

## Challenges in critical care medicine in India

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Over the last few decades, there has been a tremendous increase in the knowledge, technology and skills required to treat critically ill patients. This has led to the development of intensive care units (ICUs), which are essentially areas where severely ill patients can be cared for and provided with the infrastructure and expertise necessary to treat critical illness. The ICU is highly specified and sophisticated area of a hospital which is designed, staffed, located, furnished and equipped, dedicated to management of critically ill patients, injuries or complications. It is a department with dedicated medical, nursing and allied staff. It operates with defined policies, protocols and procedures, having its own quality control, education, training and research programmes.<sup>1</sup>

In the past 15 years, there has been tremendous growth in intensive care medicine in India, but much still needs to be done in area of infrastructure, human resource development, protocol, guidelines formation and research relevant to Indian circumstances.

### Intensive care units

In our country, it is not uncommon for a small nursing home to set up a cardiac monitor in an air-conditioned single room and call it an ICU. There are no statutory guidelines concerning definitions of an ICU, minimum standards for an ICU or who can provide intensive care. Accreditation by agencies such as the NABH is voluntary and a vast majority of hospitals, nursing homes and ICUs are not

accredited or graded. The Indian Society of Critical Care Medicine (ISCCM) has guidelines on standards for ICU design, structure, function and quality of care.<sup>1,2</sup> However, there is no central agency to establish, enforce and monitor standards. Similarly, there is no data on the number of hospitals, nursing homes and ICUs in the country. It is therefore, difficult to estimate the number of ICUs, intensivists and other critical care unit staff required for India, or to plan for provision of intensive care services in India.

### Trained manpower

Till the academic year 2012, Critical Care Medicine (CCM) was not recognised by the Medical Council of India as a separate speciality. As a result, intensive care was delivered by anaesthesiologists, physicians and other doctors with some expertise or interest in critical care, but mostly without formal training. The ISCCM started a 1-year certificate course in ICUs accredited by it for training. This course, now called the Indian Diploma in Critical Care Medicine (IDCCM) was open to doctors with a postgraduate degree in anaesthesiology, medicine and chest medicine.<sup>3</sup> Over the last 15 years, over 400 doctors have been trained in critical care. This was the first organised attempt at CCM training in the country. Today over 100 ICUs are accredited for the ISCCM courses,<sup>3</sup> and over 60 intensivists graduate every year. With CCM now being offered as a DM programme (2 centres have enrolled 4 students for DM in critical care this academic year), intensivists will emerge with a 3-year training and a university degree. However, many more doctors trained in intensive care will be required, and the relevance of courses such as those run by the ISCCM will not diminish. Similar problems exist in developing manpower in

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critical elements of the CCM team, including critical care nursing, technicians, respiratory therapists, nutritionists, physiotherapists, clinical pharmacists, *etc.* Training programmes and vocational courses by professional societies, hospitals and medical colleges are required to develop the manpower required to staff and run modern ICUs.

### Role of the intensivist in a hospital

Current ICU patterns result in the patient being admitted under a primary consultant before admission to the ICU. Often this primary consultant may not be conversant with current critical care practices. The presence of a consultant intensivist has been demonstrated to greatly increase patient safety and to improve outcomes in terms of morbidity, mortality, length of stay and costs. Despite this, while the concept of the ICU has gained widespread acceptance amongst medical professionals, hospital administrators and the general public, recognition of the need and role for doctors specialising in intensive care medicine has lagged behind. One of the reasons may be that CCM is a relatively new speciality. Social, political and economic factors in the hospital also undoubtedly play a role in preventing wholehearted acceptance of a consultant intensivist in the hospital. It is at times disheartening for the young, newly qualified and well trained intensivist to be treated like a mere registrar, and to be told to just *'hold the fort'* while the primary consultant issues the necessary instructions. The ISCCM has produced a guideline on the roles and responsibilities of the consultant intensivist in a hospital.<sup>4</sup> Essentially, he should be treated *at par* with any other specialist. Undoubtedly, acceptance of intensivists will increase exponentially once good outcomes become evident with trained intensivists manning the ICU.

