CURRENT CONCEPTS OF NEONATAL INTENSIVE CARE

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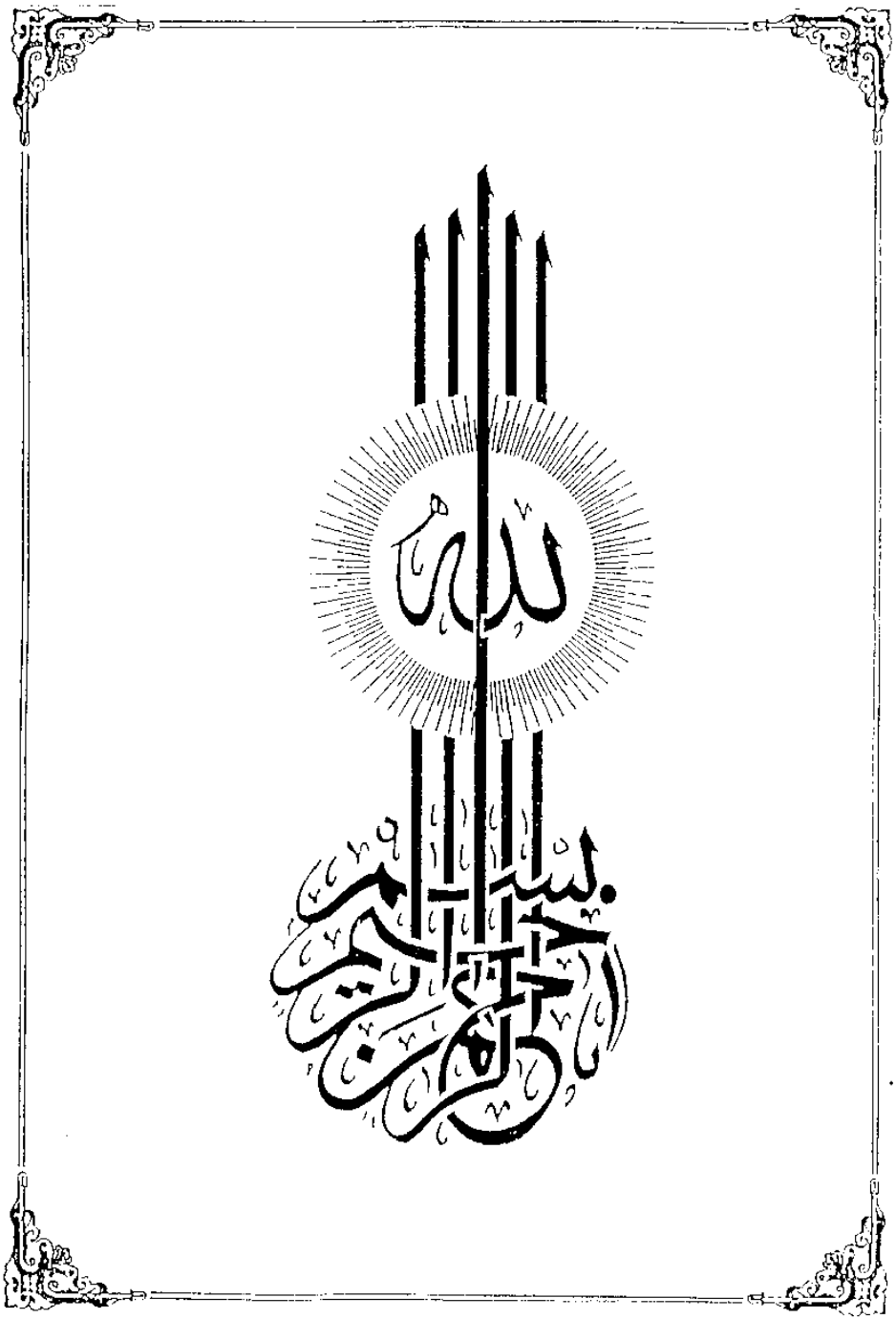

DEDICATED TO

MY WIFE

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Introduction And Aim of The Work

Advances in paediatrics especially in the field of intensive care have dramatically improved the prognosis for the critically ill patients. Numerous conditions that were previously fatal are now treatable and many patients who previously would have sustained a permanent disability now recover completely (David, 1986). Intensive care units (ICU s) are centres for risky infants regardless of gestational age or birth weight. Neonatal ICU's deal with newborns who have risky disease,severe malformations or genetic abnormalities not responsive to medical prescription. There is a good experimental evidence from randomized controlled clinical trials that intensive care interventions in the perinatal period are efficient in reducing perinatal / neonatal mortality and fetal / neonatal morbidity (Sinclair, 1982) .The development and utilization of regional perinatal intensive care centres for high risk pregnant women and newborn infants have been responsible for the decrease in overall and low birth weight neonatal mortality rates.The British pediatric association (1985).defined neonatal intensive care as the care given in an intensive care nursery providing continuous skilled supervision by nursing and medical staff. The aim of the work is to review

the detailed functions and requirements of the modern intensive care requests as well as skills for the management of newborns who are at risk in the perinatal as well as postnatal periods.

How to construct an I.C.U.

Organization : A permanent critical care unit committee should be established with nursing , administrative, pediatric anesthesia, pediatric surgical, and pediatric speciality representation. Mandatory members of the committee should include the medical director of the Icu and the unit head nurse.

