

## CRITICAL CARE MEDICINE IN BANGLADESH: EVOLUTION AND CHALLENGES

Mohammad Omar Faruque<sup>1</sup>

**Editor's Tag:** *The author is the founder of Critical Care Medicine in Bangladesh and a CMC 10 celebrity alumnus of Chittagong Medical College.*

Critical Care evolved from a historical recognition that the needs of patients with acute life threatening illness or injury could be better served if they are grouped into specific areas of the hospital. Nurses have long recognized that very sick patients receive more attention if they are located near the nursing station. Critical illness or injury acutely impairs one or more vital organ systems such that there is a high probability of imminent or life threatening deterioration in patient's condition. Care of these patients can take place anywhere in the inpatient hospital setting, although it typically occurs in intensive care unit (ICU).

During early years of evolution of critical care medicine (CCM), it became rapidly evident that fixed location where intensive resources and personnel were available, provided better than adhoc provision of intensive care services spread throughout the hospital. Critical care involves highly complex decision making to assess, manipulate and support vital organ system functions to treat single or multiple vital organ systems failure and/or to prevent life threatening deterioration of patients' condition<sup>1</sup>.

\*The concept of CCM is based on the fact that many critically ill patients can revert to normal life if intensive care, observation and sophisticated treatment can be prescribed. To practice effectively in the setting of ICU, the critical care specialist or the Intensivist must be familiar with the pathophysiology of critical illnesses and the required life support systems. The Intensivist must make urgent decisions under these circumstances and assume primary responsibility. He is trained to acquire experience in wide range of clinical problems and to possess sound knowledge of all those subspecialties of Internal Medicine including Cardiology, Pulmonology, Nephrology, Gastroenterology, Infectious diseases etc.

and have working knowledge of Emergency Medicine, Trauma, Postoperative care, Toxicology, Anesthesiology, Pediatrics, Obstetrics etc.

Few areas of medicine have changed so rapidly as the field of critical care in the recent past. It is a procedure oriented specialty. Indeed the decision making process that goes into the performance of a procedure for example mechanical ventilation, pulmonary artery catheterization, continuous renal replacement therapy etc. represents major aspects of this specialty. Intensive care as such has emerged as a distinctive specialty in the world over the last 3-4 decades<sup>2</sup>.

A qualified Intensivist should be able to make general assessment of any critically ill patient, make major therapeutic decisions and manage patients requiring noninvasive as well as invasive monitoring (intra-arterial, central venous, end tidal CO<sub>2</sub> etc), cardiopulmonary resuscitation, temporary pacemaker placement, mechanical ventilation, trauma life support, dialysis (both hemo and peritoneal), and ongoing neurological assessment etc.

He often requires input from a series of different specialties like Cardiology, Nephrology, Pulmonology, Infectious diseases, Neurosurgery, Vascular Surgery, etc. whenever the patient suffers from multi organ failure or dysfunction. As a result management of a patient in an ICU becomes a team work of different specialties where the Intensivist plays the role of the leader of the team.

Philosophically and for practical purpose, the Intensivist is expected to fulfill one or more of the following four goals<sup>3</sup>. The first goal would be to return patient to an independent state that improves quality of life. The second goal would be to lengthen life for some purposeful period such as continuing treatment to enable patient to accomplish certain goals before death. The third goal would be to postpone death because of sanctity of life. The fourth goal would be to achieve strictly physiologic goals such as raising blood pressure by vasoactive agents or preventing death from ventilation failure by using mechanical ventilator, etc.

1. Professor of Critical Care Medicine BIRDEM Hospital & President Bangladesh Society of Critical Care Medicine

Historically, implementation of mechanical ventilation became the most significant milestone in evolution of ICUs. In 1952, polio epidemic in Europe led to the introduction of positive pressure ventilation by squeezing rubber bag through cuffed endotracheal tube by Danish anesthesiologist Bjorn Ibsen. The first officially recognized ICU in the world was established in Copenhagen in 1953<sup>4</sup>. The mortality of polio patients during that period decreased from 90% to 40% following use of ventilation with mechanical ventilator (iron lung) as well as with use of ventilation through endo tracheal tube.

No ICU existed in Bangladesh at the time of its independence. In 1980, the first ICU of our country was established at National Institute of Cardiovascular Diseases (NICVD). Since then the number of ICUs has been steadily increasing. Unfortunately most of them are concentrated in the city of Dhaka. Only two Government Medical College Hospitals at Dhaka and Chittagong have ICUs. Except at the NICVD, Dhaka Combined Military Hospital and Bangabandhu Sheikh Mujib Medical University (BSMMU), rest of all the ICUs are located within the private sector.

As most of the ICUs are located in Dhaka, critically ill patients need to be transferred from periphery to capital and transportation difficulty becomes the major impediment in critical care delivery.

Currently there are about fifty large and small ICUs with about five hundred & fifty ICU beds. There are now about one ICU bed for each eighteen thousand (18000) population of the city of Dhaka considering that in 2006, the population of city of Dhaka was about fifty one lacs as per Govt. statistics<sup>5</sup>. If you exclude the ICUs of Dhaka, we come up with about one ICU bed for each twenty eight lacs of population of Bangladesh. If at least 5% of all beds were dedicated for ICU care, then in Bangladesh we need at least 2500 ICU beds assuming that currently we have approx. fifty thousand hospital beds in the whole country. Studies have shown that 85% of our ICUs are open units which means primary care physicians choose to treat patients and make management decisions leaving the responsibility of machines and procedures to the Intensivists. Several retrospective studies have shown better patient outcome and cost benefits when ICU patients are managed in closed units where all patients are cared for by one team of Intensivists in collaboration with other primary care services<sup>6,7</sup>.

