MEDICAL PRACTICE

Hospital Topics

Programmed investigation unit

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Summary

The programmed investigation unit (PIU) is an inpatient unit where a full range of investigational medicine can be organised. It provides the basic minimum nursing care and is suitable for ambulant patients who can care for themselves. Requests for admission to the PIU at the Royal Victoria Infirmary, Newcastle upon Tyne, come directly from clinical units, and the staff of these units perform some of the tests and remain responsible for the patient while she is in the unit. At present the unit caters only for female medical patients. The average waiting time for admission is three weeks, and because the unit now deals with most investigations the waiting time for admission to the female general medical wards has fallen considerably. The staff of the unit have gained expertise in diagnostic methods, while the nurses of general medical wards have been free to concentrate on nursing those patients who need it. Separating patients who need investigations from those on general medical wards seems a logical way of using resources and staff to best effect.

Introduction

A programmed investigation unit (PIU) is a ward used to investigate patients who need minimum nursing care.[1 2] The unit could also be called a minimum care unit though the term PIU is more appropriate as the investigations are specified in detail and are arranged before the patient's admission.

It is common experience that when a patient is admitted to a traditional general ward from the waiting list much time is often wasted before some investigations can be arranged. The amount of time lost depends on many factors: the ward's routine admission, discharge, and weekend policy; the availability of the house staff, registrars, and consultants; the work load of the nursing team; and liaison with other departments. The usual practice of admitting a waiting-list patient when a bed falls vacant does not take into account the convenience of the patient nor does it give adequate opportunity to the staff to plan investigations before the admission. After admission, when the investigations are planned, the commitments of other departments may lead to further delay. Thus it is not surprising to find that the patient stays in hospital much longer than necessary.

A logical solution seems to be to separate patients requiring investigation and to plan these investigations before admission, thereby giving adequate notice to the departments concerned. This in turn reduces the load on the general ward, which can devote more attention to ill patients. With this purpose in view and bearing in mind the experience and advice of a similar unit at the Manchester Royal Infirmary,[1 2] a PIU was set up at the Royal Victoria Infirmary, Newcastle upon Tyne, in 1972.

Accommodation

The unit consists of 10 beds, five for PIU patients and five for a nurses' sick bay, the beds being freely interchangeable. The plan of the unit and its facilities are shown in fig 1.

Patients admitted

The unit operates from Monday to Friday and only female medical patients fit enough not to require active medical or nursing care are

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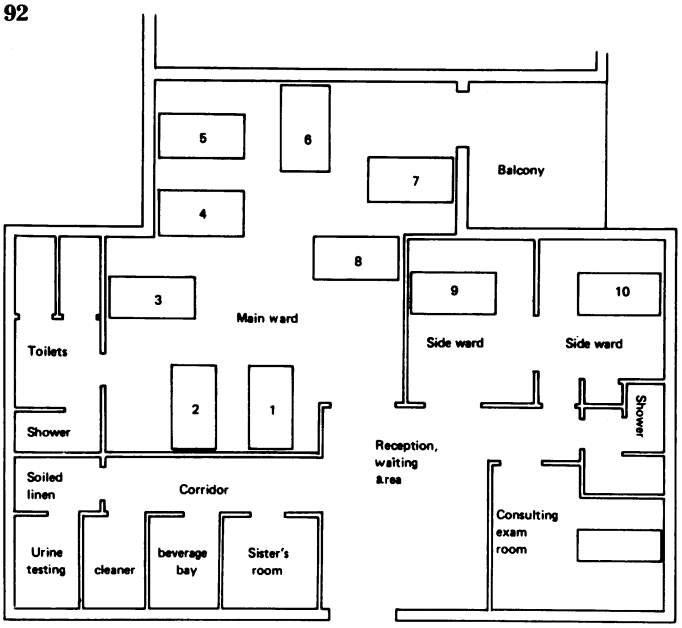

FIG 1—Plan and facilities of programmed investigation unit.

admitted. Traditionally in this hospital the number of medical beds for women is half the number for men, which results in a chronic shortage of medical beds for women. A PIU combined with the nurses' sick bay was a method devised to meet the shortage of female medical beds and to increase the efficiency of investigating such patients. The staff of the adjoining female medical ward are responsible for providing emergency care at night. A bell pull is provided by each bed which rings on the female medical ward, though this facility is rarely used because of the careful selection of the patients admitted and the procedures performed. This arrangement has proved satisfactory; and considering the extra expenditure needed the provision of separate night nursing care does not seem to be justified. The coupling of the PIU and nurses' sick bay has reduced the nursing staff requirements and facilitated overall patient care.

Staffing pattern and responsibilities

Two physicians and a senior nursing officer share in the administration of the unit. The nursing complement of the unit consists of one sister, a staff nurse, and two auxiliary nurses. The sister is the key figure of the unit as she is directly responsible for programming the investigations, performing some of them, interdepartmental communications, and documentation and other routine ward duties. Simple procedures such as injections and collection of blood samples during the day are carried out by the sister. For other investigations —for example, lumbar punctures, bone marrow aspirations, and liver biopsies—the staff of the admitting physician are called on, having been given prior notice.

