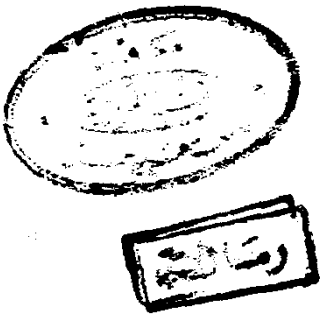
MANAGEMENT OF MULTIPLE INJURED PATIENT

AT THE SCENE OF THE ACCIDENT

This is submitted in partial fulfilment for the Master Degree in general surgery.



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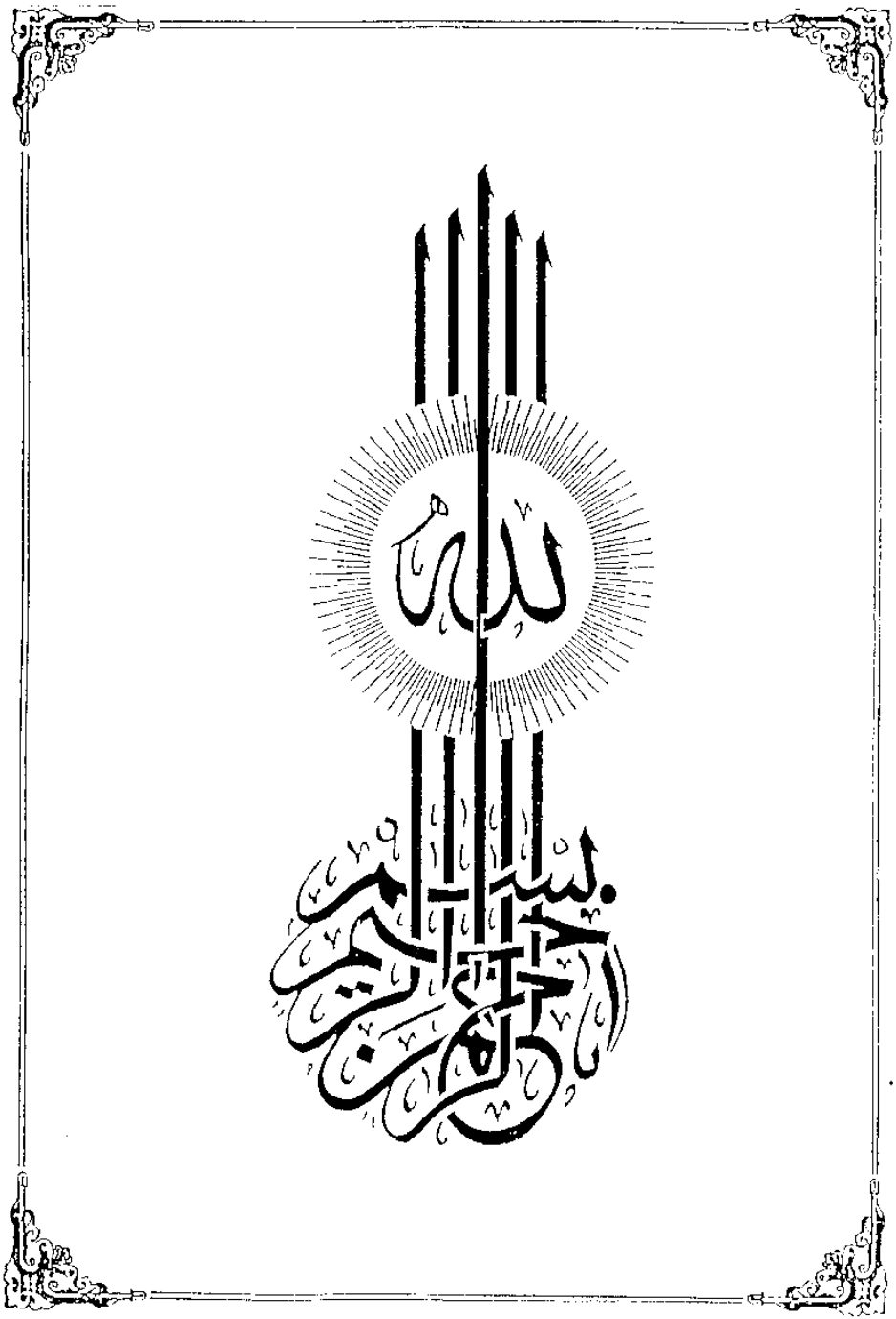

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INTRODUCTION

Each year, the society pays a frightful price in lives, pain and money for accidents, because of the cost in hospital care, permanent disabilities and high mortalities (Lewis and Carleton 1979). Trauma is a major health problem and accounts for more hospital days, than heart diseases or cancer (Lewis, 1979 and Levison & Trunkey, 1984).

Trauma is the leading cause of death in the first three decades of life, taking a staggering toll in the productive years (Herring, 1984). In 1976, trauma was the 4th leading cause of death following heart diseases, cancer and cerebrovascular diseases. In 1979, it was the third leading cause of death after cardiovascular diseases and malignancy, but now it is the number one killer of human being (Frey, 1978, Lewis & Carleton, 1979 and Levison & Trunkey, 1984).