Medical director :Administration of the icu rests with the director of the pediatric icu, who should be a physician with training, experience,and expertise in paediatric critical care. Medical directors for icu s should have completed residency training in a major clinical speciality (Pediatrics, anesthesia or surgery), including advanced skills in monitoring and life support techniques.

Physician staff : Physician coverage for the icu should include 24 hr in house coverage by pediatricians and surgeons at the resident or staff level in addition to 24 hr anesthesia coverage . Also, a full range of services of pediatric subspecialists should be on call at all times.

Nursing staff :a High Quality and specially Trained pediatric nursing staff is essential to provide 24 hr coverage.

The head nurse in the unit should work cooperatively with the medical director. There should be a minimum of one registered nurse/ 3 patients in the unit at all times. Other team members include, respiratory therapists, physician's assistance, nurse technicians, emergency medical technicians, biomedical and various laboratory technicians and this provide valuable assistance in the icu. Communication among all members is imperative. Other support functions which should be available 24-hourly are laboratory services including microspecimen chemistry techniques, blood gas determination, radiology, blood bank and pharmacy services (Bergeson, 1983).

Physical characteristics :-

External: The icu should beageographically distinct unit within the hospital, with controlled access. It should be located adjacent to or within direct elevator travel to the emergency room, operating room, recovery room, laboratory and radiology departments. A physician's on call room should be close by, as should the offices of the director and head nurse. An intermediate care area is important for continuous care of the patient as he / she recovers. It is recommended that both units be administered by the same personnel.

Internal: The ideal size for an ICU is unknown. Isolation rooms with separate washing facilities should be provided within the icu for management of critically ill patients who may be infected or who are at increased risk for infection. Central electronic patient monitoring may be utilized but does not

substitute for bed side observation. There should be a medication station with a drug refrigerator. A conference room nearby allows for teaching, conferences and counselling. There should be adequate working and charting space and appropriate mechanisms for hanging of equipment for I.V. fluids. (Bergeson and Holbrook, 1983).

Equipment and monitoring :

The information from continuous monitoring allows rapid detection of abnormalities and can greatly improve the care of the unstable and critically ill patients.

Cardiac function monitoring :

E.C.G.: Continuous display of the heart rate and ECG is essential.

Blood pressure: Can be measured by cuff and auscultation, droppler flow and oscillometry. Oscillometry has been shown to be an accurate non invasive method for measuring B.P.

Cardiac output : Poor peripheral perfusion with cool extremities is an indirect measure of low C.O.P. The most practical method is the thermodilution technique using a thermistor-tipped swanganz catheter in the pulmonary artery.

Respirotory function monitoring:-

Respiratory rate: Is monitored by an impedance technique measuring electrical changes between a pair of E.C.G. electrodes placed on either side of the chest .

Gas exchange: Direct measurement of Pao_2.$PaCo_2$is the most common and accurate method of measuring gas exchange. Transcutaneous determination of $PaO_2$and more recently $PaCo_2$ are widely used in ICU's.

Cerebral function monitoring:

Intracranial pressure : The standard method of measuring I.C.P. is still the intraventricular cannula. Another method is through a subdural catheter.

Electro-Encephalogram: The E.E.G. is a useful guide to cerebal function in unconsious, sedated or paralysed infants. Seizure activity, which may not be clinically evident because of paralysis, will be detected by the continuous E.E.G. (David, 1986).

Practical Aspects of Early Management and transportation :-

1- Ensure an adequate airway, oxygenation and ventilation, and assess gas exchange with an arterial blood gas.

2- Assess neurological status frequently.

3 Establish non-invasive monitoring with a single lead E.C.G. and B.P. measurement using a conventional cuff or doppler.

4- Insert an intravenous cannula.

5- Treat hypotension with 10-20 ml/Kg of blood or plasma and consider inotropic agent if cardiac function is impaired.

6 Treat any hypoglycemia ,severe acidosis or electrolyte imbalance.

7 Control seizures.

8 Antibiotics if septicemia or meningitis is suspected.

Drugs in intesive care(David, 1986). (Table 1)

Drug	Dose	Route
Adrenaline	10 µg/Kg stat	I.V. , Sc
	0.05-0.6 µg/Kg/min	I.V.
Alum.hydroxide	15-30 ml 4-hourly	P.o.
Aminophylline	4-6 mg/Kg stat	I.V. slow
	1 mg/Kg/h	I.V.
Atropin sulphate	10-20 µg/Kg stat	I.V., I.M
Calcium chloride	25 mg/Kg stat	I.V. (slow)
Chloral hydrate	50 mg/Kg (hypotonic dose)	P.o.
Diazepam	0.1-0.3 mg/Kg stat	I.V.
Diazoxide	5 mg/Kg stat	I.V.
Dopamine	1-20 mg/Kg/min	I.V.
Frusemide	1 mg/Kg stat	I.V., I.M., P.O.
Hydralazine	0.2-0.5 mg/Kg 4-hourly	I.V., I.M., P.O.
Isoprenaline	0.05-1 µg/Kg/min	I.V.
Mannitol	0.25-1 gm/Kg stat	I.V.
Phenobarbitone	10 mg/Kg stat	I.V.
	2.5 mg/Kg 12-hourly	I.V., I.M., P.O.
Phenytion	10-15 mg/Kg stat	I.V. (slow)
	2.5-5 mg/Kg 12-hourly	I.V., P.O.
Salbutamol	5 µg/Kg stat over 5 min	I.V.
	0.1-0.4 µg/Kg/min	I.V.
Vit K	1-5 mg stat	I.V., I.M.