

Intensive care in a developing country: a review of the first 100 cases

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Summary

The role of an intensive care unit with regard to patient care and manpower training in a developing country was considered from an analysis of the first 100 admissions to the unit. The organisation and facilities available are outlined. The majority of cases admitted were post-surgical but the best results were achieved in training the nursing and medical staff to manage peritoneal dialysis and patients with eclampsia. Despite the lack of equipment and investigative facilities the overall mortality was 30%.

Introduction

The provision of facilities for intensive care in areas where there is a high infant mortality associated with communicable disease and the average lifespan is short, could be considered to be esoteric and a waste of limited resources. Human resources in such countries are not in such short supply as equipment, so that it was considered feasible to set up a small unit in a Teaching Hospital with trained dedicated nurses who could be supported by basic equipment, to allow the best conditions in these circumstances to prevail. The Jos University Teaching Hospital acts as a specialist referral centre for three of the 19 states in Nigeria and caters for all specialties and has no special units.

The aims of the intensive care unit were as follows:

- 1 to concentrate nursing skills where they could be effectively used
- 2 to concentrate scarce resuscitation equipment in a central area
- 3 to provide one nurse per patient per 24 hours
- 4 to train nursing and medical staff in the correct management of patients
- 5 to provide the facilities for long term ventilation of patients
- 6 to allow all medical and surgical disciplines to have access to the unit

Organisation of the unit

There were two main constraints to the development of the unit. Firstly, there were no funds to erect a purpose built unit and secondly, there were nine nurses which were only enough to provide care for two intensive care patients.

A site for the unit was chosen which was central and close to the two main operating theatres. It was part of a ward, and minimal reconstruction was undertaken in the form of the provision of fly proofing and the installation of a new ceiling. No provision could be made for isolation facilities; there was a nursing desk with a small store, the two bedded

area, a rest room and kitchen, toilet and trolley holding bay.

The recommended number of intensive care beds per hospital beds is more than one per 100(1), but with the limitations on staff and space this had to be reduced to two beds for a teaching hospital having over 500 beds.

The unit was formed as a result of demands from the anaesthetic department and the head of the department became responsible for initiating a committee of consultants to assist in drafting policy guidelines. Medical care for the patient remained the responsibility of the admitting consultant and, since there was no resident doctor on the unit, the admitting consultant had to provide a member of his team to be available all the time that his patient was on the unit. This deterred the admission of some patients. For those patients who needed artificial ventilation the anaesthetic registrar on call had to sleep on the unit. It was considered that, since the numbers of beds available for intensive care was small, those cases requiring admission or discharge should be assessed by a consultant anaesthetist so that patients who required only standard nursing care could be refused admission or be sent back to the ward without delay. Consultant anaesthetists each covered the unit for two weeks at a time, whilst also on call for operating theatre and allied duties. He/she undertook a daily ward round of the unit and instructed trainees.

It was the policy of the unit that, in the absence of isolation facilities, an infectious patient could be admitted to a bed, providing that there was no other patient admitted, and to nurse any other cases requiring admission on a general ward with the help of trained intensive care nurses. It was not possible to use a side ward for isolation because there was only one and this usually contained more than one patient. There were hand washing facilities on the unit but with laundry being scarce—there were few bed sheets—no attempt was made to provide gowns for staff and visitors. It was also not possible to provide bacteriological swabbing of the unit at regular intervals. Instruments were either boiled or autoclaved, depending on the functional state of the equipment. Chemical disinfection was available for particular items only when the solution was in stock. The problem of infection could not be tackled at the source (2).

FACILITIES

The unit was able to provide an ordinary hospital bed without a backrest, a sphygmomanometer, oxygen from a cylinder, electrical and mechanical suction and an electrocardiogram for each patient. One autoclavable ventilator (Engstrom 300) was available, two syringe pumps and a Wright respirometer. Resuscitation equipment consisted of a Waters circuit, an Ambu bag and mask, defibrillator

(adult external) and equipment for intubation. The services of a technologist were available and he was able to maintain the equipment.

