papers dealing with treatment are unhelpful to the clinician seeking guidance for a plan of management. For this reason we have drawn up the following protocol based on our own observations and on our review of previous work:

Respiratory function tests should be performed before attempts to paralyse the phrenic nerve. The left side should be blocked with bupivacaine first to test the effect on hiccup and respiratory function. Left-sided diaphragmatic contraction is more distressing to the patient, and an attack on this side is usually successful.¹⁹ If it succeeds phrenic crush should be performed. If this fails the right phrenic nerve should be blocked and crushed, provided respiratory reserve is adequate. Hiccup may persist even after bilateral phrenic nerve crush, in which case muscle relaxation and positive-pressure ventilation with 5% carbon dioxide should be considered.

Hiccups may diminish in frequency over hours or days in response to treatment, rather than stopping immediately.³⁹ For this reason regular recording of the frequency and intensity of hiccup is essential in assessing the effect of any therapeutic agent.

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Contemporary Themes

An adolescent ward

F N BAMFORD, P M MINSHALL, P D MOHR

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Summary

A ward has been set up for adolescents, who, being neither children nor adults, have special needs. It provides a pleasant and enthusiastic atmosphere that allows the patients to mix together socially and removes much of the fear of entering hospital. A mixture from different

specialties is important, but not more than 20% should be long-stay patients. Those needing intensive care or specialised investigations and those likely to be a disruptive influence are excluded. No serious sexual problems have been encountered.

Introduction

"In recent years it has become increasingly evident that adolescents have needs and problems sufficiently distinguishable from those on the one hand of children and on the other of adults to warrant consideration as a distinct group for health care provision."¹ Adolescence is a period of great emotional and biological change and the management of illness at this time of life has to take account of it.²

Purpose-built wards have been in use in the United States for several years to meet the special needs of the physically ill

St Mary's Hospital, Manchester M13 9WL

F N BAMFORD, MD, DCH, senior lecturer in child health
P M MINSHALL, SRN, sister in charge of the adolescent ward

Manchester Royal Infirmary, Manchester M13 9WL

P D MOHR, MB, MRCP, senior registrar in neurology

FIG 1—Two bedrooms showing sliding partitions.

adolescent patient.³⁻⁶ They have not been generally available in Britain and we describe here the operation of a ward adapted for use by adolescent patients. The ward is in St Mary's Hospital, Manchester, and is part of a main teaching hospital complex. It was developed to provide a service for adolescents so that they need not be admitted to adult wards of Manchester Royal Infirmary.

The ward

A "Nightingale" ward above an existing children's ward was converted into a 15-bed unit. We wanted to create a unit incorporating a high degree of privacy combined with the opportunity for noisy but unobtrusive recreation. The conversion posed several problems for the architect because the old ward was long and narrow. Her design consisted of partitioned bedrooms and open spaces (fig 3).

There are six single rooms, three double, and one three-bedded connected by sliding wood panels, which provide privacy when closed but prevent social isolation at other times (fig 1). The rooms are furnished in a modern self-contained style with built-in drawers, cupboards, wash-basin, mirror, and shaver point. All the necessary outlets such as the oxygen point were incorporated into a compact wall unit. Special emphasis was given to the communal areas, which are equipped for various games and sports and liberally decorated with paintings and posters (fig 2). These areas are also used by the ward's teaching staff. The decor is finished with bright colours and includes washable and flame-proof surfaces. The general effect provides a

FIG 2—One of the ward's recreational areas.

cheerful environment and reduces the institutional atmosphere of the traditional hospital ward.

Patients

The ward opened in April 1974 but was not fully operational until 1975. There is no rigid admission policy, and any physician or surgeon may list a patient for admission. A paediatrician is responsible for the general supervision of the ward, but the day-to-day management of the patients is the responsibility of the admitting consultant. It was envisaged that patients needing intensive-care facilities after neurosurgery, cardiac surgery, or ENT surgery and those undergoing specialised investigation on the metabolic ward would continue to be admitted to the unit concerned. Urgent admissions and transfers from the adult ward are encouraged depending on the bed availability. Certain types of patients are usually excluded from admission because of their potentially disruptive influence. These include drug addicts, pregnant girls for termination, and disturbed psychiatric patients.

Over the past two years 774 patients from various specialties have been admitted to the ward (see table). The average age was 13.8 and ranged from 10 to 19. There is no strict age criterion for admission, as maturity is more important than the chronological age, but generally patients between 13 and 16 are the most suitable. Dental treatment is the commonest cause of admission, but some of these patients have coincidental medical problems. Trauma and orthopaedic problems are common in this age group, and this is reflected in the admission figures; the remainder of the patients have a wide spectrum of medical and surgical problems. The length of stay varies from a few days for

FIG 3—Plan of the adolescent unit.

