe lesions to swimmers in the neighbourhood, from simple visceral contusion up to disrupting of the abdominal cavity or parenchymatous

organs, such as the liver. Stomach rupture was reported as a result of gastro-intestinal barotrauma. (Cramer and Heimbach 1982).

5. Fractures of the bony pelvis or of the thoracic cage as a result of different types of trauma may lead to injury of many abdominal viscera as the liver, the spleen and the urinary bladder (Weems, 1979).

Frequency of injury in abdominal trauma.

Viscera injured	Frequency
Spleen	26.2%
Kidneys	24.2%
Intestine	16.2%
Liver	15.6%
Abdominal Wall	3.6%
Retroperitoneal Haematoma	2.7%
Mesentery	2.5%
pancreas	1.4%
Diaphragm	1.1%

(Mcclelland et al ., 1973)

Types of Injuries:

1. **Spleen:**

Because of its relatively free-hanging position, the spleen is the organ most commonly injured in blunt abdominal trauma. Acute abdominal compression most often results in laceration of the splenic capsule, whereas deceleration commonly results in partial or complete avulsion of the splenic pedicle. (Litwin and Drapanas, 1977).

An emergency splenectomy was necessary 25 days after blunt injury of a patient whose initial peritoneal lavage was negative, whose visceral angiograms were negative and whose abdomen remained asymptomatic during interval intensive observations. Delayed splenic rupture can occur rarely in the face of extensive diagnostic evaluation. Occasionally the splenic pulp may be injured without laceration of the capsule. (Gruenberg and Horan, 1983).

2. **Urinary tract:**

A. **Kidney:**

Injuries of the kidney vary from mild contusion to complete fragmentation or avulsion. Four times as many men as women sustain such injuries and over half of these occur before the age of 30. This is due to greater vocational exposure, more strenuous physical activity,

and possibly the more inflexible fixation of the kidney in men (Scholl and Nation, 1970).

Renal injuries may be classified into six groups depending upon their severity and location:

- Contusions.
- Renal cortical contusions with renal subcapsular extravasation.
- Lacerations of renal cortex through renal capsule, but with bleeding confined to the perirenal space defined by Gerota's fascia.
- Multiple lacerations of the kidney with bleeding not confined by Gerota's fascia.
- Injuries to main renal vessels.
- Ureteropelvic junction dismemberment and renal pelvic injuries (Wilson and Pierce 1975).

B. **Ureter:**

External non penetrating and non perforating injuries rarely result in damage to the ureter. The ureter, relatively small and inaccessible, is also quite elastic and quite mobile. It is protected in its course by a relatively soft cushion of fat and muscle, and blunt trauma is thus dissipated before damage is done to the ureter (Glenn, 1975).

The resulting injury is usually that of perforation, severance by bony fragements, or avulsion. There is one type of traumatic injury of the ureter that is worthy of special mention, avulsion of the ureter from the pelvis in children struck by motor vehicles. It has been suggested that extreme hyperextension may draw the ureter tuat as a bow string and cause separation of the ureter in this manner. (Rusche and Morrow, 1970).

C. **Bladder:**

When the bladder is empty, it is extremely well-protected against most types of trauma. When it is distended with urine, it is much more likely to be ruptured by blunt trauma or torn by spicules of bone from a pelvic fracture (Wilson and Pierce, 1975).

Types of injury of the bladder may be classified as follows:

- Contusion.
- Intraperitoneal rupture.
- Extraperitoneal rupture.
- Combined intraperitoneal and extreperitoneal ruptures. (Prather,1970).

The extraperitoneal rupture of the bladder is accompanied in thirty five per cent of cases with other intra-peritoneal visceral injuries (Palomar et al ., 1980).