Multipurpose Intensive Care Unit in a District General Hospital

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Summary

The advantages of a four-bedded purpose-built general intensive care unit in a district general hospital are described. In addition to 1,447 inpatients treated between January 1968 and December 1971 the unit was used to conduct outpatient investigations. This has filled an important gap in conventional arrangements, and is practical and economical. The unit has proved to have advantages, not only for seriously ill patients but also has benefited the hospital in other ways. It has been of material assistance in recruiting and training nursing and medical staff and has been welcomed and supported by patients and their relatives. It has also attracted practical support from voluntary organizations whose generosity has enabled much additional equipment to be purchased.

Introduction

During the last decade an increasing proportion of seriously ill patients have been treated in specialized units. Particular advantages have been claimed for units dealing exclusively with the treatment of myocardial infarction,¹ and acute poisoning.² In small district general hospitals such specialized units may not be a practical proposition. We describe the advantages that have resulted from an economically built multipurpose intensive care unit in a district general hospital during the past four years, and the use of the facilities of the unit for performing outpatient investigations.

Foundation of Nuffield Unit

St. Martin's Hospital is one of two district general hospitals in Bath. It was originally a Poor Law Institution to which a number of single-storey hutment wards were added under the Emergency Medical Service in 1939, and an extensive programme of up-grading has been undertaken. Like many other hospitals it has experienced a shortage of nursing staff for some years. As it has a pupil nurse training school it is necessary to recruit registered nurses from elsewhere and this has resulted particularly in a shortage of staff nurses.

It was against this background that the establishment of an intensive care unit was first discussed in 1965 as a means of making the best possible use of limited nursing resources. Not enough local or regional funds were available but the Nuffield Provincial Hospitals Trust donated £9,000 towards a purpose-built unit on the understanding that facilities would be made available for the development and assessment of monitoring techniques. Later, the Trust gave an additional grant of £9,000 towards the cost of running the unit for three years.

No existing accommodation was available for conversion. A four-bedded building was designed, situated in a position

bounded by the main hospital corridor, the x-ray department, and the research wing, with access to all these areas. The operating theatre and casualty department were in close proximity. Building was started on 1 July 1967, completed on 14 October, and the first patient was admitted on 25 November 1967. The building cost was £11,300 and furniture and medical equipment cost £7,500. The South-Western Regional Hospital Board agreed to meet all other capital and revenue expenses.

Design of Unit

The layout of the unit is shown in the figure.

The area for patients is 708 ft² (66 m²). One bed is in a single room of 132 ft² (12 m²) and there are three beds in the remaining 576 ft² (54 m²). This is small by most present standards. Mackenzie³ advised an area of up to 200 ft² (19 m²) per patient and Mitchell and Graves⁴ advised 226 ft² (21 m²) per patient. The single room has proved to be too small for convenience when dealing with a cardiac arrest or with a patient on a respirator, though adequate for other purposes. The larger ward, providing 192 ft² (18 m²) per patient, has been satisfactory and allows a nurse sitting at a desk in the ward to see all the patients, including the patient in the single room, and all the bedside monitors.

In addition to the area for patients, the unit also contains an office, a waiting room with facilities for an overnight stay, an equipment store, a linen store, a blood gas laboratory, a small kitchen and rest room for staff, and a sluice. Behind the three beds in the main ward is a corridor. Patients can be observed through double-glazed windows with internal venetian blinds, and there is access for electrical cables. This monitoring corridor is used if it is necessary to keep experimental monitoring equipment out of the ward to avoid disturbing patients.

Though the patient area is not sterile coved skirtings and flush fittings have been used wherever possible so that cleaning is simplified. Much of the equipment is suspended on wall-mounted rails which leaves the floor space as free as possible. There is a V.H.F. staff location system in the hospital, and by pushing a button in the patient area or office a special signal can be sent direct to the "crash call" team of medical and technical staff to indicate that they are urgently required in the Nuffield Unit, thus reducing the time factor in getting medical help in cases of emergency.

