

ESTABLISHING AN INTENSIVE CARE UNIT IN A RURAL HOSPITAL

Intensive Care Units (ICU) have also been referred to as Intensive Therapy Units (ITU). The latter is a misnomer and implies that therapy contributes significantly to patient management. Critically ill patients suffer organ dysfunction for which, to date, there exists precious little in the way of innovative therapies. Support of dysfunctional organs until the natural healing process has occurred is the aim of intensive management.

Care is defined as "attentive assistance to those in need" and "painstaking application to detail". This is a prerequisite for any ICU. The critically ill do not tolerate medical or nursing indiscretions, whether by omission or commission, accidental or otherwise. It is therefore essential if an ICU is to be established that it is awarded its own location, equipment and staff. There is little to be gained by attempting organ support in a corner of a ward with makeshift machinery and untrained care providers, no matter how willing they may be. Such a scenario inevitably results in an unacceptable rate of iatrogenic complications. A single adverse event in a critically ill patient is enough to cause an unnecessary fatality. While this is obviously unfortunate for the patients and their families, it results in a loss of staff morale and insight into the benefits of optimal management of the critically ill. Although complications occur in the best run units, they are far less frequent.

Levels of intensive care

Before establishing an ICU the level of care to be offered must be decided. In this regard there are three possible levels. The highest category (Level I) will be able to offer support for patients with multiple organ dysfunction syndrome (MODS) and is best termed Critical Care. Facilities must therefore be available to manage severe impairment in all the major organ categories, namely pulmonary (ARDS), cardiovascular (haemodynamic instability), renal (ATN), haematological (coagulation abnormalities), neurological (ICP monitoring) and gastrointestinal (advanced nutritional support). Such patients require constant monitoring and intervention and are best managed in centres with full supportive services.

Intensive Care (Level II) should offer support for single organ dysfunction which is most commonly pulmonary. Single organ dysfunction probably does not exist, however, for there are invariable subtle signs and symptoms of other organ impairment if one looks hard enough or waits long enough. The reason for apparent isolated pulmonary dysfunction is that interstitial oedema, the hallmark of organ dysfunction, is least well tolerated by the lung, the function of which is the easiest to assess clinically, radiologically, and biochemically. Pulmonary dysfunction may range from mild acute lung injury (ALI) to full blown (ARDS). This level is probably the most appropriate for the rural environment in combination with Level III.

High Dependency (Level III) offers intensive monitoring only and advanced organ support is not required. This level is intended for patients undergoing procedures with possible risk (eg. epidural analgesia) or organ function that may deteriorate without close and continuous assessment (eg. mild acute asthma, polyuric renal failure).

Having decided upon the desired level of support to be offered, the first step is not to identify a suitable location and to equip it, but to appropriate adequate numbers and grades of staff. All too often a facility is created and expensive equipment purchased only to remain unutilised because of a lack of staff.

Staffing

This is the most crucial aspect of intensive care and without adequate staff ICU will not succeed. The best performing units match

their patient loads to staffing availability. ICUs require medical, nursing, paramedical and artisan staff.

Medical

Someone must be in administrative charge. He or she must assume the responsibility for the daily running of the unit and have full admission and discharge rights. Such an individual must have strong leadership qualities, clinical credibility, and an active clinical presence at the coal face, while simultaneously recognising his or her limitations. This has repeatedly been shown to influence patient outcome in a favourable manner. The common title for such an individual is Director and this is most appropriate, for a director rather than dictator is required.

Junior medical staff are as essential as senior staff and will be responsible for the daily grind. An occasional visit is undesirable and their presence on a 24-hour basis is essential.

Nosocomial sepsis is the price of intensive support and an interested microbiologist should be recruited. If this is not possible on a daily basis then microbiological surveillance must be performed regularly. This allows directed rather than random antimicrobial therapy with the benefit of minimising bacterial resistance. Furthermore, not all fevers and hypercatabolism are related to infection, but rather to the Systemic Inflammatory Response Syndrome (SIRS). Such patients do not benefit from antimicrobials and uncontrolled prescription will only encourage the colonisation of the critically-ill patient with resistant organisms.

In conjunction with the nursing director, the senior medical staff must ensure that a programme of continuing medical education is activated, protocols are established and reviewed regularly and an audit of unit performance in the form of morbidity and mortality meetings is undertaken.

Nursing

As with medical staff, a suitable nurse must be appointed to be in overall charge of nursing administration. This person must be trained in Intensive Care nursing. In conjunction with the medical director decisions need to be made daily on admissions depending on the available nursing complement. It must be emphasised however, that nurses must be assigned to the ICU and not recruited from other areas of the hospital when desired. The nurse:patient ratio depends on the level of care offered. Critical Care requires a minimum of 1.5:1, Intensive Care 1:1, and High Dependency 0.5:1. When the ratios decrease below these levels, the first step must be to cancel elective admissions.

Paramedical

Physiotherapists are an essential part of the ICU team. The effect on pulmonary function can be dramatic and can make all the difference between successful weaning or ventilator dependency. Pharmacists contribute a wealth of information concerning drug therapy and in the situation of multiple prescriptions can advise on appropriate dosage and interactions.

