Perioperative Management Of Patients With Multiple Organ Failure Syndrome

Essay

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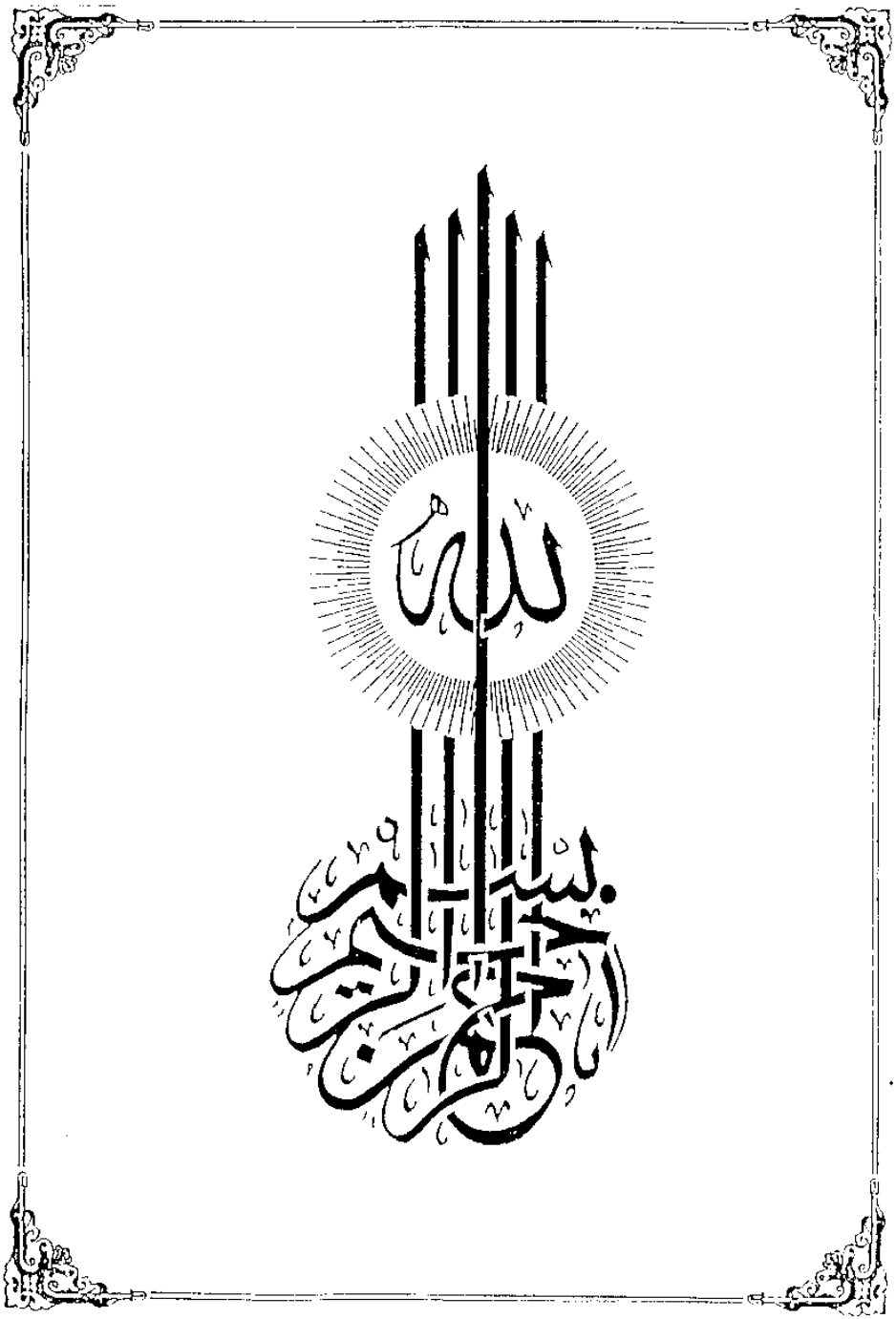
بسم الله الرحمن الرحيم

قالوا سبحانك
لا علم لنا إلا ما علمتنا
إنك أنت العليم الحكيم

صدق الله العظيم



To My Parents,
My Wife
&
My Family

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Mohamed El Shafei

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INTRODUCTION

In World War I, the casual relationship between acute blood loss and irreversible "Wound Shock" was not known, and consequently acute shock was a common cause of death. Based on studies performed in the post-world war I period establishing the role of acute blood loss in the development of shock, blood was used liberally during World War II to prevent and treat shock, thereby largely eliminating the previously common syndrome of irreversible wound shock. *(Deitch, 1990)*.