Working pattern and admission procedure

Beds are not allocated to individual physicians. Requests for admissions are received directly from the clinical units. The doctor requesting such an admission fills in a PIU admission form listing the procedures required and the person designated to perform these and sends it directly to the PIU sister. The admission requests are treated strictly in the order received unless there is an urgent reason for expediting admission. The average waiting time between receipt of the form and admission is three weeks.

Programming procedure

The construction of the programme and organisation of the sequence of investigations are the responsibility of the sister. She ensures that

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
(1) 24-Hour urinary sodium excretion	Fasting renin (recumbent) Post-ambulation renin Frusemide stimulation Book for aldosterone estimation after 5 days' sodium loading	(7) Air encephalogram To medical ward overnight	(8) Blood and urine glucose estimations 7 am; 11 am; 3 pm; 10 pm *X*-ray chest Serum cholesterol Urea and electrolytes (U and Es) Electrocardiogram (ECG)	Consult dietician
(2) Full clerking Full blood count (FBC) Serum folate Plasma proteins and strip Serum iron and transferrin	Sigmoidoscopy and biopsy	Barium enema	^{14}C palmitate breath test Barium follow through if enema is negative	
(3) Coagulation studies FBC/U and Es Liver function tests/bile acids Plasma proteins and strip Liver biopsy (pm)	Fasting and 2-hour post-prandial bile acids Mid-stream urine (MSU) Height and weight	24-Hour creatinine clearance	(9) U and Es Serum calcium (Ca), phosphorus (P), magnesium (Mg), alkaline phosphatase Serum parathyroid hormone (PTH) Calcium absorption test Skeletal survey Bone biopsy	Serum Ca, P, alkaline phosphatase Serum PTH Bone densitometry Plasma 25-hydroxy-cholecalciferol
(4) Full clerking U and Es Haemoglobin (Hb) Protein-bound iodine (PBI) Thyopac-3 Ca, P	Glucose tolerance test (GTT) for blood sugar (BS) and growth hormone (GH) 9-am Plasma cortisol ECG *X*-ray skull, chest, skin, and heel pad	Augmented insulin tolerance test (ITT), thyrotrophin-releasing hormone (TRH) test, luteinising hormone/follicle-stimulating hormone-releasing hormone (LH/FSH-RH) test for cortisol, BS, TSH, LH, FSH, and prolactin Visual fields	(10) Full clerking FBC/ESR Coagulation studies Uric acid, U and Es BS fasting and postprandial	ECG resting and post exercise
(5) Full clerking U and Es *X*-ray chest and skull ECG	Corticotrophin (ACTH) and cortisol at 9 am, 4 pm, and 12 midnight Urinary free cortisol (11-OHCS)	ACTH and cortisol at 9 am, 4 pm, 12 midnight Urinary 11-OHCS	(11) Full clerking FBC/ESR *X*-ray chest ECG	Echocardiography
(6) Renal arteriography	Book for renal vein studies	(12) 24-Hour urinary 17-hydroxycorticosteroids (17-OHCS), 17-ketosteroids (17 KS), 11-OHCS, and pregnanetriol (P_3)	ACTH 80 units intramuscularly Metyrapone 750 mg four-hourly Urinary P_3	Urinary P_3

(1) A case of hypertension and hypokalaemia.
(2) A 70-year-old woman with chronic history of alternating diarrhoea and constipation.
(3) Investigation of liver function after paracetamol overdose.
(4) A suspected case of acromegaly.
(5) A suspected case of Cushing's syndrome.
(6) A suspected case of renovascular hypertension.
(7) A case of enlarged sella turcica with visual field defect.
(8) Assessment of a diabetic patient.
(9) Investigations of a patient with chronic renal failure on haemodialysis complaining of bone pains.
(10) Investigations of a patient with precordial pain.
(11) Investigations of a patient with a cardiac murmur.
(12) A case of hirsutism.

FIG 2—Copy of a typical weekly programming board.

Types of investigations performed in programmed investigation unit 1972-75

Investigations:	Endocrine	Renal	Gastrointestinal	Cardiac	Haematological	Respiratory	Miscellaneous	Total
1972	40	32	26	8	21	8	15	150
1973	52	42	34	10	26	10	16	190
1974	179	25	39	5	18	4	10	280
1976	221	42	42	6	12	2	8	333

there is no interference between the tests and no interaction between the test and the patient's treatment. The admitting physician retains responsibility for the care of the patient and, as a rule, a member of his clinical team performs the tests beyond the professional scope of the sister. Once the investigations have been programmed a date convenient to the patient is arranged. The programme is displayed on a board (fig 2).

