MEDICAL PRACTICE

*Clinical Topics***A five-day ward as part of a comprehensive surgical service**

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Abstract

The role of a five-day ward was examined as part of an audit of the work of a general surgical unit. The four levels of care for elective operations were main ward, five-day ward, major day care, and minor day care. In a prospective study 2000 consecutive patients were followed through their hospital courses from the first referral to the surgical clinic to the postoperative follow-up visit. The aim was to measure the surgical needs of this population and to determine the rates of success or failure in carrying through the planned care. One thousand and forty-five (52%) of the referred patients were put on waiting lists, and of these, 975 (93%) completed their hospital course within the two years of the study. The surgeons chose five-day ward care for 28% of the patients, major and minor day care for 8% and 33% respectively, leaving only 30% who were judged to require care in the main ward. Selections were validated by postoperative interview, which showed that 82% had followed the expected hospital course, and by monitoring deviations from planned care. Four per cent of the five-day ward patients required transfer to the main ward and 3.3% required readmission. Patients managed in the five-day ward were on average younger and the conditions less urgent than those in the main ward. We conclude that a five-day ward can fulfil a large and important part of a general surgical service provided that its function is closely integrated with other parts of the service and that patients are accurately assessed in the outpatient clinic.

Introduction

Specialised systems of surgical management widely adopted in recent years to improve the quality of care and make better use of resources include units for intensive care, emergency admission, postoperative recovery, programmed investigation, five-day care, and day care. What is the role of such units, and in what proportions should they be provided in a typical surgical service? In old hospitals all or most of these specialised functions still take place within the conventional acute ward or are provided by new extensions, or by converting existing wards whose dimensions and staffing are inevitably governed by expedience rather than planning. New hospitals usually include these facilities but in widely varying proportions, and they have commonly been designed with little concept of the function of individual units as components of the service as a whole.

Planners are not entirely to be blamed since few surgical teams appear to have experience of using a full range of facilities. We are not aware of previous studies in which authors have sought to measure prospectively in a surgical population the appropriate proportion of each type of provision.

At the Western General Hospital recently an opportunity arose to make such a study in respect of the elective part of the service. The ingredients were: (1) a teaching hospital that functions as a district general hospital, (2) one general surgical unit, providing *all* the care for the referred surgical population, (3) staff accustomed to working jointly agreed policies of management, and (4) four distinct levels of care that had evolved in the unit in recent years. These were main ward, five-day ward (established in 1975), major day care^{1 2} (established in 1970), and minor day surgery—the traditional type of minor outpatient surgery.

The existence of several alternative levels of care introduces a new element of decision making in the surgical outpatient clinic. Indeed, efficient use of hospital facilities implies a quite radical change in the way in which clinics function.

Activities commonly left until the time of admission now have to take place in the clinic. Patients need to be carefully assessed

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(to help this, at the Western General, we had previously introduced a system of patient self-assessment). History taking, a basic minimum of physical examination and investigations, and clerking are necessary to allow selection of the correct level of care and also to minimise preoperative stay. Where postoperative care in the community is part of the plan—as in five-day or major day care—the patient's social history is important. Not only is it necessary for the correct level of care to be selected but, if beds are to be efficiently used, there must also be a reliable forecast of the duration of postoperative stay. This is particularly important for the five-day ward in which patients needing four days of postoperative care must have their operations on a Monday while those needing a shorter stay can be admitted later in the week.

We seek to illustrate and define the role of each level of care in a general surgical service. Particular emphasis is placed on the five-day ward, since this type of unit has received scant attention in comparison with, for example, systems of day care.

Facilities

Day surgery was carried out in the hospital's 24-bedded day bed unit. General surgery was allocated an average of five beds on three mornings a week.

The number of beds in the five-day ward was arbitrarily chosen as 10 before this project. Men and women were admitted on alternate weeks. Operating lists were carried out on Monday and Wednesday afternoons. This ward was primarily intended for elective general surgical patients, although other specialties, such as orthopaedics and cardiology, admitted patients when spare beds were available.