Patients admitted to the adolescent ward in 1975 and 1976

Specialty	1975				1976			
	No of patients	Boys	Girls	Average age	No of patients	Boys	Girls	Average age
Dentistry	166	59	107	13.9	161	64	97	14.4
Orthopaedics	43	19	24	14.3	36	17	19	13.9
General surgery	37	17	20	13.0	24	10	14	12.7
Trauma	25	14	11	14.3	22	18	4	13.9
Urology	21	12	9	13.0	20	16	4	12.8
Paediatrics	19	12	7	13.0	16	3	13	14.6
Neurology	18	7	11	14.0	33	12	21	13.8
Cardiology	16	10	6	13.2	20	11	9	12.3
Haematology	14	10	4	14.3	7	5	2	14.9
Neurosurgery	10	4	6	14.4	9	5	4	14.0
Rheumatology	9	3	6	12.7	7	3	4	13.4
Gynaecology	6	—	6	13.7	8	—	8	13.0
General medicine	6	3	3	15.2	3	2	1	14.7
Endocrinology	4	4	—	14.3	14	7	7	13.0
Total	394	174	220	13.8	380	173	207	13.7

patients undergoing investigation or dental treatment to several weeks after orthopaedic operations.

The patients react well to the unit. After an initial period to settle in they tend to form younger and older peer groups, but they mix freely and take part in joint social and teaching activities. As a group they support each other, and this helps to allay the natural fear of illness or impending investigations. The presence of both boys and girls on the same ward has not given rise to any serious sexual problems. Free visiting is encouraged, and close communication among the patients, parents, and staff is an important feature of ward routine.

Since the ward opened there have been six deaths from neoplastic disease. These patients seemed to benefit from the privacy of the bedrooms but also appreciated having friends and recreational facilities close at hand. Although bereavement has not been a problem, the other patients are clearly sensitive to the needs of the terminally ill patient. When a patient dies the others are often quiet for several days; they then mention it to the nursing staff and say how sorry they are to hear what has happened. Later a general discussion of death often takes place among themselves.

Nursing staff

The ward is under the direct supervision of an experienced sister trained in paediatrics and with a special interest in adolescent problems. During the day the staff complement is made up from one full-time and two part-time staff nurses and seven student nurses undertaking paediatric experience as part of their general training. The night duty is covered by two part-time sisters, four part-time staff nurses, and two student nurses. There is always a qualified nurse on duty.

A wide range of medical and surgical problems demands a high level of different nursing skills but in return this offers good experience of various diseases, which the trainee nurse is likely to encounter in both adult and paediatric practice. Total patient care is practised, although the intensity of nursing care needed varies, as some patients are mobile while others are confined to bed. The nature of the ward may engage the nurse in other activities apart from conventional nursing duties, and she may join in the social activities of the patients, usually as an organiser.

Use by specialist department

Most medical and surgical specialties have developed their own centralised units equipped to deal with their own specific problems. This raises the question of whether a ward based on age grouping can provide the necessary skills to deal with so many different specialties. To assess this a group of neurological patients was studied in more detail.

NEUROLOGICAL PATIENTS

In 1976, 33 neurological patients were admitted to the adolescent ward. Although this was only a small proportion (3%) of the total neurological admissions, it represented 90% of the adolescent neuro-

logical patients requiring admission. This group was in no way selected and included both elective and urgent admissions (17%). The average age was 13.8 and the average stay 7.9 days; they accounted for 8% of admissions to the adolescent ward.

The commonest reason for admission was to investigate fits or blackouts (60%), often of an unusual type. For these patients the adolescent ward proved of great value. Often only a brief stay was necessary to characterise the nature of the attack, and the staff have developed great skill in assessing the role of emotional and psychological factors, which often play a part in this type of patient. The second commonest problem was headaches (17%) and the remainder had a wide spectrum of neurological disability, including muscle and peripheral nerve disorders, subnormality, movement disorders, myasthenia, and multiple sclerosis. The neurological management was efficient and all types of neurological investigations, both invasive and non-invasive, were performed in a routine manner. It was ward policy to put special emphasis on discussing the nature of any investigation or medication with the patient and the parents.

The main advantage of the ward for the specialist is that it provides a pleasant and enthusiastic atmosphere that allows the younger patients to mix together socially and removes much of the fear of coming into hospital. A further advantage for some specialties such as neurology and rheumatology is that it separates the impressionable adolescent from the more severely handicapped and crippled patients on the adult ward.