In spite of improved early survival, many of these patients went to die of acute renal failure. During the Korean war, acute renal failure remained the most common cause of delayed death in successfully resuscitated patients and therefore there was a focus of intense investigations on the post-traumatic renal insufficiency which eventually led to the realization that injury induced renal failure could be largely prevented by resuscitating these patients with sufficiently large amounts of crystalloids (to maintain renal perfusion) in addition to blood. Thus based on this better understanding of the patho-physiology of injury and the need for acute volume resuscitation, acute renal failure was largely prevented in the Vietnam conflict. *(Shires, 1972)*.

As more severely injured patients survived for longer periods, however, a new syndrome (Adult Respiratory Distress Syndrome

ARDS) emerged, and in the 1970s, the lungs became the organ system limiting survival. *(Ashbaugh, 1976).*

Today, although the mortality rate of patients with **ARDS** remains high, improvements in the management of these patients have resulted in the cause of death shifting from impaired gas exchange to Multiple System Organ Failure (**MSOF**), and currently more than 75% of the patients dying with **ARDS** now die of **MSOF** and systemic haemodynamic instability rather than of hypoxia. Viewed in this light, **MSOF** clearly represents the next, but surely not the last, obstacle that must be passed to improve survival in the critically ill patients. *(Montgomery, 1985).*

Nowadays, Multiple System Organ Failure (**MSOF**) represents the number one cause of death in intensive care units. The basic pathophysiology of this syndrome remains to be fully understood. *(Deitch, 1990).*

The anaesthesiologist should be aware that the risk is high in patients with **MSOF** for virtually any surgical or anaesthetic procedure as perioperative mortality is increased. *(Brown et al, 1988).*

Definition, Incidence and Economical Impact of Multiple Organ Failure Syndrome *(M O F S)*

Definition:

A multiple organ dysfunction syndrome *(MODS)*-like illness was first described by Tilney, et al in 1973. *MODS* develops as a progressive deterioration of two or more major organ systems such as neurological, cardiovascular, respiratory, renal, hepatic, hematologic or gastrointestinal systems. *MODS* has been described as a phenomenon which occurs as an outgrowth of the massive technological support available to critically ill patients. Patients with *MODS* commonly require more than 5 days of ICU therapy. *(Coursin et al, 1993)*.

In 1985, Knaus and his colleagues have given rise to a more consistent method to quantify organ dysfunction and patient outcome associated with an increasing severity of illness. They have developed criteria defining failure for six systems : Neurologic, cardiovascular, respiratory, renal, hepatic and hematologic.

I. Neurological system:

Failure of neurological system is considered if Glasgow coma score < 6 (in absence of sedation).

Glasgow Coma Score *(GCS):*

Teasdale and Janett in 1974 introduced the Glasgow Coma Score which includes sum of best eye opening, best verbal and best motor responses. Scoring of response as follows: (Points)

A. **Eye-open:**

- Spontaneously (4)
- To verbal command (3)
- To pain (2)
- No response (1)

B. **Motor:**

- Obeys verbal command (6)
- Response to painful stimuli
  - * Localizes pain (5)
  - * Flexion-withdrawal (4)
  - * Decorticate rigidity (Flexion) (3)
  - * Decerebrate rigidity (Extension) (2)
  - * No response (1)
- Movement without any control (4)

C. **Verbal:**

- Oriented and converses (5)
- Disoriented and converses (4)
- Inappropriate words (3)
- Incomprehensible sounds (2)
- No response (1)

If intubated, use clinical judgement for verbal response as follows:

- Patient generally unresponsive (1)
- Patient's ability to converse is in question (3)
- Patient's appears able to converse (5)

If the patient is paralysed or sedated, neurologic scoring is not performed and the patient is not considered in neurologic failure.

II. Cardiovascular system:

Failure of cardiovascular system occurs if:

- Heart rate <54/minute
- Mean arterial blood pressure <49mmHg (Systolic blood pressure <60mmHg).
- Occurrance of ventricular tachycardia and/or ventricular fibrillation.
- Serum pH <7.24 with a $PaCO_2$ of <49mmHg.

III. Pulmonary system:

Failure of respiratory system occurs if:

- Partial arterial pressure of CO_2 (Pa CO_2) >50mmHg (acutely).
- Alveolar arterial difference in O_2 (A-a DO_2) >350mmHg. A-a DO_2 = [713 x FIO_2 - ($PaCO_2$/RQ) - PaO_2]
- Dependant on ventilator or continuous positive airway pressure (CPAP) on the second day of organ dysfunction.

IV. Renal system:

Failure of renal system is considered if:

- Urine output <479ml/24 hours or <159 ml/8 hours.
- Serum blood urea nitrogen (BUN) >100mg/100ml.
- Serum creatinine >3.5 mg/100ml.

V. Hepatic system:

Failure of hepatic system occurs if:

- Jaundice (bilirubin > 6mg%)
- Coagulopathy (Prothrombin time (PT) = 4 seconds greater than control, in absence of anticoagulation).

VI. Hematological system:

Failure of this system occurs if:

- White blood cells (WBC_s) <1.000/ cu mm