The two beds were situated in an area of 22 m² separated by a storage cupboard. Natural cross ventilation had to be used which has proved adequate in other units (3). There was no generator independent from that to which the whole hospital was connected. Each bed had six electrical socket outlets and in the event of a power cut torches and lanterns were provided and hand ventilation was instituted.

Attempts were made to secure a reasonable selection of drugs for emergency use but usually there were essential ones missing. Intravenous fluids were available and also dialysis fluids.

The laboratory facilities were basic and did not include blood gas or rapid electrolyte estimations. A portable X-ray machine was available for most of the time and there was one physiotherapist for the whole hospital. Postmortem examinations were performed whenever possible.

TYPES OF CASES

Table I shows the range of conditions for which patients were admitted to the intensive care unit. The majority of the patients were admitted for postoperative care. Urological cases, for example total cystectomy and prostatectomy with complications, accounted for 16 admissions. Abdominal surgery especially following typhoid perforation accounted for 8 admissions and 7 patients were admitted after thoracotomy.

Twenty four patients were unconscious when admitted, all except three following head injury. One patient was admitted in hepatic coma, one in diabetic coma and another with hypertensive encephalopathy. Facilities were available for peritoneal dialysis and 9 patients were admitted for this treatment.

Deaths from eclampsia occurred in patients nursed in the general obstetric ward and so a policy of admitting all eclamptic patients to the unit was initiated. Nine such patients came to the unit.

Acute respiratory failure of various aetiologies necessitated 7 admissions. Two of these patients had polyneuritis, two had pneumonia (one bacterial, one aspiration), one had asthma and one pulmonary oedema of unknown aetiology. The seventh patient was a child in respiratory distress following removal of a foreign body in the bronchus which had been present for days and had caused severe mucosal oedema.

Septic shock was associated with perforated typhoid and septic abortion and four cases were admitted with this condition.

There were a few patients who required the administration of blood in the postoperative period as a result of haemorrhage during surgery and the non-availability of blood in the theatre. These types of cases are now much rarer since the blood transfusion service has improved.

Other cases which presented included poisonings (one had ingested native medicine and the other the insecticide Gamalin 20), postcardiac arrest (two patients), paraplegia following fracture of the sixth thoracic vertebra (she was transferred after spinal fusion and stabilisation to Stoke-Mandeville Hospital, England), and one patient with a sickle cell crisis.

AGE OF PATIENTS

It was anticipated that there would be a high percentage of paediatric and young adult patients and this was reflected in the choice of equipment and training which was initially instituted. The mean age was 30 years and the range is shown in Table II. Two neonates required nursing care after surgical correction of congenital abnormalities (exomphalos and meningomyelocele); the two oldest patients were 75 years of age, one being admitted after craniotomy for head injury caused by a road traffic accident and the

TABLE I *Types of cases admitted to the intensive care unit and their associated mortality*

	Admitted n=100	Died in ICU n=30
Postoperative	37	8
Coma	24	11
Renal failure	9	3
Eclampsia	9	1
Respiratory failure	7	2
Septic shock	4	1
Haemorrhage	4	1
Others	6	3

TABLE II *Age range of patients admitted to the intensive care unit (100 patients)*

Age (years)	Number n=100
0-10	19
11-20	16
21-30	27
31-40	10
41-50	10
51-60	10
61-70	6
71-80	2

other after prostatectomy.

DURATION OF ADMISSION TO THE INTENSIVE CARE UNIT

The mean duration of admission was 4.8 days, the range being from one to 39 days. The longest admission was for the first patient with head injury admitted to the unit. He started to recover consciousness after ten days and was discharged from the unit when he became ambulant with assistance. He became psychologically dependent on the unit but the family was supportive and his recovery was not jeopardised.

