LEADING ARTICLE

MEDICAL INTENSIVE CARE IN THE GENERAL HOSPITAL

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Introduction

Intensive care has been defined as "the care of patients who are deemed recoverable but who need continuous supervision and need or are likely to need prompt use of specialised techniques by skilled personnel"[1]. In the 40s, specialised centres for the treatment of specific disease entity such as poliomyelitis which required the "iron lung" were set up. Recognising the advantages of disease specific specialised intensive care led to the setting up in the 50s and 60s of other specialised care units such as the renal unit with its dialysis facilities and the CCU (coronary care unit) for patients with coronary artery disease. The idea of using similar principles of staffing, organisation and facilities to serve general hospitals came later and gave birth to the general medical intensive-care unit in the early 70s in Singapore. Today, all the general hospitals in Singapore have general medical intensive-care units serving one or more medical unit in the hospital.

Admission Criteria

Who should be admitted to the intensive care unit? A simple answer would be a patient who has a life-threatening illness that is deemed recoverable using present day medical technology. The medical intensive care unit shares this patient load with the other specialised care units that may be available in the hospital. Thus, the patient with acute myocardial infarction would be treated in the coronary care unit whilst the patient with chronic renal failure may be more suitably cared for in a dialysis centre, if available. Each medical intensive care unit will have to work out the guidelines that allow it to work in harmony with the other specialised units available in the hospital. These guidelines should be defined by a team including doctors, nurses and hospital administrators[2]. Through common agreement, it will be possible for the unit to build up a list of diseases that it can competently manage. Respiratory and non-coronary cardiac problems usually constitute the main disease groups in most ICU's, followed by infection, (in most cases accompanied by septicaemia and intravascular coagulopathy) drug overdose, renal failure, endocrine emergencies and neurological diseases causing respiratory failure. In many cases, multi-system organ failure is present. The two articles in the current issue of the Singapore Medical Journal provide an insight into the utilisation of the medical ICU's in two general hospitals in Singapore. The patient case-mix reveals general similarities such as the preponderance of cardiac and respiratory cases and also emphasises the importance of "local" medical interest in autoimmune diseases in one hospital.

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Whilst there is general agreement on the patient who would benefit from the ICU, there is less agreement as to who would not benefit from intensive care. Intensive care is expensive care and medical technology can keep alive patients who have no realistic chance of survival for long periods at great financial and emotional cost to their relatives. The statistics are thought-provoking. In the United States, critical care takes up 15%[3] ($15 billion) of the funding for hospital-care. At least 15% of the ICU patients are admitted with underlying conditions from which there is no likelihood of survival or who at best may gain only transient recovery[4]. Furthermore patient survival has been shown to be related inversely to length of ICU stay and not treatment[5]. Clearly the question of who not to be admitted to the ICU needs to be examined carefully.

It is much easier to decide that intensive care treatment is inappropriate before it is started than it is to decide to discontinue after the patient has been admitted, intubated and connected to a respirator. The decision is easier to make in patients who have an incurable condition such as advanced malignancy or has evidence of brain death. Advanced age is not a reason to withold ICU. The problem area is in the postresuscitation patient. Resuscitation inevitably is undertaken by the junior doctors but the decision for intensive care should be decided by an experienced consultant who should base his decision on whether he thinks the patient is recoverable.

Predicting the outcome of critically ill patients

In the past decade a number of scores have been devised to help to predict the outcome of the adult ICU patients. The Acute Physiology and Chronic Health Evaluation (APACHE) system of Knaus[6] with its modifications, APACHE II and II has been widely used in the United States as well as other in countries. The simplified Acute Physiology Score (SAPS) is used extensively in France and Europe[7]. Each of these systems has been in use between 6 to 10 years and has been validated by hospitals around the world. Software packages have been developed to use these scores. The limitation of these scores is that they have not been shown to predict the outcome of the individual patient. It is controversial whether these scoring systems should be used to triage patient to ICU admission. The present consensus is that these scores are useful in stratification of ICU patients and for comparison of performance of ICUs and treatment strategies[7].

High Dependency Areas

Another approach to the problem of increasing the availability of intensive care beds without increasing the number of ICU beds is through the introduction of intermediate care units, mainly for patients who require vital sign monitoring but not intensive therapy. In a study conducted at the Cook County Hospital, Chicago[8], the admission and case fatality rate (CFR) was examined for a 12-month-period before and a 12-month-period after implementation of a intermediate care unit to a urban hospital that already has a medical/coronary care unit. The nurse patient ratio was 1:8 in the general ward and 1:2 in the medical ICU and 1:4 in the intermediate care unit. Follow-

ing the opening of the intermediate care unit, the admission to the medical ICU decreased by 7.1% whilst the CFR of the hospital decreased by 13.3%. The decrease in overall mortality was accounted by a 25% decrease in general ward deaths and a 38.8% in ward cardiac arrests, reflecting the usefulness of the intermediate-care unit. This study has implications for health care planners and is important enough for it to be verified.

Research in intensive care medicine.