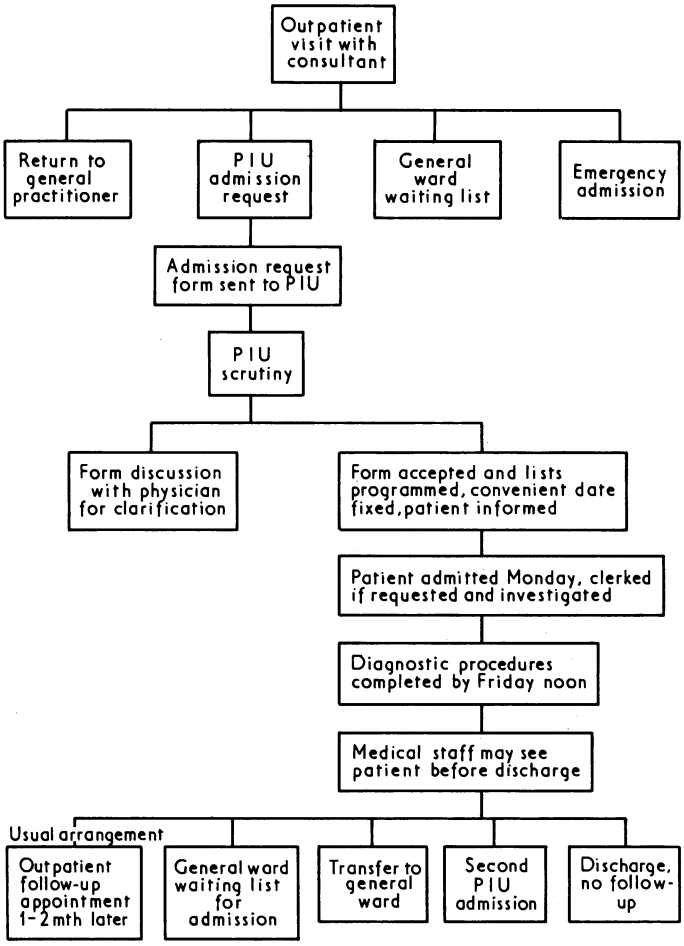

FIG 3—Flow chart of programmed investigation unit admissions.

Ward routine

The patients are usually asked to arrive on the ward on Monday morning. The nature and sequence of investigations and the time of discharge are indicated to the patient. They may or may not be clerked by the medical staff, depending on the request of the admitting physician already indicated on the PIU form. A set of protocols with full details of all the tests performed on the unit is available with the sister for reference. She ensures proper labelling and prompt dispatch of the samples and the receipt of laboratory reports. Some of the patients stay from Monday to Friday, whereas others may be discharged earlier, to be replaced by short-stay patients.

Discharge procedure

The investigations are usually completed by noon on Friday, when the admitting physician may visit the unit to review the case in the light of available results and to decide if any change is required in the discharge instructions already given on the PIU admission request form. Since many results are not available at the time of discharge it is usual to arrange an outpatient appointment one or two months later (fig 3).

Work load

The unit closes down during Easter, Christmas, and the summer holidays for a total of six weeks in the year. The unit is fully occupied for the rest of the year and the number of admissions is increasing annually (see table). Although the endocrine unit is the major user of PIU, various other units find the facilities helpful. The tests performed include air encephalography, barium studies, cholecystography, angiography, venography, and other radiological studies, catheterisations, cannulations, lumbar punctures, electroencephalography, sigmoidoscopies, test meals, tissue biopsies, serial blood pressure recordings, glucose and insulin tolerance tests, circadian plasma 11-hydroxycorticosteroids (11-OHCS) estimation, tests of the hypothalamic-pituitary-thyroid/adrenal/gonadal axes, blood gas estimation, and respiratory function tests, etc. The height and weight of each patient is recorded and routine urine analysis performed. In view of the lack of overnight nursing care, patients subjected to such procedures as air encephalography are usually transferred to a female medical ward overnight by prior arrangement.

Discussion

The unit has proved its value from the start. Having taken over most of the investigations, it has considerably reduced the waiting lists for the general female medical wards. It is in constant touch with other departments and has established a healthy co-operative team spirit. Over the last four years it has gained wide experience and expertise in diagnostic methods and can ensure the rapid and reliable performance of investigations in a compatible sequence without interaction and interference between different tests. Patients are admitted when it is convenient for them and they are placed under minimum restrictions. Their stay in the unit is usually relaxed, without the usual tensions of most hospital wards. As arranged here the PIU has its limitations. There is no provision for nursing care at night, a deficiency which necessitates the transfer of a few patients to a general ward for overnight nursing care after certain procedures. Secondly, the unit as structured cannot provide for the investigations of male medical and surgical patients. These limitations can easily be overcome, as at the Manchester Royal Infirmary, where the PIU consists of 26 beds, and all types of patients can be investigated.

Conclusions—The programmed investigation unit provides a practical and economical alternative to the traditional pattern of management of waiting list patients in which the availability of the beds is the major factor that determines the admission of the patients. It relieves the general ward nursing staff of investigational procedures and allows them to concentrate on nursing their ill patients. It seems logical to regroup hospital patients into intensive care units, traditional general units, and PIUs.

References

[1] Longson, D, and Young, B, *British Medical Journal*, 1973, **4**, 528.
[2] Longson, D, and Young, B, *Nursing Times*, 1974, **70**, 1322.