Results

There was a 30% mortality overall. The highest mortality rate occurred in patients who had sustained head injury. This amounted to 33% (8 patients of 21). Table I shows the mortality figures. The patients who died of renal failure were the first three patients admitted to the unit with this diagnosis and various mistakes were made leading to their death. The first patient was not adequately dialysed and died with a high blood urea. The second patient had a sudden cardiac arrest in ventricular fibrillation and despite defibrillation could not be resuscitated. The staff were instructed to monitor the serum potassium more closely. The third patient had classical signs of hypokalaemia on the E.C.G.: extasystoles and U-waves but no laboratory investigations were available and no solutions containing potassium could be found, and a cardiac arrest occurred with unsuccessful resuscitation. These mistakes were not repeated in subsequent patients, because the laboratories were more helpful and potassium containing solutions were found.

Twelve patients were ventilated mechanically and ten died. The two survivors were comatose patients who had sustained head injury and had undergone decompression craniotomy. There was a shortage of plastic endotracheal tubes. In consequence patients who were intubated were found to require a tracheostomy on the first or second day after intubation, not only because of the type of tube but also because humidification of the endotracheal tubes was inadequate in the absence of efficient humidifiers and consequently tubes blocked frequently.

Discussion

Intensive care units have tended to grow from respiratory care units and the major reason behind the development of this unit was to provide safe ventilatory support. This did not deter the anaesthetists, however, from taking a broader base for the unit. In the initial planning of the unit it would have been helpful to be able to predict the type of cases which would present but this was not possible from the available literature. It was expected that infectious cases would require admission, but there were no cases except for patients suffering from typhoid.

Despite a high infant mortality only 19% of patients were below the age of 10 years and this may reflect the standard of paediatric practise. The surgeons took advantage of the facilities of the unit and sometimes intervention by the consultant anaesthetist was required in the discharge of patients. The relatively high mortality of the postoperative patients suggests that the facilities were not misused. Patients at the extremes of life who have undergone major surgery require constant observation and detailed care in the early postoperative period. Postoperative care is frequently given in the intensive care unit in Zimbabwe (4) but their problem with numerous relatives visiting at all hours was not encountered by us. Instead there were some patients who were almost abandoned and many relations were reluctant to enter the unit.

Despite the availability of only two beds, and at times only one, depending on the number of nurses available, no patient was refused admission. There was only one patient who was discharged too soon and had to be readmitted. The pattern of admissions changed according to the interests of the clinicians practising in the hospital; for example, there was only one head injury admission until a neurosurgeon was appointed and no burned patient was admitted despite the presence of these patients in the hospital.

The development of an intensive care unit not only allows nurses training and skills to be improved but also those of the medical staff, leading to a reduction in mortality in the patients and an improvement in staff morale. This was clearly demonstrated in the areas of renal failure and the management of eclampsia. The anaesthetists became involved in the management of critically ill patients and, with

the multidisciplinary role of the unit, learning was enhanced.

The psycho-reactive problems associated with intensive therapy were not those reported by Schroeder (5) related to disturbing experiences but were of dependency on the nursing staff and a reluctance to leave the caring environment. Perhaps the staff training had overemphasised the nurse-patient role.

The average duration of stay in a large British teaching hospital intensive care unit where there is a high proportion of postsurgical cases was three days (1). The slightly longer stay in this series of patients was probably related to the standard of nursing care on the wards.

Intensive care is labour intensive and the cost of other items, unlike in some developed countries, has to be passed on to the patient. Thus there were times when drugs and laboratory or radiological investigations could not be performed.

The provision of artificial ventilation for patients with respiratory failure due to coma was life saving in a small percentage of patients, but this figure could have been improved with suitable nursing care and laboratory facilities and efforts are being made to achieve this.

This report indicates the advantages and some of the problems faced in providing round the clock nursing care for a patient in a developing country. The type of patient treated differed from teaching hospitals in other countries but was mainly related to the interest of the hospital consultants.

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