Six Months in review in Intensive Care Medicine

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Abbreviations

ACS……...Acute coronary syndromes
AHA……American Heart Association
AIS .....Abbreviated Injury Score
ALI……...Acute Lung Injury
AMS ……Altered Mental Status
APACHE ….Acute Physiology And Chronic Health Evaluation
CAPD……..Continuous Ambulatory Peritoneal Dialysis
CCU…… Coronary Care Unit
CHF……..Congestive Heart Failure
CNS……..Central Nervous System
DKA…….Diabetes Keto-Acidosis
ICU…….. Intensive Care Unite
IHD……...Ischemic Heart Disease
IMCU……Intermediate Care Unit
ISS……..Injury Severity Score
LFT……....Liver Function Test
MI……..Myocardial Infarction
MODS……Multiple Organ Dysfunction Score
MPM……..Mortality Prediction Model
MRSA…….. Methicillin-resistant Staphylococcus aureus
NYHA……...New York Heart Association
OSF……....Organ System Failure
RFT……....Renal Function Test
rhAPC……...Recombinant Human Activated Protein C
SAFE…….....Saline versus Albumin Fluid Evaluation
SAPS……..Simplified Acute Physiology Score
SCCM……Society of Critical Care Medicine
SIRS……...Systemic Inflammatory Response Syndrome
SOFA……..Sepsis related Organ Failure Assessment
SSC……..….Surviving Sepsis Campaign
STEMI…….. ST segment elevation myocardial infarction
TISS……...Therapeutic Intervention Scoring system
UA……..Unstable Angina
tPA……..... Tissue Plasminogen Activator
VF……...Ventricular Fibrillation
VT……..…Ventricular Tachycardia

Contents

1- Introduction ……..... 1

2- Chapter 1

Who should be admitted to the Intensive Care Unit? 3

3- Chapter 2

Scoring systems in ICU……..... 17

4- Chapter 3

Commonly encountered diagnosis in the ICU..... 31

5- Patients and Methods…… 58

6- Results…… 62

7- Discussion…….. 87

8- Summary …….. 98

9- References…… 101

INTRODUCTION

The intensive care unit (ICU) has been called the hallmark of the modern hospital ***(Russell, L. B., 1997)***, yet it is a recent development, having come into existence only in the last 50 years. The development of ICUs was preceded by the rapid growth of postoperative recovery rooms following World War II. ***(Hilberman M., 1999)***

The ICU is that part of the hospital where critically ill patients that require advanced airway, respiratory and haemodynamic supports are usually admitted ***(Mayr V., 2006).***

Patients with critical illness comprise an increasing proportion of hospital admissions and consume substantial health care resources. ICU admissions which aim at achieving an outcome better than if the patients were admitted into other parts of the hospital however come at a huge cost to the hospital, the personnel and patients' relations**.** ***(Grenvik A. et al, 2001)***

ICU demands a broad based knowledge to cater for all aspects of management of these patients to achieve good outcome ***(Shehu BB. 2002).***

Intensive care units (ICUs) often have different treatment and care procedures that may affect patient survival and recovery rates; however, few studies have been carried out on how the treatment protocols used in an ICU is associated with survival rates for critically ill patients and affect patient outcomes in ICUs. ***(Somi R. Desikan, 2007)***

Worldwide, ICU requires a vast use of up to date resources such as advanced monitors, organ support equipments and highly skilled staff. This however, often taxes the most buoyant health systems even of the developed nations. ***(Mitchell V.T, 2001)***

In most developing nations where there are several financial constraints resulting from poor funding of the health care generally and the ICU specifically, there is often a limit to the availability and specialization of this form of care**.** ***(David B.H, 2001)***

Besides allocation of resources, intensive care also demands a tremendous amount of time and effort on behalf of the medical and nursing staff to treat and improve survival of the critically ill patients. ***(Pronovost PJ., 2002)***

It therefore follows that the role of the ICU must be justified wherever it exists. This study is therefore carried out to audit our patients' admissions into our ICU and their outcome.

Chapter 1

Who should be admitted to the ICU?

ICU admission criteria should select patients who are likely to benefit from ICU care. The Society of Critical Care Medicine (SCCM) provides guidelines for ICU admission in three different models: the Diagnosis Model, the Objective Parameters Model, and the Prioritization Model. ***(Bone RC, 2003)***

1- The Diagnosis Model

The Diagnosis Model guidelines list a number of diseases in each specialty or organ system usually requiring management in an ICU.

