SURGICAL SHOCK

Essay

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IN

(GENERAL SURGERY)

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بِسْمِ اللهِ الرَّحْمٰنِ الرَّحِيمِ

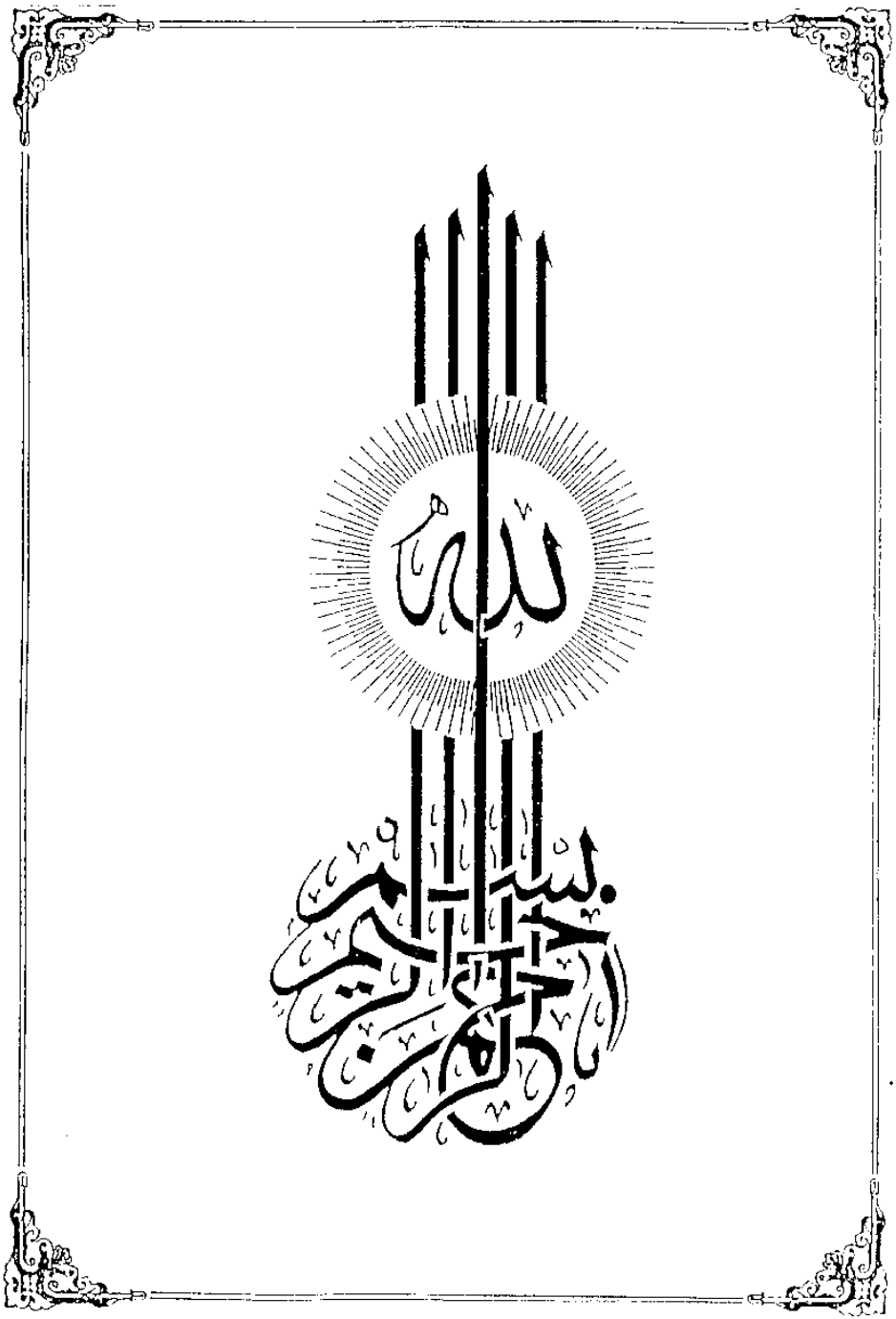
وَبِهِ نَسْتَعِين

"رَبَّنَا ...

آتِنَا مِن لَّدُنْكَ رَحْمَةً ...

وَهَيِّئْ لَنَا مِنْ أَمْرِنَا رَشَدًا "

صَدَقَ اللهُ العَظِيم



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GOD ONLY REWARDS ALL.

C O N T E N T S

DEFINITION

1

S H O C K

DEFINITION

The word shock in English Language means collapse derived from latin collapsus.

In 1943, the word shock was first used medically by Henri Francoise Le Dran; a reflection from experience with gun shot wounds, he defined shock as a progressive deterioration following injury.

Shock has been defined by Fine, in 1963 as a species of functional concussion by which the influence of the brain over the organ of circulation is deranged or suspended.

In 1967 Hardaway et al., defined wound shock broadly as the clinical manifestations of an inadequate volume of circulating blood accompanied by physiologic adjustments of the organism to a progressive discrepancy between the capacity of the arterial tree and the volume of blood available to fill it.

In 1973 Guyton defined shock as a state of circulation in which the body tissues in wide area are damaged due to nutritional insufficiency as a result of decrease cardiac output.

In 1976 Richar C. Lillehi et al., defined shock as a state which results when tissue or organ blood flow is in

adequate to sustain normal cell activities and that this is usually accompanied by lowered arterial blood pressure.