### Costs of care

Intensive care is often thought of as expensive care. Hence, the question often asked is 'can India afford intensive care?'. India is a rapidly developing country but a significant proportion currently lives below the poverty line. Per capita income in the country is low. Total government expenditure on health is only 4.1% of the gross domestic product. Health insurance and social security are almost non-existent in India

and 70.8% of the total health care bill is borne personally by patient or the family.<sup>5</sup> Majority of ICU beds in India are in private hospitals. Therefore, few ICU beds that offer free treatment in public hospitals are in constant demand. These constitute only about 10% of the critical care facilities in India. Usually, funding in these institutes is scarce and hence, facilities are quite limited. Professional and overhead costs in these institutes are not transferred to patients. However, very often, patients have to pay for consumables which are not available. Surveys show that irrespective of income class, one episode of hospitalisation is estimated to account for 58% of per capita annual expenditures pushing 2.2% of the population below the poverty line. Studies in Kerala indicate that almost 37% of the hospitalised have had to borrow money or sell their assets.<sup>6</sup>

There is little systematic data regarding cost implications in ICU. In the year 2000, Rao *et al*<sup>7</sup> found the cost of intensive care in India to be about ₹5,000 per patient per day in a public hospital in Hyderabad, while in 1999, Parikh and Karnad<sup>8</sup> reported an average cost of treatment per patient per day of ₹1,973 in a public hospital ICU in Mumbai. The average cost per survivor was ₹17,029. As this study was carried out in a public hospital ICU, it implied that a large proportion of costs were paid for by the government. In our hospital, in the year 2005, the total cost of ICU care per patient per day was ₹12,000 with direct costs being approximately ₹8,000 per patient per day. The cost per survivor was calculated to be approximately ₹47,000.<sup>9</sup> Even after accounting for inflation (an average of 7% per year), the costs were significantly higher than that calculated by Parikh *et al*<sup>8</sup> in 1999. Interestingly, the observed mortality in Parikh's study was 36%, with 1.67 as the standardised mortality ratio. It could be argued that greater spending and costs to comply with acceptable international standards of intensive care would be more than offset if outcomes improved and intensive care proved to be more cost-effective.

The public health system in India should undoubtedly give priority to providing basic health and hygiene, reducing maternal and infant mortality, and prevention and control of infectious

diseases. However, even in the Indian context, given the relatively young population and a significant burden of severe tropical infectious diseases, trauma, poisonings, and envenomations, as well as the rising incidence of non-communicable diseases such as coronary artery disease and cancer, there is a definite role for intensive care. Intensive care in India may be no more expensive than the costs of treating other diseases such as cancer, heart disease or dialysis – dependent chronic renal failure. Investment in intensive care, including equipment, organisation, staffing, and education may increase initial costs but prove to be cost-effective in the longer term. Most monitoring, ventilation and other equipment and their consumables are imported, significantly adding to the daily direct costs of care. Indigenisation and import substitution of expensive equipment without compromising on standards and patient safety can substantially reduce costs. This requires communication and collaboration between intensive care professionals and the medical equipment and device industry. Efforts should also be made to have a nationwide audit on costs, practice patterns and outcomes, so that overall estimates and regional variables are available for planning and cost-minimisation analyses.

### **End-of-life care in Indian ICUs**

Many patients in an ICU reach a point when it is reasonably inferred that meaningful survival is not likely. At that point, persistence of intensive therapy usually serves only to postpone death and add to the patients' and families' suffering and to the financial burden. Physicians often discuss this situation with the family and switch the care to focus on comfort rather than the artificially supported prolongation of life or postponement of death. However, the ethical and legal status of these issues is ambiguous in India. Concepts like autonomy and death with dignity have not been explored in any meaningful or pragmatic way by the constitution or the courts. Euthanasia and physician-assisted suicide are not legal, and the Indian Penal Code states that even attempting suicide or abetting suicide is illegal. There is also no clarity on the legality of standard palliative techniques such as terminal sedation or the 'double effect' of comfort measures. The recent judgement of the

Supreme Court of India in the Aruna Shanbaug case has clarified that withholding or withdrawing of care in a terminally ill patient (unfortunately termed as passive euthanasia by the Court) is not unlawful and can be permitted. However the prescribed procedure requires approval of such withholding or withdrawal of care by the concerned High Court. While this procedure is appropriate in patients with a persistent vegetative state, it is impractical for the ICU setting where end-of-life care (EOLC) decisions are taken in the setting of a life-threatening illness and futility.