The increasing rate of industrialization and socioeconomic improvement in developing countries is closely related to the increasing incidence of serious injuries which have become a major health problem. Road traffic accidents are the commonest cause of injuries in the developing countries. The factors contributing to high incidence of these injuries in the developing countries are:

a) Relatively short experience in the use of automobiles
b) The low educational status of most classes of road-users
c) The poor condition of the roads which are often narrow, poorly lit and inadequate for the amount of traffic they carry.

d) Motor vehicles used for public transport are often mechanically defective (Anyanwu et al, 1981).

There are many trials to lessen and prevent the occurance of injuries. The accident problem should be viewed as a public health responsibility, and efforts to control accidents should be mounted on two fronts:

First: One directed at accident prevention: some progress in highway trauma has been made through improved automobile design, use of seat belts (over half of the deaths resulting from motor vehicle accidents can be preventable if shoulder and lap belts are always worn) and speed limitation. Also, attention has been directed to the role of human behaviour as an important factor. Perhaps it is understandable that the public believes accidents to be "inevitable" or to result from carelessness that it is an "inevitable trait of human nature".

Second: Another, directed at reducing the extent of injuries and the mortality of those injured through:

a) Perfect and rapid emergency care system at the scene of the accident
b) Patient's care during transportation.
c) The delivery of the accident victim to the nearest hospital.
d) Widespread upgrading of emergency equipment and communication systems.
e) Accurate diagnosis, rapid assessment and treatment

(Frey, 1978, Lewis & Carleton, 1979 and Anayanwu et al 1981).

As the concept that care of the injured should be regionalized to specific trauma centres has become more accepted, attention has shifted to that segment of care in the prehospital setting (Copass et al, 1984). The objectives of first aid are (St. John Ambulance, 1977).

1 - To Preserve Life:

If an accident results in the cessation of breathing and/or functional circulation, the patient will almost certainly die in 4 - 6 minutes unless effective cardiopulmonary resuscitation (CPR) is immediately applied by an appropriately trained individual (Parcel & Rinear, 1982). The prime concern of the first aider must be to maintain respiratory and cardiovascular function (Dupree, Mc Connell & Parcel, 1982).

Shock is a life-threatening situation and requires recognition and early care by the first aider (Abston, 1982).

Appropriate early first aid may relieve discomfort and the threat to body life of burns (Abston, 1982).

2 - To minimize the Effects of Injury

Proper care by the first aider may prevent serious complications and permanent crippling (Parcel, 1982).

3 - To Relieve Pain and Distress:

A first aider may intervene to lessen the severe discomfort generated by stress and help affected persons to cope

in more constructive ways (Mc Kevitt, 1982). Bandaging of wounds is one of the first aid procedures (Parcel, 1982).

- First aid must be carried out promptly with materials which are immediately available (St. John Ambulance, 1977).
- First aid is the immediate and temporary care given to a person who has been injured.

Injury becomes an emergency when life is threatened, suffering occurs or problems develop that endanger physical or psychological well-being.

Injured individuals involved in emergency situations become dependent on others for their well-being.

Emergency care is the full range of procedures and services administered to a person who has been injured. It begins with first aid and includes emergency transportation, emergency, medical care, and follow-up care (which is a care provided once the emergency condition or problem has been stabilized).

Despite advancements in medical technology, first-aid in emergency care still the first critical link in the management of trauma. A first aider is more than just a person willing to help. Anyone who assumes responsibility for first aid care, assumes the responsibility for the life and well-being of another person. This requires making decisions that are based on a knowledge of what to do and based on established guidelines for administering first aid care (Parcel, 1982).

The patient with multiple injuries is in desperate physiologic straits and his survival is directly dependent upon a coordinated, carefully planned team approach to diagnosis and treatment. The patient is best managed when the overall responsibility for his care rests on one physician, division of responsibility or attention only to the particular area in which the physician has special knowledge may decrease awareness of complications and will hinder the evaluation of the patient's overall problems. Meticulous and detailed attention to total patient care during the phases of the patient's injury is of paramount importance, and the physician or the team of different specialists who called upon to treat a patient with multiple injuries should be capable of initially dealing with all the acute derangements that are present (Litwin, 1981).

In all cases of multiple injuries, there must be a"captain of the team" who must have a plan which enables him to cope with the most serious injuries in order of their importance, directs resuscitation, establishes priorities for the management beginning with the life-threatening, and decides special diagnostic procedures (Meyers, 1983).

The leader of trauma must first identify the problems, history of the mechanism, severity and time of the injury. After initial examination, it is necessary to develop priorities for management. A diagnostic and therapeutic plan is formulated based on the urgency of each problem. Finally,

the team leader administers treatment or calls on appropriate specialists to direct the definitive care of the patient.

Certain injuries are so critical that operative treatment must be undertaken as soon as the diagnosis is made. In these resuscitation is continued as the patient being operated on (Meyers, 1983).

MECHANISM OF TRAUMA

A severely injured patient frequently sustained trauma to several major body systems (Meyers, 1983).