CARDIAC SYSTEM

- Acute myocardial infarction (MI) with complications.
- Cardiogenic shock
- Complex arrhythmias requiring close monitoring and intervention.
- Acute congestive heart failure (CHF) with respiratory failure and/or requiring hemodynamic support.
- Hypertensive emergencies
- Unstable angina particularly with dysrhythmias, hemodynamic instability or persistent chest pain.
- Status post cardiac arrest.
- Cardiac tamponade or constriction with hemodynamic instability
- Dissecting aortic aneurysm
- Complete heart block
- Patients with second degree atrioventricular block Mobitz 2
- Patients with cardiogenic pulmonary edema who need to be closely monitored.

(Oliver MF, 2007)

PULMONARY SYSTEM

-Acute respiratory failure requiring ventilatory support.

-Pulmonary emboli with hemodynamic instability

-Patients in an intermediate care unit (IMCU) who are demonstrating respiratory deterioration need for nursing/respiratory care not available in the less acute care areas.

-Massive hemoptysis

-Respiratory insufficiency with possible intubation

-Patient with a persistent, severe asthmatic attack as one who should be considered for admission to ICU. **(*Nasraway SA, 2008*)**

NEUROLOGIC DISORDERS

- Acute stroke with altered mental status (AMS)
- Coma: metabolic, toxic, or anoxic
- Intracranial hemorrhage with potential for herniation
- Acute subarachnoid hemorrhage
- Meningitis with AMS or respiratory compromise.
- Central nervous system (CNS) or neuromuscular disorders with deteriorating neurologic or respiratory function.
- Status epilepticus.
- Brain-dead or potentially brain-dead patients who are being aggressively managed for the purpose of organ donation Vasospasm.
- Severe head-injured patients.
- Delirium. **(*Kraiss LW, 2005*)**

DRUG INGESTION AND DRUG OVERDOSE

-Hemodynamically unstable drug ingestion.

-Drug ingestion with significant AMS with inadequate airway protection.

-Seizures following drug ingestion.

-Patients with severe drug withdrawal syndrome. **(*Brett AS, 2007*)**

GASTROINTESTINAL DISORDERS

-Fulminant hepatic failure.

-Severe pancreatitis.

-Esophageal perforation with or without mediastinitis.

-Life threatening gastrointestinal bleeding including that associated with hypotension, angina, continued bleeding or risk of rebleeding, or with comorbid conditions**. (*Kollef MH, 2005*)**

SURGICAL DISORDERS

-Post-operative patients requiring hemodynamic monitoring/ventilatory support or intensive nursing care.

ENDOCRINAL DISORDERS

-Diabetes ketoacidosis (DKA) complicated by hemodynamic instability, AMS, respiratory insufficiency, or severe acidosis.

-Thyroid storm or myxedema coma with hemodynamic instability. -Hyperosmolar state with coma and/or hemodynamic instability.

-Adrenal crisis with hemodynamic instability.

-Severe hypercalcemia with AMS, requiring hemodynamic monitoring.

-Hypo- or hypernatremia with seizures, AMS.

-Hypo- or hypermagnesemia with hemodynamic compromise or dysrhythmias.

-Hypo- or hyperkalemia with dysrhythmias or muscular weakness.

-Hypophosphatemia with muscular weakness

MISCELLANEOUS

-Septic shock with hemodynamic instability

-Hemodynamic monitoring

-Clinical conditions requiring ICU-level nursing care

-Environmental injuries (lightning, near drowning, hypo- or hyperthermia)

-Experimental therapies with potential for complication. **(*Kalb PE, 2009*)**

2- The Objective Parameters Model

The Objective Parameters Model uses objective findings such as vital signs, laboratory values, radiographic findings, electrocardiographic findings and physical findings.

VITAL SIGNS

-Pulse <40 or >150 beats per minutes

-Systolic blood pressure <80 mm Hg, or 20 mm Hg below the patient's usual pressure.