There is very limited data on EOLC in India.<sup>10-12</sup> There appear to be number of perceived barriers to EOLC in India,<sup>13</sup> including fear of the legal ramifications,<sup>14</sup> unawareness of ethical issues, the culture of *'fighting till the end'*, lack of orientation to palliative care, as well as the pressure to admit futile cases in self-paying patients. Despite these challenges to EOLC, withholding and withdrawal of life support does occur in 34–49% of deaths in Indian ICUs.<sup>11,12</sup> Withholding of life support is more common, whereas withdrawal of life support is less common, occurring in only 8% of cases. LAMA (left against medical advice) appears to be a common practice, where the patient is transferred out of the ICU terminally for financial or other reasons. It deprives the patient of palliative care, analgesia and comfort care at the EOL, and is strongly discouraged in the position statement of the ISCCM.<sup>15</sup> Fear of legal consequences, rather than cultural or ethical issues appears to be the major reason for the limited EOLC practice and its full documentation.

### **Nosocomial infections and antimicrobial resistance in Indian ICUs**

There are no systematic nationwide data on the extent and magnitude of nosocomial or health care associated infections (HCAIs) in India. A study in 12 ICUs of seven Indian cities from July 2004 to March 2007 reported an overall rate of 4.4%, and 9.06 HCAIs per 1000 ICU days. The central venous catheter-related bloodstream infection (CVC-BSI) rate was 7.92 per 1000 catheter-days and the ventilator-associated pneumonia (VAP) rate was 10.46 per 1000 ventilator-days. These rates are much

higher than the United States NNIS benchmarks of 3.2 and 5.1 per 1000-devices days for CVC-BSI and VAP respectively.

There are no nationwide data on antimicrobial resistance in Indian ICUs. However, there are several reports of an alarming proportion of infections with resistant organisms in ICU patients, leading to an editorial titled *An obituary – On the death of antibiotics!*.<sup>17</sup> While susceptibility patterns may vary between regions and hospitals, all data indicate that *Pseudomonas*, ESBL-producing *enterobacteriaceae* and *Acinetobacter* are the major resistant Gram negative pathogens. A worrying feature is the increasing problem of carbapenem resistance.<sup>18</sup>

Antibiotic resistance in ICUs is an aggregate of factors in the community and healthcare system, and practice patterns in individual hospitals and ICUs.<sup>19</sup> A unique feature of the Indian health care system is that it is completely unregulated. Cheap generics of various classes of antibiotics, fixed combinations of cephalosporins and beta-lactamase inhibitors and even ceftriaxone and vancomycin are aggressively marketed. Any physician can freely prescribe any class of antibiotic without notifying or being accountable to any health authority. Patients may present to the ICU with resistant organisms acquired in the community or in the small community hospitals. In the ICU, patients are at risk of developing nosocomial infections with resistant strains. Patients are commonly exposed to broad-spectrum antibiotics and the nature of activities in the ICU facilitates cross-transmission of these resistant microbes.

It is essential for individual hospitals and ICUs in India to track antimicrobial resistance patterns with time. Using overall hospital data or western literature to guide antimicrobial therapy in an ICU may be inappropriate. The problem of antimicrobial resistance in India appears to be similar to or perhaps even greater than that in Western countries. While we must take lessons from the West in coping with this problem, our healthcare systems will need to be urgently reformed and the necessary infrastructure for detection, reporting, monitoring, education and

action will have to be put in place. Professional bodies and government must work in concert to fight the threat of antibiotic resistance, in the community and in the healthcare setting.

## Research

It is vital that research is carried out in areas of critical care medicine relevant to India. We first require adequate information and baseline data about our ICUs, practices and patients. The Indian Intensive Care Case Mix and Practice Patterns Study (INDICAPS) of the ISCCM has acquired data of 124 ICUs and over 4000 patients. The results should be available soon, and will be the first attempt at collecting large, multicenter Indian critical care data. A census of ICUs is required, and nationwide reporting of outcomes, antibiotic resistance and other data is essential to determine the problems, their magnitude and possible solutions.

This article has focused on the challenges in critical care medicine in India. This is not to suggest that all is lost or that we are doing a bad job. However, while working to our strengths, it is essential that we acknowledge our weaknesses so that we can find solutions to make our ICUs safer, and to provide better care and outcomes for our patients.

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