Though there is a combined medical and nursing office a mobile nurse station is maintained at all times in the patient area. As the nurses remain virtually at the bedside there has been no need to purchase additional equipment for monitoring patients at a central station.

Administration and Staffing

Initially the unit was administered by a surgeon, a physician, and an anaesthetist. Since January 1969 one of us (A.R.T.), a physician with a special interest in respiratory diseases, has been in administrative charge. Both systems worked well but one departmental head has advantages, particularly in a small unit. One session a week is theoretically allocated for work in the unit.

Any consultant may admit a patient to the unit and he retains clinical responsibility. There is no upper or lower age limit, though neonatal problems are dealt with in a different unit. No junior medical staff are allocated specifically to the unit. The

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Floor plan of the Nuffield Intensive Care Unit.

nursing establishment to cover day and night duty is 5½ State-registered nurses, 3½ State-enrolled nurses, and 2 pupil nurses (for experience).

Inpatients treated in Unit

Between 1 January 1968 and 31 December 1971 1,447 patients were admitted to the unit (see table). The average length of stay was 57 hours, but more than half of the patients stayed less than 30 hours and were then transferred to other wards. Of the patients admitted 13% died in the unit, the highest mortality rate being for surgical patients with postoperative complications (22%).

In addition to these patients the unit was also used for special procedures such as right heart catheterization, pericardial aspiration, or cardioversion in patients being treated in other wards. These patients were transferred back after a few hours' observation and are not included in the figures above.

Outpatients treated in Unit

In the belief that an intensive care unit should provide intensive investigation as well as intensive therapy, it seemed logical to make use of the staff and equipment in the unit to benefit patients requiring certain investigations either performed by or needing assistance from nurses. Occasional outpatient investigations of this nature do not fit easily into the day-to-day working of a casualty or outpatients department and are even more

difficult in a busy acute medical or surgical ward. Previously such patients had been admitted to hospital. During the four years reviewed the nurses performed 348 pentagastrin stimulation tests of gastric function and assisted with arterial puncture for blood gas analysis, thermography, lung function tests, and phonocardiography—all performed as outpatient procedures.

One of the advantages of this use of the unit has been the adaptability that the nurses have shown. Some attempts at measurements of aspects of bodily function prove not to be useful in practice, while others become incorporated as part of the routine assessment of patients with certain conditions. Several departments of the hospital have made use of the opportunity of assessing new methods of investigation which, in themselves, would not have justified the attachment of a nurse specifically to that department. Thus measurement of gastric acidity has become part of the routine investigation of many patients, while impedance pneumography as a method of monitoring respiration has proved impracticable in most patients. It would have been more difficult to evaluate these procedures if specific funds had needed to be allocated for nursing help in their performance.

Records

As well as the usual hospital records, a punch card is completed for each patient. This details the diagnosis, length of stay, special treatment, and outcome in each case. Also, other information may be recorded for specific purposes if required. The cards are collated regularly and reports on the working of the unit have been circulated locally and to other interested bodies such as the Nuffield Provincial Hospitals Trust and the Department of Health and Social Security. It has been possible to identify and compare different regimens of treatment in common conditions.

Teaching

Two pupil nurses (studying to be enrolled nurses) are attached to the unit to gain the special experience that is available and have been extremely useful members of the staff. Regular meetings of medical, nursing, and technical staff are held to

Diagnosis and Mortality of Inpatients Treated in Unit, January 1968—December 1971

Diagnosis	No. of Patients	Percentage Total Admissions	No. of Deaths (%)
Myocardial infarction	450	31.1	59 (13)
Other cardiac disorders	93	6.4	6 (6)
Self-poisoning	193	13.3	6 (3)
Respiratory disorders	179	12.4	30 (17)
Surgical	160	11.1	35 (22)
Trauma	149	10.3	10 (7)
Other	223	15.4	38 (17)

discuss current problems or the specific management of medical emergencies. The unit houses a reference library.