Artisans

The plethora of equipment and services required for a successful unit necessitates people skilled in their maintenance. Although the medical and nursing staff must know the common problems, the sophistication of modern medical equipment precludes a full understanding of their inner workings. Prestik and Sellotape do not last long. It is possible and mutually advantageous for contracts to be established between the administration and commercial sector for routine and emergency servicing of all major equipment.

Location and equipment

The ICU must be central to all necessary services. Critically-ill patients do not take kindly to being transported outwith the ICU

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environment and such expeditions should be kept as brief as possible. In this regard, the unit should be close to the emergency receiving area, operating theatres and radiological facilities. Adequate space within the unit is essential. At least 1,5 metres should be available around the patient, who must be accessible through 360 degrees, especially at the head of the bed, where emergency intubation may be required. Storage space for equipment not in use, surgical sundries, intravenous fluids and drugs is needed. A rest room for staff may double as a seminar room, and a room for counselling relatives should be provided.

The use of high technology is not a significant factor in determining the outcome of patients. Indeed, a study of units in the United States showed that the best units had the lowest use of pulmonary artery catheters and the greatest use of physiotherapy and dressing changes. *Intensive care is about doing the simple things well.*

Properly designed ICU beds must be purchased regardless of the level of care offered. Standard hospital beds are inadequate and often obstructive. The wealth of ventilators on the market is confusing to first-time buyers. It must be remembered that no matter how many knobs, dials, bells, sirens, or flashing lights the machine may possess, the sole purpose is to allow effective oxygenation and removal of carbon dioxide in the manner least injurious to the patient. Machines which are simple to use are often the best. Oxygen, medical air and vacuum points should be provided with two outlets per bed and at least six electrical points.

Oximetry must be available for each patient and it is preferable to have access to blood gas analysis within the unit and not at a central laboratory. Syringe pumps are ideal for drug infusions and volumetric pumps for intravenous fluids. Given the vagaries of power supply in South Africa all equipment should be able to function on battery back up for at least two hours. As with ventilators, there are numerous monitoring systems available and the choice should be made in conjunction with the nursing staff, for they are the people who use them most often. The simpler the better.

Protocols and audit

Unit protocols and policies must be established. Although perhaps not always absolute, they should be adhered to as much as possible. It is necessary, however, to review these regularly. With respect to an admission policy, not all patients with organ dysfunction benefit from intensive care. There are three groups of patients to be considered. Firstly, dysfunction may be minimal and ventilation not required. Intensive Care is not indicated. Secondly, ventilation is necessary and the expected outcome favourable. These patients deserve admission. Thirdly, there are patients whose dysfunction is deemed to be non-recoverable, or if salvageable, the long term prognosis is poor. This is a hard decision to make and only comes with experience. If facilities permit, a "short, sharp burst of ICU" may allow a more rational decision to be made within 24 hours.

A policy must also be made concerning age. This refers not to longevity but to the young. Children are not small adults and managing them during critical illness requires special skills outwith those needed for adults.

Admitting a patient to the ICU implies the decision to treat and the expectation of reasonable recovery. In some, unfortunately, this expectation is dashed and a futile situation arises. Given the harsh economic realities of ICU coupled with scarce resources, a withdrawal of support policy should be in place. The decision to withdraw must be made on objective evidence. To date, survival of three or more concurrent organ dysfunctions for more than three days is unprecedented.

Based on known microbiological data an antibiotic policy should be established. This will minimise bacterial resistance and allow an educated best guess selection if directed therapy is not available.

A review of unit performance is essential for the purpose of education and policy changes. The simplest method involves a regular morbidity and mortality meeting. This must be constructive and not destructive. The use of international predicted outcome data is not relevant to this country.

Problem patients

As mentioned before, intensive care is about doing the simple things well. Close attention to the basic ABC algorithm of advanced life support goes a long way in achieving success. Despite adequate management however, a number of patients will deteriorate and require Critical rather than Intensive Care. The sooner these patients are identified the better the outcome.

Firstly, those of advancing age with associated chronic health problems are bound to create problems. Secondly, in the younger patient certain risk factors can be identified. The majority of these patients are admitted as a result of trauma or sepsis. With regard to the former, multiple anatomical compartment injuries or multiple organ injuries within a single anatomical compartment generally fare badly with prolonged ICU stays.

The "Triple H" combination of hypoxia, hypotension and hypothermia is ominous. With regard to sepsis, leucopaenia and progressive thrombocytopenia are risk factors. The need for increasing intravascular fluids or inotropic support are indicative of problems, as is the appearance of a second organ dysfunction, however minimal this may seem.

The wisdom in these scenarios is to transfer the patient to a higher facility early rather than when multiple system dysfunction is established.

Managing the critically ill can be both extremely rewarding and intensely frustrating. The only changes that happen rapidly are complications and close attention to detail is essential. Intensive Care, simply put, provides organ support until the natural healing process has occurred. Patience is a virtue in this regard and much can be gained by masterly inactivity. ●

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