-Mean arterial pressure <60 mm Hg

-Diastolic arterial pressure >120 mm Hg

-Respiratory rate >35 breaths/minute

LABORATORY VALUES

-Serum sodium <110 mEq/L or >170 mEq/L

-Serum potassium < 2 mEq/L or >7 mEq/L

- PaO2 <50 mm Hg-

- pH < 7.1 or > 7.7

-Serum glucose >800 mg/dL

-Serum calcium >15 mg/dL

-A toxic level of a drug or other chemical substance in a hemodynamically or neurologically compromised patient.

RADIOGRAPHY/ULTRASONOGRAPHY/TOMOGRAPHY

-Cerebral vascular hemorrhage, contusion or subarachnoid hemorrhage with AMS or focal neurologic signs.

-Ruptured viscera, bladder, liver, esophagus, or uterus with hemodynamic instability.

-Dissecting aortic aneurysm.

ELECTROCARDIOGRAM

-Myocardial infarction with complex arrhythmias, hemodynamic instability or congestive heart failure.

-Sustained ventricular tachycardia (VT) or ventricular fibrillation (VF).

-Complete heart block with hemodynamic instability.

PHYSICAL FINDINGS (acute onset)

-Unequal pupils in an unconscious patient

-Burns covering >10% body surface area

-Anuria

-Airway obstruction

-Coma

-Status epilepticus

-Cyanosis

-Cardiac tamponade

(***Task Force on Guidelines, 2008***)

3- The Prioritization Model

The Prioritization Model is a more comprehensive model that divides patients into four levels of priorities:

1-Patients are critically ill, unstable and in need of intensive treatment and monitoring.

2-Patients require close monitoring as they may need urgent intervention based on their clinical conditions.

3-Patients are critically ill or could require urgent intervention, but with multiple underlying medical problems they have a low likelihood of recovery.

4-Patients represent the two extremes: not ill enough or with terminal or irreversible illness or disease that they would not benefit from ICU Care. **(*Stenson, 2002*)**

Importance of Patients' Registration

Patients' registration is medical record documentation which is required to record pertinent facts, findings, and observations about an individual's health history including past and present illnesses, examinations, tests, treatments, and outcomes. The Patients' registration chronologically documents the care of the patient and is an important element contributing to high quality care. Patients' registration consists of name, address, age, sex, occupation, disease, diagnosis, and recommendations made by the concerned doctor in course of undergoing treatment**.** Moreover, it acts as a tool for the doctor who is looking into the patient. ***(Halpern NA, 2010).***

The Patients' registration facilitates:

1- The determination of admission criteria to the ICU

2- The ability of the physician and other health care professionals to evaluate and plan the patient's immediate treatment, and to monitor his/her health care over time.

3- The evaluation of medical care service quality and its outcome.

4- The collection of data that may be useful for research and education.

5- Simplifying care.

6- Quality improvement and management.

7- Implementing quality indicators in intensive care units. ***(Groeger JS, 2009)***

Planning the patient's treatment

Development and evaluation of ICU decision-support systems would be greatly facilitated by the availability of a large-scale ICU patient database. Patients' registration provides a wide base of information about the patient as medical,

allergic, family history, drug intake, previous admission to hospital and toxicology exposure. It is the tool by which doctors see the patients, make diagnosis, determine the list problems of patient, its priority, choose the best line of treatment, and follow up its efficacy. ***(Huffman, E.K., 2009)***

Daily notes: Medical Records are the daily orders, which the consultant has to refer time and again during the course of the treatment until the patient is completely cured of the disease. Even afterwards it serves as an important document for further treatment and follow-up. Operative notes: To consult the operative events and treat the patient accordingly. To plan for the next operation. To know any anesthesia problems met with. Follow up: Even after the treatment part is completed for the follow up of the patient as and when the patient comes for the treatment. Even more relevant when the patient is examined by another doctor. The staff members get their instructions from the daily orders regarding which drugs are to be given and the frequency of each of them. They are directed by the orders from the Medical Records. **(*Kacprzak E, 2007*)**

Patients' registration act as communication channel between consults of different or same specialty, and between medical and paramedical staff. Law requires proper maintenance of case sheets. These can be used in medico legal cases. In few cases these single most important document that documents may serve as effective alibi for the patients. ***(Pronovost PJ, 2008)***

Evaluation of medical care service quality and its outcome

Patients' registration helps in calculating morbidity and mortality rates, and its relation to duration of stay. large-scale ICU databases have been effective resources to understand the efficacy of various treatment strategies. For instance,