The main unit comprised 36 acute beds. On one day a week the unit provided the emergency on-call service for the Edinburgh area, which meant that the staff were unable to count on beds being available for planned elective admissions—a strong incentive to the establishment of separate short-stay facilities.

Methods

Consecutive patients newly referred to the general surgical clinics of the hospital were included. All four consultant surgeons and their junior staff took part.

Data were recorded on separate proforma for each stage of the patient's progress: new referral, subsequent clinic visits, hospital stay, operation, and postoperative follow-up clinic. All essentially clinical information was recorded by surgeons, the remainder by a research nurse (CC) who attended clinics, interviewed patients separately, and monitored the patient's progress as an inpatient. Data were analysed by means of punched feature cards and by computer.

Surgeons agreed to adhere to the previously established policy in the unit, which was to select for each patient the degree of urgency and the simplest level of care consistent with surgical need, convenience, and safety. The proposed plan of management was fully discussed with the patient. The surgeon was asked to record his reasons for selecting a particular level of care—which, in practice, meant his reasons for not selecting a lower level—and to record his estimate of the duration of postoperative stay. The research records were kept separate from the clinical records so that later decisions on medical management were made without knowledge of the previous forecasts. The patient's hospital course having been completed, he or she was interviewed again at the follow-up clinic.

Results

Two thousand patients were referred to the general surgical clinics over a period of ten months (April 1977 to January 1978): 1045 were put on the waiting list for operation. The study was continued for a further 14 months within which time 975 of those listed completed their hospital course.

LEVELS OF CARE

Of the 1045 listed for operations, 316 (30%) were regarded as needing care in the main surgical ward, 297 (28%) were allocated to the

five-day ward, 83 (8%) to major day care, and 349 (33%) to minor day care.

The main factors that determined the choices were medical in 88%, social in 9%, and psychological—for instance, anxiety or a psychiatric history—in 3%.

To illustrate the distribution of cases among the four levels of care several of the most common operations have been listed in table I. Points of interest include: 11% of cholecystectomies and 18% of mastectomies were performed in the five-day ward, only 29% of herniorrhaphies and 6% of vein operations required admission to the main ward, and most procedures for haemorrhoids (68%) were carried out on an outpatient basis.

TABLE I—Care allocations of patients with selected diagnoses/operations

	Main ward	5-day	Major day	Minor day
Large bowel resection	12 (100%)			
Cholecystectomy	57 (89%)	7 (11%)		
Repair of inguinal or femoral hernia	29 (29%)	59 (60%)	11 (11%)	
Simple mastectomy	18 (82%)	4 (18%)		
Breast biopsy	2 (14%)	5 (36%)		7 (50%)
Varicose veins (ligations ± stripping)	11 (6%)	70 (41%)	69 (40%)	22 (13%)
Haemorrhoids				
Haemorrhoidectomy	5 (9%)	13 (23%)		38 (68%)
Cryotherapy/Lord's				

IS THIS A TYPICAL GENERAL SURGICAL POPULATION?

To what extent could the experience of this unit be applied to surgery in general? Table II lists the eight commonest elective general surgical operations in Scotland.³ We have omitted appendicectomy (emergency—ranked 2), laparotomy (ranked 4) as being too non-specific, and cystoscopy (ranked 7) as our series included no urology. The equivalent figures for the Lothians area and for this study have been included in the table and expressed as a percentage of the total cases in each column to assist comparability.

TABLE II—Commonest elective surgical operations in Scotland.³ (Percentages in parentheses)

Operation	Scotland (1977)	Lothians (1977)	This study†
Hernia repair	5 490 (24)	882 (22)	83 (23)
Cholecystectomy	5 319 (23)	948 (24)	59 (16)
Varicose veins	4 327 (19)	967 (24)	139 (38)
Breast biopsy	1 717 (8)	182 (5)	34 (9)
Mastectomy	1 672 (7)	262 (7)	18 (5)
Haemorrhoidectomy	1 648 (7)	280 (7)	9 (2)
Large bowel resection	1 456 (6)	265 (7)	12 (3)
Vagotomy with other gastric operation	1 281 (6)	193 (5)	12 (3)
	22 910 (100%)	3979 (100%)	366 (100%)

†These patients comprise those who have been discharged after operation.