Research in critical care medicine has always been practical. Research efforts aimed at developing scoring systems that can be used to predict patient outcome has been discussed. The other areas that have received researchers' attention include intensive care technology and therapeutic intervention; personnel and resource utilisation in the ICU; disease entity research particularly all types of shock, adult respiratory distress syndrome, multiple organ system failure, nosocomial infection, nutrition in the ICU; ethical issues in the ICU[9]. Locally, research interests in ICU started with data on ICU utilisation[10]. There has also been research into diseases of local interest such as paraquat poisoning[11], and heat stroke[12] which have been published in this Journal.

Infection in intensive care units

The ICU is probably the single largest identifiable source of nosocomial infection in the hospital[13]. The ICU patient is frequently intubated, ventilated and nearly always catheterised with urinary catheters, and cannulated with CVP lines. To begin with, many patients are already infected with life-threatening community acquired infection before admission into ICU. In the process several lines of defence eg skin, bronchial, urethral barriers will be breached, facilitating the entry of potentially pathogenic micro organisms (PPM). The total infection rate within different types of ICU was reviewed[14]. Total infection rate is 1% in cardiac surgery ICU and 23.5% in medical/surgical ICU. ICU acquired infection, however, is 0.8% for cardiac surgery and 11.2%[13] for medical ICU indicating about half of the infections were acquired from within the unit. Candida, Pseudomonas aeroginosa, Klebsiella Enterobacter - Serratia (KES)[13] were the most common organisms in the medical/surgical ICU.

The urinary tract is the most common source of hospital acquired infections numbering more than 30% in an UK study[15]. E. Coli is the commonest organism and is found up to 45-50% of cases. Ampicillin resistance is about 40%-45% but resistance to cefuroxime and gentamycin is still fortunately low. Hospital acquired pneumonia (10-15%) is probably the next commonest. There are many modes of transmission of bacteria. In general, it could be endogenous ie from patient's own microflora or acquired from exogenous environmental sources such as from equipment or hands of medical attendants. In a prospective study of 250 consecutive cases, the predominant cultures were Acinetobacter, Pseudomonas and Klebsiella. Few of the patients were positive for these organisms on admission to the ICU but within 24 hours, 32 out of 59 patients were colonised by Acinetobacter. Acinetobacter survive well on moist surfaces and in moist containers such as humidifiers. In a study over a 2-year-period, 6.2% of 1791 patients became colonised with Acinetobacter[13] as a result of failure to decontaminate the humidifiers.

Staphylococcus aureus and MRSA are common causes of wound infection and are much more important in the surgical ICU than the medical ICU.

Ethical issues in Intensive Care

Two ethical issues stand out in intensive care medicine: informed consent and euthanasia. Informed consent in the critically ill patient can be difficult to obtain as informed consent requires freedom and competence of the patient. The critically ill patient such as a patient in shock might not be competent enough to understand the information given or treat the information rationally. Neither does he have complete freedom of choice when he is so dependent of his environment. Hence, intensive care staff may invoke a proxy decision process, leading to "paternalism with permission"[16]. The French Society of Intensive Care declared that informed consent is a meaningless concept in the critically ill whose liberty of judgement is incomplete[17]. Apppelbaum and Grisso[18] recently compromised by suggesting "to begin with the presumption of competence but in life-threatening circumstance to lower the threshold at which a determination of probable incompetence is made." Despite these arguments, a survey conducted by the European Society of Intensive Care, reveals that intensive care doctors in Europe usually support the principle of informed consent and respect the patient's decisions, and 70% would accept the patient's[19] decision not to undergo a surgical intervention that is deemed necessary.

In the management of the terminally ill patient, most physicians recognise that some kind of limit to intensive care should be applied to avoid futile therapy. DNR orders (do not resuscitate) whether verbal or written have appeared in clinical practice and in the U.S., it is permissible under certain circumstances to withhold life-sustaining treatment[20-22]. Euthanasia, defined as purposely terminating the life of a patient to prevent further suffering, has been declared illegal on both sides of the Atlantic[23,24] but legalised in some countries in Europe such as Holland. The answers to these difficult questions on the treatment of the terminally ill patient particularly in the ICU setting would differ from country to country and is governed by the legal, moral, religious, cultural code of the country, so that the physician will have to act within the framework that society has defined for him.

Specialty training in intensive care

Specialty training in intensive care has been the subject of much discussion. In the late 70s and early 80s the controversy was who to train. Should the physician or anaesthetist be in charge? It is clear nowadays that no one discipline could claim an inherent right to run the ICU and that all physicians regardless of their speciality need further training outside their own field to become competent intensive care physicians. On the other hand, physicians who have spent most of their time in ICU should also be encouraged to seek a field to specialise in. The Ministry of Health has drawn up a programme in intensive care training of two years' duration for doctors with a specialty qualification (registrars and above) consisting of a posting in a respiratory unit with rotation through coronary care, renal unit and neurology unit in addition to developing an interest in a subspecialty. The training programme is similar to other programmes in other countries such as the UK[25]. It is a step in the right direction and should see the emergence of a new specialist - the intensive care physician, in Singapore.

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