1 - Head, Central Nervous System and Facial Injuries

Craniocerebral injuries are more immediately life-threatening than those of the spine.

Central nervous system injury may be to the brain or to the spinal cord.

Head Injuries

Head injuries may be:

a) Penetrating head injuries due to sharp objects, e.g. bullets, knives, spears.

b) Blunt head injuries, e.g. motor vehicle accidents, fall from a height on a blunt object, fall of blunt objects on the head....

Head injuries may be:

a) With brain damage or

b) Without brain damage.

Common Types of Brain Injuries Include:

1 - Concussion 2 - Contusion

3 - Intracerebral haemorrhage 4 - Sub dural haemorrhage

5 - Epidural hemorrhage (Gardner & Roylance, 1977 and Litwin 1981).

Spinal Cord Injuries:

Usually occur in association with spinal fractures and/or dislocations specially at the cervical or thoracolumbar regions. Spinal cord injuries may be due to:

a) Penetrating trauma caused by sharp objects or

b) Blunt trauma (Litwin, 1981).

Facial Injuries:

May be due to penetrating or blunt trauma. Fracture of the malar/maxillary complex is a common injury, may be associated with ocular injuries resulting in blindness. This fracture is often badly comminuted.

The head and neck are the common sites injured in blast injuries and result in lacerations, abrasions, bruises, fractures and loss of soft and bony tissues (Thomas, 1979 and Whitlock, 1981).

II - Neck Injuries

Neck injuries may be:

a) Penetrating neck injuries, caused by sharp objects.

Penetrating trauma to the posterior neck may injure:

i) The vertebral column.

ii) The cervical spinal cord.

iii) The interosseous portion of the vertebral artery.

iv) The neck musculature.

Penetrating trauma to the anterior and lateral neck may injure:

i) The larynx.

ii) The trachea

iii) The esophagus

iv) The thyroid

v) The carotid arteries

vi) The subclavian arteries

vii) The jugular veins

viii) The subclavian veins

ix) Vagus, recurrent laryngeal, phrenic, hypoglossal, spinal accessory nerves, brachial and cervical plexuses.

Extracranial carotid artery injuries are usually due to gunshot wounds and commonly associated with other injuries (Allen, 1979 - Litwin, 1981 - Brown et al, 1982 - and Karlin et al, 1983). or

b) Blunt neck injuries

Blunt neck injuries usually occur in association with severe head and/or chest injuries.

Blunt neck trauma may cause:

i) Carotid artery injuries

ii) Laryngeal and tracheal injuries complicated by haemorrhage and airway obstruction.

iii) Fracture or dislocation of the cervical vertebra with risk of spinal cord injury.

Great forces are required to produce damage in a normal spine and these forces are commonly complex and combined.

The most common level of the cervical spine injury is C_5 or C_6. The midcervical spine fractures or dislocates

as the body is thrown head first into the window, roof or inside from the automobile with the head in a flexed or rotated position.

Direct blow to the top of the head with the patient stationary frequently result in a burst of C_1 vertebra (Jefferson's fracture). The resultant pattern of vertebral injury is to some extent determined by pre-existing changes in the vertebral column and whether the muscles are tensed or relaxed at the time of injury.

Types of Cervical Vertebral Injury

1 - Compression (Axial loading): in the explosive type of compression fracture there is lateral expansion and retropulsion of bone.

2 - Hyper extension (retroflexion, deflexion) commonly seen in elderly when the spine has lost mobility because of spondylotic changes.

3 - Unilateral facet dislocation or subluxation

4 - Bilateral facet dislocation or subluxation.

5 - Miscellaneous (Allen, 1979 - Litwin, 1981 - Stauffer, 1984 and Mc Sweeny 1984)

III - Thoracic Injuries

Chest injuries seldom occur alone. Combined injuries of multiple intrathoracic structures are usual. Chest injuries may be:

a) Penetrating chest injuries caused by sharp objects

b) Blunt chest injuries.

Despite increased automobile safety and a lower nation-wide maximum speed limit, deaths from blunt chest trauma due to high-speed vehicular accidents continue to be a major problem.

Thoracic injuries may involve the thoracic wall the lungs and the mediastinum:

I - Chest wall:

a) Rib fractures: varies from simple fracture to those with hemopneumothorax to severe multiple fractures with flail chest and internal injuries.

b) Flail chest. (Steering wheel injury); occurs when a portion of the chest wall becomes isolated by multiple fractures and moves in and out with inspiration and expiration with potentially severe reduction in ventilatory efficiency. Usually the rib fractures are anterior and there are at least two fractures of the same rib.

Bilateral costo-chondral separation and the sternal fractures can also cause a flail chest (Gardner & Roylance, 1977 - Thomas, 1979 - Litwin, 1981 -Thompson et al 1982 - Harley, 1983 and Mayfield, 1984).

c) Fractured Scapula: Commonly due to motor vehicle accidents and usually associated with other injuries (thoracic and extrathoracic).

Combination of a fracture of the scapula and the underlying first rib appears to be a particularly severe injury (Armstrong et al, 1984).