Predominance of open ICUs in our country is a simple reflection of the non-availability of sufficient number of medical specialists in Intensive care and lack of awareness about the superiority of "closed system" among our primary care physicians.

ICU care is generally labor intensive and technology intensive besides being very costly. With the exception of ICUs of Govt. Medical Colleges and Institutes (there are few in the country), where care is presumed free but this is not true in practice. The average cost of ICU care in Bangladesh can range from Taka 15000 per day to as high as Taka 60000 per day in the private sector hospitals. Institutes like BSMMU treats patients on subsidy but not on free basis.

It has been observed that the number of ICUs in private sector is growing gradually and it is a good news for our capable rich population. But growth of ICU beds in private sector does not automatically ensure increased health care delivery for the average population where average daily per capita income is Taka 100 per day. Besides the meagre number of ICUs in the country and fewer number of ICU beds, the status of ICUs in terms of equipment, manpower distribution have been an important issue. Existing ICUs in our country with the exception of few are neither adequately staffed in terms of trained doctors and critical care nurses nor adequately equipped.

In 2007, a survey was conducted by the Department of Critical Care Medicine, BIRDEM hospital, on the status of ICUs of Bangladesh<sup>8</sup>. The study showed that there was one ICU bed for every hundred general beds in Bangladesh. It also showed that 95% ICUs were located in the city of Dhaka and 60% of ICU beds had accompanying mechanical ventilators. Arterial blood gas (ABG) analyzers, bedside echo cardiography and ultrasonography facility were available in 70%, 55% and 65% units respectively. 51% of ICUs had doctor-patient ratio of 1:5 to 1:4, 92% of ICUs had nurse-patient ratio of 1:2 to 1:1. The study also found that 51% of doctors and 36% of nurses were cardiopulmonary resuscitation (CPR) trained.

It is our expectation that health care policy makers of our country may begin with establishing designated ICUs (or dept. of Critical Care Medicine) in all Govt. medical college hospitals. Assuming that Govt. institutions in reality cannot provide free ICU care, cost of supporting ICU care can be subsidized

with rational use of allocated funds as well as with the help of private philanthropic resources.

In 1986, CCM was recognized as postgraduate specialty in USA where as in Bangladesh the postgraduate MD course in CCM was established in 2007 & 2008 at BIRDEM hospital & Dhaka Medical College Hospital respectively. Only training workshop on critical care nursing was introduced at ICU BIRDEM hospital in 2009. It is imperative that graduate medical students and nurses need to be exposed to critical care knowledge during final year of their student career. It is also imperative that postgraduate medical students of disciplines like Int. Medicine, Cardiology, Pulmonary Medicine, Surgery and Anesthesiology etc. need to have mandatory exposure in CCM and mandatory questions on critical care should be included in their test papers. Whereas Bangladesh needs at least five hundred postgraduate qualified Intensivists at the moment, our first postgraduate qualified critical care medicine specialist is expected to roll down our MD courses not earlier than 2012.

Bangladesh Society of Critical Care Medicine (BSCCM) was established in 2009 with the goal of promoting CCM across the country keeping in mind the need for expanding the number of ICUs & number of ICU beds in the country along with expansion of trained manpower capable of delivering right critical care for all citizens irrespective of their ability to pay.

It is also worth mentioning the current status of Emergency Care in our country. Emergency rooms as opposed to ICUs are poorly developed and the bulk of emergency medical care has been shifted to the ICUs which have been the home of primary resuscitation of most sick patients who visit the Emergency rooms. This reality calls for upgrading Emergency depts. & promoting Emergency Medicine as a medical specialty in our country.

The future of CCM in Bangladesh looks bright but it is still quite remote for us to reach. Our health care

policy makers need to be objective, goal directed, practical and realistic. We need to create awareness among our medical community & general public about CCM and guide our policy makers in formulating right critical care medicine policy so that a bright horizon can be reached in near future.

#### References

1. Ewart GW, Marcus L, Gaba MM, Bradner RH, Medina JL, Chandler EB. The critical care medicine crisis a call for federal action. *Chest* 2004; 125: 1518-1521
2. Dudley HAF. Intensive care: a specialty or a branch of anesthetics? *British Medical Journal* 1987; 294: 459-460
3. Younger SJ. Who defines futility? *JAMA* 1988; 260: 2094-2095
4. Bennett D, Bion J, ABC of Intensive Care. *British Medical Journal* 1999; 1468-1470
5. Statistical Pocket Book of Bangladesh 2008. Bangladesh Bureau of Statistics. Planning division. Ministry of Planning, Govt. of Peoples Republic Of Bangladesh 2008; 13.01: 373
6. Manhous CA, Amoateng-Adjepong Y, Al-Kharfat T, Jacob B, Alnuaimat HM, Chatila N et al. Effects of medical intensivist on patient care in a community teaching hospital. *Mayo Clinic Proceedings* 1997; 72: 391-399
7. William III C, Dentschman CS, Anderson III HL, Relly PM, Behringer EC, Schnab CW et al. Effects of an organized critical care service on outcomes and resource utilization: A cohort study. *Critical Care Medicine* 1999; 27: 270-274
8. Faruq MO, Ahsan ASMA, Fatema K, Ahmed F, Sultana A, Chowdhury RH. An audit of Intensive Care Services in Bangladesh. *Ibrahim Medical College Journal* 2010; 4: 13-15