Design, Equipment and Organization of Intensive Care Unit

Essay

Submitted for Partial Fulfillment of Master Degree In Intensive Care Medicine

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بسم الله الرحمن الرحيم
إقرأ باسم ربك الذي
خلق ﴿١﴾ خلق الإنسان
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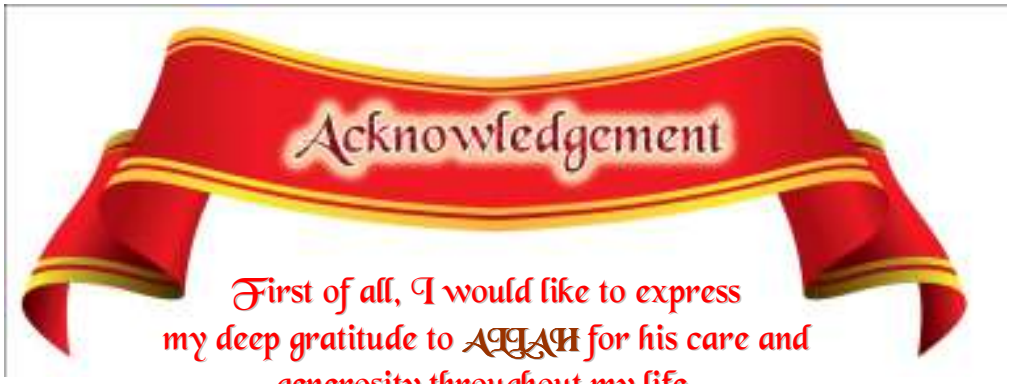

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List of Abbreviations

Abb.	Full term
APACHE	*Acute Physiologic And Chronic Health Evaluation*
BSN	*Bachelor of science in nursing*
CPR	*Cardio-pulmonary resuscitation*
ECG	*Electrocardiograph*
EEG	*Electroencephalograph*
HVRs	*High-visible rooms*
IABP	*Intra aortic balloon pumping*
ICU	*Intensive care unit*
IV	*Intravenous*
LVRs	*Low-visible rooms*
MSN	*Master of science in nursing*
OB/GYN	*Obstetrics and gynecology*
RN	*Registered nurse*

INTRODUCTION

Within the unit, the zone that houses the critical care patient is crucial to delivery of quality care. This is where the patients spend the vast majority of their stay on the unit and where significant majority of their care is delivered.

Patients requiring an intensive level of care are grouped into units where teams of specially trained clinicians can be instantly available and can have access to the appropriate technology ***(Hamilton and Shepley, 2010).***

Patient safety is a fundamental goal of all intensive care units, and the patient environment is a prime location where harm or adverse events may occur. The design of these environments should, therefore, contribute directly to reduction of infection, error and injury.

Similarly, most staff injuries also occur in the patient environment, nurses experience more workplace injures than construction workers. The patient environment must also be designed to reduce the chance of injury to the staff involved in delivering patient care.

An environment that supports the patient and the recovery process will offer the maximum possible comfort, while recognizing that the clinical interventions and treatment plan may involve significant discomfort. At the same time, the emotional distress that accompanies the stay in intensive care

unit may be partially relieved by the support of caring staff and the patient's family and loved ones ***(Evanoff et al., 2003)***.

Organization is the act of assembling elements into an orderly, functional structure. Management is the ongoing revision and renovation of that carefully assembled organization to cope with change. The concept of bedside management is familiar to a clinician who has titrated vasopressors or adjusted ventilator settings, but the ongoing management needs of the intensive care unit (ICU) itself may be underappreciated ***(Higgins and Steingrub, 2011).***

Management extends beyond the implementation of ICU policies and procedures, organization of service and teaching rounds, budget preparation and regulatory compliance, although these are essential tasks. The successful ICU manager must innovate and direct change. Creativity is important, but perseverance is also essential because the typical organization will resist change. Knowing how to navigate the obvious and subtle impediments to change is a key skill for the ICU manager ***(Angood, 2005).***

AIM OF THE WORK

To lettering a full and complete essay about construction and establishment of ideally functioning intensive care unit in a general hospital.

DESIGN OF INTENSIVE CARE UNIT

The design of intensive care units, or the modification of existing units, requires not only knowledge of regulatory agency standards, but also the expertise of critical care practitioners who are familiar with the special needs of this patient population ***(Piergeorge et al., 1995).***

I. Location and relationship of the ICU to other hospital departments:

The flow of patients into and out of the intensive care unit becomes a factor in design. If it is a physically or operationally difficult to discharge patients from intensive care to environments of lower acuity, such as step down beds, intermediate care units, skilled nursing facilities, or rehabilitation settings, then the length of stay will increase for other than clinical reasons. Such increases may constrain admissions to intensive care, as having fully occupied beds in an intensive care unit reduces a unit's ability to accept new patients from emergency department, surgery, or other interventional procedures such as catheterization ***(Haraden and Resar, 2004).***