The series are broadly similar. This study included smaller percentages of major abdominal surgery (cholecystectomy, large bowel resection, vagotomy) and a larger percentage of varicose vein operations than pertained nationally and in the area. This tends to bias the management at the Western General in favour of day care and short stay. This trend is countered by the omission of urology, most of whose procedures are minor (cystoscopies) and the inclusion of 22 major arterial operations, which were all managed in the main ward.

AGE, SEX, AND LEVEL OF CARE

Table III shows the age distribution in the whole series together with proportions allocated to the waiting lists. In the younger age groups most patients were treated surgically. With rising age the proportion listed for operation progressively fell, so that above the age of 75 the proportion was 36%. The figure shows the age and sex expressed as a percentage of the patients at each level of care. The greater proportion of older patients were in the main wards where 45% were over 55 as compared with the five-day ward and day care groups,

TABLE III—Age distribution in whole series with proportions allocated to waiting list

Age	Total referred	Waiting list
<24	273	161 (59%)
25-34	298	169 (56%)
35-44	344	180 (52%)
45-54	334	182 (54%)
55-64	328	174 (53%)
65-74	286	130 (45%)
75-84	124	43 (35%)
≥85	13	6 (46%)

Age and sex distribution of patients at each level of surgical care.

which showed only 20% above this age. This gradation is due in part to the different severity of age-related diseases and in part to the unsuitability on general medical, social, or psychological grounds of elderly patients for short stay or outpatient surgery.

There are also pronounced sex differences within each level of care, mainly explicable in terms of patterns of disease presentation. For example, the predominance of women in the age range 45-54 in the major day care group may be related to the frequency with which varicose veins require treatment in women at this age.

THE FIVE-DAY WARD

Accurate selection and forecasting of duration of stay proved to be particularly important for the five-day ward. Table I lists examples of operations performed at each level of care. In the five-day ward herniorrhaphy and varicose vein surgery, in patients unsuitable for day care, were the biggest groups. Other operations successfully managed in the five-day ward, in selected patients, have included cholecystectomy, highly selective vagotomy, thyroidectomy, carotid endarterectomy, simple mastectomy, and haemorrhoidectomy. As table IV shows it was important to have the "back-up" of the main ward for the patients who required a longer stay than expected. Of the 16 whose discharge was delayed, nine were transferred to the main ward.

OUTCOME

Three patients died during the period of study. Nine hundred and seventy-five patients were put on waiting lists and completed their hospital course. Most of those who underwent minor outpatient operations were discharged to the care of their general practitioners—it being unit policy not to bring these patients back to a follow-up clinic unless a problem was expected or reported. The remaining 662 were interviewed about two weeks after discharge from hospital. The percentage of patients completely followed up was 93% for the main ward, five-day, and major day care groups and 34% for the minor day care group.

In reply to the question, "Did the care go according to plan?" the answer was "no" in 122 (18%) (table IV). Of these, 82 had stayed in

TABLE IV—Number (percentage) of patients who needed a longer stay in hospital than expected

	Main ward (n = 228)	Five day (n = 239)	Day care Major (n = 76)	Minor (n = 119)	Total (n = 662)
Delayed discharge	64 (28)	16 (6.7)	1 (1.3)	1 (0.8)	82
Readmitted	5 (2.2)	8 (3.3)	1 (1.3)	0	14
Extra hospital visits	5 (2.2)	1 (0.4)	0	0	6
Other change of plan	6 (2.6)	8 (3.3)	2 (2.6)	4 (3.4)	20
Total "problems"	80 (35)	33 (14)	4 (5)	5 (4)	122 (18)