Discussion

The main purpose of an adolescent ward is to provide facilities for young patients who would otherwise be admitted on to adult wards.¹⁻⁷ A ward of this type can function efficiently and deal with many conditions, but some limitation must be accepted. An adolescent unit cannot be expected to duplicate expensive intensive care equipment, and adolescent psychiatric problems demand their own special unit.⁸

The experience of adolescent wards in America³⁻⁶ is similar to ours. Attention to detail as regards the design of the ward and the ideal mixture of patients is essential if it is to succeed. A mixture of different categories of patients is important for the smooth running and morale of the ward. Not more than 20% of orthopaedic or long-stay patients should be combined with a majority of short-stay patients. Subnormal patients are well accepted but should not occupy more than one or two beds at a time. The versatile design of our ward has solved many of the potential problems. Predictions of problems from mixing the sexes and of vandalism have not been realised.

Initial fears that an age-based unit would not be able to cope with patients from varied specialties have proved unfounded. The ward has proved popular with the medical staff despite the fact that it may be geographically removed from their own departments. We hope that this report will encourage further developments of this type.

We owe special thanks to Mrs Joyce Bolchover, the architect of the ward, for her comments in the architect's report and for permission to reproduce the plan of the ward. We would also like to thank the

physicians and surgeons who have admitted patients to the ward, and in particular Professor J A Davis for his encouragement.

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Today's Treatment

Diseases of the urinary system

Management of chronic renal failure

A C KENNEDY

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The principal diseases responsible for chronic renal failure in Britain are glomerulonephritis, pyelonephritis, polycystic kidney disease, nephrosclerosis, and analgesic nephropathy. In respect of management it is important to realise that there is considerable variation in the rate at which primary renal disorders usually progress. Pyelonephritis tends to progress more slowly than glomerulonephritis, polycystic kidney disease also progresses slowly, and analgesic nephropathy may even improve provided analgesic abuse ceases. Depending on the nature of the primary disorder and on the efficiency with which reversible factors such as hypertension are controlled, the time taken for renal function to fall from the range of moderate impairment to potentially terminal may vary from a few weeks or months to many years.

Rate of progression

The rate of progression may conveniently be followed by relatively simple measurements. Serum creatinine concentration (normal range 35-115 $\mu\text{mol/l}$ (0.4-1.3 mg/100 ml)) is a better index of function than the serum urea concentration (normal range 2.5-7.0 mmol/l (15-42 mg/100 ml) and is much simpler to obtain than serial measurements of glomerular filtration rate (GFR) (normal value 90-125 ml/min). Generally a rise in the serum creatinine concentration to between 150 and 250 $\mu\text{mol/l}$ (1.6-2.8 mg/100 ml) indicates that the GFR has fallen to 50-25 ml/min; 250-700 $\mu\text{mol/l}$ (2.8-7.9 mg/100 ml) corresponds with a GFR between 25 and 10 ml/min; while a serum creatinine concentration of 700 $\mu\text{mol/l}$ (7.9 mg/100 ml) or higher indicates that the GFR is likely to be below 10 ml/min.

Nearly all patients with slowly progressive renal failure have no symptoms related to the renal insufficiency per se until it is quite far advanced—that is, until renal function is reduced to 25% of normal or less. They may, of course, have symptoms related to accompanying problems such as fluid retention and hypertension. Until, therefore, the GFR has fallen to about 25-30 ml/min the management of the patient is essentially a question of identifying and correcting any reversible factors. As the GFR falls to between 30 and 5 ml/min it is also necessary to introduce dietary management and other measures. Once the GFR has fallen to around 5 ml/min it is imperative to take active steps to have the patient assessed for suitability for maintenance dialysis and transplantation if this has not already been done, and to make appropriate plans such as the creation of an arteriovenous fistula if the patient is suitable.

Reversible factors

The most important of the reversible factors in patients with chronic renal failure, no matter what the level of renal function, are as follows.

Obstruction within the urinary passages due, for example, to prostatic enlargement or renal stones, should always be considered. Clinical appraisal should usually be augmented by radiography. High-dose infusion pyelography has obviated the need in most cases for retrograde pyelography even in patients in whom renal function is seriously impaired.

Analgesic abuse—A careful history should always be taken about analgesic abuse and if present the patient must be advised that continued analgesics, particularly those containing phenacetin, are harmful.

Potentially nephrotoxic drugs—Other potentially nephrotoxic drugs that should be considered both as a possible cause and as an aggravating factor in patients with renal failure include tetracycline, methicillin, amphotericin B, neomycin, gold, and cephaloridine (especially if frusemide is also being given in high dosage).

Dehydration and hyponatraemia—Correction of any water or sodium deficit is extremely important since dehydration and hyponatraemia will further prejudice renal function, often severely. Dehydration may result from intercurrent diarrhoea and vomiting; from excessive use of diuretics; during any intercurrent illness, particularly if it has an infective basis; or during hospital admissions

University Department of Medicine, Royal Infirmary, Glasgow G4 0SF

A C KENNEDY, MD, FRCP, professor