Effects of Unit on St. Martin's Hospital

Papers discussing the advantages of intensive care units usually concentrate on the benefits in patient care. Our experience has been in keeping with that found in other units, particularly in those cases requiring highly specialized treatment such as mechanical ventilation. It is more difficult to measure the secondary benefits in terms of the stimulus generally within the hospital but it is our opinion that this can be almost equally important.

Many patients and relatives have felt reassured by the appearance and atmosphere of the unit, which they have said combines efficiency and tranquillity. The reputation of converted Poor Law Institutions often lingers long in the memory of local inhabitants and it is reassuring to hear from visitors such comments as "Well, I didn't know you had anything like this; I wouldn't mind coming into hospital now."

The unit has been fortunate to receive frequent spontaneous donations from patients or relatives and from local voluntary organizations. With such gifts it has been possible to purchase items of equipment such as additional portable oscilloscopes for emergency trolleys, so that the whole hospital has benefited.

When the unit was first planned fears were expressed as to the effect of concentrating the most acute type of problem in a small area and the possibility that this would take away some of the interest for the nursing staff in the other acute general wards. In practice, a four-bedded unit in a hospital of 509 beds deals with only a very small percentage of the most seriously ill patients. Contrary to the doubts expressed before, the senior nurses in the acute wards have been relieved rather than disappointed that the unit has dealt with time-consuming problems that often were an almost intolerable burden on hard-pressed staff coping with large numbers of emergency admissions. A further benefit to the nursing staff has been the fact that, rather than drawing on the most skilled resources of the hospital to staff the unit, we have been able to recruit staff nurses and sisters on a national basis. Many of these nurses would not have applied for posts at St. Martin's Hospital but for the intensive care unit and in fact some nurses who came to the unit in a junior capacity later applied successfully for more senior posts in the other wards, so providing an additional source of recruitment for the hospital in general.

We have been impressed by how much these nurses have to offer. Many have seized the opportunity of learning how to grapple with the complexities of the Astrup blood gas analyser and have proved to be careful and useful technicians in this and other "non-nursing" procedures. One male nurse devised a special method of securing pacemaker electrodes and arranged for a prototype to be constructed.

As well as attracting nurses, the unit has helped to influence medical staff. The junior staff have often commented on how

much the unit has helped their work. They quickly become familiar with the best approach to medical emergencies from the example shown in the unit. This, and the high standard of observation and treatment demanded, undoubtedly influences their management of patients in other wards and increases the standards generally.

Advantages of a General Intensive Care Unit

Very specialized procedures will always be performed best in very specialized units. In a district general hospital it is probably more efficient in terms of bed and staff utilization to have a general purpose intensive care unit, and in a small hospital anything other than a general unit is impracticable. Even so, there are advantages in the general unit. The work is more varied than in a special unit such as a coronary care unit, and many nurses find that this variety is more interesting. The staff become more practised in the whole range of intensive nursing skills and can cope more efficiently with unusual complications of common conditions. For example, mechanical ventilation may occasionally be required after resuscitation from cardiac arrest in a patient with myocardial infarction. A nursing team that often deals with patients with respiratory failure is better able to deal with this situation than a coronary care team who meet the problem only rarely.

Small intensive care units need not be very expensive in terms of capital cost. Four beds is probably the smallest viable unit that can exist with its own staff, and in this size of unit the amount of nursing time needed varies considerably, depending on the condition of the patients being treated. For this reason a flexible arrangement to perform outpatient investigations has been a very useful addition to the more conventional activities of an intensive care unit. Occasional slack periods are utilized to accommodate an increased number of outpatient investigations. This has been a very valuable arrangement, has lessened the demands on the nursing staff in the general wards, and has avoided the need to admit certain patients into hospital for their investigations to be performed.

The original planning of the unit was undertaken by a design team which consisted of medical, nursing, administrative, and technical staff of the hospital to establish requirements and decide what could be provided in the limited area which was available.

Without the interest and support of the Nuffield Provincial Hospitals Trust the unit would not exist.

References

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