It is often not practical or feasible for hospitals to have more than one of certain diagnostic devices; others cannot be provided on a portable basis within the critical care unit. Such devices include imaging technologies such as magnetic

resonance, cardiac catheterization, interventional radiology, angiography and others. When critical care patients need one of these technologies, the proximity relationship which governs the length and duration of travel for patients at risk is important. A design consideration for Intensive care unit in the distance and time required to transport patients in critical condition to the imaging department, catheterization lab, or location of the relevant technology. Hospitals are increasingly building high-tech interventional suites in which varied combinations of imaging, endoscopy, laparoscopy and surgery are combined. The design of these suites should also consider the transport of critically-ill patients ***(Ulrich and Zhu, 2007).***

Fig (1): The department is located in close proximity to Operating Theatres and Emergency Department ***(Anderson, 2010)***.

Another important consideration for the design of intensive care unit is the relationship to materials management and the need for delivery of a constant flow of supplies **(Figure 1)**. Design solutions can range from just-in-time deliveries from vendors directly to the unit, to more typical arrangements of hospital loading docks, receiving functions and store rooms. Deliveries are usually made on some type of par-level replenishment stocking system or with fully stocked carts simply exchanged for partially depleted carts on the unit ***(Radl, 2000).***

The organization's operational model can have an impact on the design of an intensive care unit. If the unit is under its own independent management, the design could be different from a model in which several units are under a common management structure. The operating model will have an impact on the need for and location of offices for managers, educators and clinical specialists of various types. The organization might be operated with centralized or decentralized patterns for meeting rooms, education spaces, on-call rooms, house-keeping or environmental services and so forth. The ultimate design must take into account each of these separate operating decisions ***(Dilani, 2001).***

Some intensive care units may identify the need for diagnostic or procedure capability to be planned near the unit, within the unit, or in the patient room. The goal is to reduce the

need to move a patient and to limit the distance traveled when moving is required.

Every critical care patient room should be designed to accommodate portable imaging technologies, including ultrasound, radiography and fluoroscopy. Additional consideration might be given to specialized imaging capability, such as catheterization or angiography, in close proximity to the patient room, either on the unit or nearby ***(Bennett and Bion, 1999).***

A certain number of invasive procedures are predictably performed on critical care patients. These procedures can include line insertions, catheterization, implants, endoscopic examinations, minor surgeries and interventional imaging, among others. The ability to perform some of these types of procedures in the room can offer a clinical benefit and reduces the need for risky patient transport. Designers may plan dedicated rooms on the unit or nearby to handle instances when a procedure cannot be performed in the patient room. Issues of duplication of space, equipment, staffing and supplies must be clearly understood before developing such a model ***(Hamilton and Shepley, 2010).***

The intensive care unit of a hospital is where life can hang in the balance everyday and where skillful and timely intervention literally save lives. The intensive care unit is where some of the hospital's most difficult and demanding work takes

place. The ICU is the stage for many of life's most extraordinary dramas ***(Hamilton and Shepley, 2010).***

Intensive care involves continuing supervision, care and treatment by doctors, nurses, physiotherapists, technicians, dieticians and others. An intensive care unit (ICU) is a designated area offering facilities for the prevention, diagnosis and treatment of multiple organ failure.

A hospital design that supports the crucially important work of Intensive care must serve the minimum functional needs of physicians, staff, patients and their families. A good hospital design will efficiently serve the physical, psychological and emotional needs of those who use it ***(Hamilton and Shepley, 2010).***

With an aging population and more critical diseases, the demand for critical care services is rising each year. At the same time, significant changes are occurring in ICU services due to changes in medical informatics, technology and equipment ***(Rashid, 2006).***

Intensive care units (ICUs) vary significantly from hospital to hospital with respect to structure, services provided, personnel and their level of expertise and organizational characteristics. These variations are based on economic and political factors unique to each hospital's internal dynamics and external environment. Accordingly, the characteristics of an

ICU may depend on the population served, the services provided by the hospital and by neighboring hospitals, and the subspecialties of physicians on the hospital's staff. In addition, a hospital may choose to segregate ICU patients into areas based on diagnosis, acuity of illness, prognosis, or age ***(Hoyt, 1995).***

Although the types and variety of ICUs may differ from hospital to hospital, all ICUs have the responsibility to provide services and personnel that ensure optimal care to critically ill patients ***(Haupt et al., 2003).***

It is recommended that all hospitals determine the level of critical care services offered in keeping with their mission and goals as well as regional needs for this service. Three levels of care are proposed to accommodate university medical centers, large community hospitals and small hospitals with limited critical care capabilities.

I. Level-I critical care:

These critical care centers have ICUs that provide comprehensive care for a wide range of disorders requiring intensive care. They require the continuous availability of sophisticated equipment, specialized nurses and physicians with critical care training. Support services including pharmacy services, respiratory therapy, nutritional services, pastoral care and social services are comprehensive. Although most of these