Shock also is defined by (Trunkey, 1975) as a breakdown of effective circulation at the cellular level.

J. H. Siegel in 1976 reported a long definition: a major body injury, a severe septic process or a significant myocardial depression, or infarction produces a substantial alteration in the fragile haemstatic equilibrium which sustains life, when this delicate balance is altered to the point at which the metabolic requirements for energy generation exceed the supply of substrates and oxygen, a shock state develops which is frequently but always associated with hypotension.

Maclean, 1977 said that shock is the inadequate blood flow to vital organs or inability of the body cell mass to metabolise nutrients normally.

Shock of all forms appear to be invariably related to inadequate tissues perfusion. The low flow state in vital organs seem to be the final common denominator in all forms of shock.

Holocroft (1981) stated that shock is a condition in which vital organs convert to catabolic metabolism because of either poor tissue perfusion or sepsis.

In 1983 Trunkey defined shock as peripheral circulatory failure causing tissue perfusion to be inadequate to meet the nutritional requirements of the cells and remove the waste products of metabolism. In the simplest terms, therefore, shock is inadequate tissue perfusion.

In 1984 H. A. F. Dudley defined shock in physiological terms as the body's response to a reduced effective. Circulating blood volume, but in every day practice the word is used to describe the clinical state of affairs of reduced peripheral blood flow and resultant peripheral tissue hypoxia.

The two mechanisms explain most of the clinical manifestations of the shock syndromes: Pallor; cold; clammy periphery; peripheral cyanosis; and mental confusion.

CLASSIFICATION

CLASSIFICATION

As we have seen in the definition, that it is greatly changed from past to present according to the advancement of medicine, haemodynamics, monitoring also the classification changed from old to recent ones.

Primary and secondary shock which are of historical interest (Cowel, 1974) Cowel used term primary shock to describe clinical state develops after wounding.

Nowadays primary shock is used to describe an acute beut of hypotension, reflex, in nature which may follow trauma, fright, or visceral stimulation. It is transitory and harmless and may result from pooling of blood in the splanchic circulation (Vasovagal attack) (J. Walter, 1974).

Lillehei in 1974 classified shock as follows:

A. Traumatic shock:
   1. External volume loss.
   2. Internal volume loss as in multiple fractures.
   3. Mixed type of both external and internal volume loss.

B. Septic shock:
   1. Gram negative bacterial infections (endotoxin shock)
   2. Gram positive bacterial infections as staphylococcus aureus.
   3. Fungal specially Candida albicans.

C. Cardiogenic shock.

Maclean et al., 1977 classified shock into:

A. Hypovolaemic:

Blood loss plasma ... water loss.

B. Cardiogenic:

1. Myocardial infarction.
2. Arrythmias.
3. Tamponade.
4. Late hypovolemia.
5. Epidural and general anaethesia.

C. Peripheral pooling:

1. Loss of tone in resistance vessels.
2. Trapping in capacitance vessels.

D. Septic shock:

Failure of cells of vital organs to perform normal metabolic functions despite availability of oxygen.

In 1981 Dunphy classified shock into the following types:

A. Hypovolemic.

B. Cardiogenic.

C. Septic:

a. Hyperdynamic.

b. Hypodynamic.

Trankey in 1983 classified shock into hypovolemic, septic, cardiogenic, neurogenic, or miscellaneous (e.g. anaphylactic reactions and insulin shock).

TRAUMATIC SHOCK

Traumatic shock is one of most important types of surgical shock. It may be defined as traumatic peripheral circulatory collapse. (Essay in Surgical Sheck, 1979).

It develops when there is severe damage to muscle and bone, and it is seen in war and car accidents victims where the frank bleeding into the injured areas is the principal cause of shock. The amount of blood lost may be unremarkable by vision but in fact the amount be huge, for example the increase in the diameter of the thigh by one centemeter equals loss of one liter of blood extravasated into the thigh.

It is established clinically that circulatory collapse is a normal sequence of severe injury. Certain factors can aggravate it and cause it to develop including infancy and old ages and they are more susceptable for traumatic shock. In fit young adults the volume of damaged tissue or the effective loss of circulating blood volume which are required to precipitate traumatic shock are increased. Haemorrhagic and burn shock are two special varieties of surgical shock in the same respects from shock due to wounds.

Thomas Lewis (1927) found a histamine like substance in injured skin, suggested that vasodilator agents librated from injured skin, injured tissues, entered the circulation and cause fall in blood pressure.

Canon and Bayliss (1923) in studies of crush injury to limbs, weight gain due to accumulation of fluid in the limb failed to account for shock,they traumatized limbs after their isolation from the systemic circulation by a tourniquet. Shock developed only after the tourniquet had been removed, and on the basis of this observation, toxaemia was considered the prime cause for traumatic shock.

Blalock and Phemister (1927) accounted for the shock on the basis of local fluid loss at the site of injury. The efficiency of circulating pressure of the patient control the length of latent period passed between the time of accident and the development of surgical shock.

In crush syndrome there is injured limb with severe muscle ischaemia where muscle pigments and other intracellular substances enter the circulation. Also in crush syndrome there is loss of blood, protein, fluid into the injured tissue and there is release of myoglobin into the circulation and other toxic substances which pricipitated in renal tubules causing renal damage. So the combination of traumatic shock and renal damage is called crush syndrome and the diagnosis is established by finding muscle pigments in the urine.

AETIOLOGY