hospital longer than the surgeon had forecast, of whom 11 (2.5%) had required transfer to a higher level of care—nine from five-day care to main ward, one from day care to five-day ward, and one from minor outpatient to day care. Fourteen (2.0%) had required re-admission, six (0.9%) required unscheduled outpatient visits to the hospital for extra dressings or assessment, and 20 (3.0%) experienced some other change of plan, such as postponement or cancellation of operation or an operation different from that originally envisaged. These figures are expressed as percentages of the relevant groups—that is, delayed discharge is expressed as a percentage of the 467 inpatients; transfer to higher level of care as a percentage of 434 five-day and day care patients; and the remaining categories as a percentage of all operations. Table IV shows these deviations from plan in relation to the level of care. Nine five-day patients (3.8%) required transfer to the main ward, eight (3.3%) were re-admitted, and a further eight (3.3%) had some other change of plan. Of the total of 122 patients whose care did not go according to plan the cause was postoperative complications in 54 (44%). In the remainder it was due to a wide variety of administrative and other factors.

The outcome has been related to various factors such as age, sex, and the experience of the surgeon. To simplify the tabulations the various indices of failure of the operation to go according to plan, such as delayed discharge or transfer to a higher level of care, have been grouped together in the tables as "a problem."

There was no difference in the sex incidence of postoperative problems. Table V illustrates the steadily rising incidence of problems

TABLE V—Age and outcome. (Percentages in parentheses)

Age (yr)	No problem	Problem*	Total
5-14	6 (100)	0	6
15-24	47 (96)	2 (4)	49
25-34	71 (89)	9 (11)	80
35-44	96 (83)	19 (17)	115
45-54	100 (81)	24 (19)	124
55-64	102 (79)	27 (21)	129
65-74	81 (73)	30 (27)	111
75-84	32 (76)	10 (24)	42
≥85	3 (75)	1 (25)	4
Not known	2	—	2
	540	122	662

*Problem refers to deviations from plan as enumerated in table IV.

with age. The predominance of major operations and longer stay in hospital in the older age groups has been mentioned earlier.

In table VI the postoperative problem rate is related to the seniority of the operating surgeon. The figures as presented may reflect no more than the fact that the more senior surgeons carried out the more

serious operations. For example, the 294 operations carried out by the senior house officer were predominantly minor day care procedures. For a morbidity audit designed to evaluate surgical performance, larger numbers of operations would be required with comparison of outcome in similar homogeneous groups of operations

TABLE VI—Postoperative problems related to the seniority of the surgeon

	No problem	Problem*	Total
Consultant	112 (69%)	51 (31%)	163
Senior registrar	66 (82%)	14 (18%)	80
Registrar	64 (65%)	34 (35%)	98
Senior house officer	271 (92%)	23 (8%)	294
Not recorded	27	—	27
	540	122 (18%)	662

*Problem refers to deviations from plan enumerated in table IV.

FORECAST OF DURATION OF STAY

Of the 503 patients who underwent operations in either the main ward or the five-day ward, the surgeon had committed himself to a forecast of the duration of postoperative stay in 382 (76%). Follow-up showed that 181 (36%) were discharged on the day forecast, 307 (63%) discharged within a day on either side of the forecasts, and 377 (75%) within two days.

ADMINISTRATIVE ASPECTS

Although this was not designed as a study of the use of resources, several relevant observations were made. During the course of the project the waiting list for the main ward fell from over 300 to under 100. There were no long waiting lists for day surgery or short stay; patients could be given a date for their operation when they attended the clinic. The mean duration of stay was 10 days in the main ward and two days in the five-day ward. While the main ward ran at a bed occupancy of over 75%, the five-day ward averaged around 50%. It was therefore decided that the arbitrarily chosen size of 10 beds for the five-day ward was larger than was required for the population, so that when the ward was upgraded at the end of the study the number of beds was reduced from 10 to eight, since when the occupancy rates have risen.

Discussion

No unit can be said to be absolutely typical of the national pattern in terms of its work load or its methods of managing particular diseases. Every general surgeon specialises to some degree—and increasingly so. This unit included a vascular interest and excluded urology and complex gastrointestinal problems, which were dealt with by specialised adjacent units. In other respects we believe the referred surgical population and therefore the pattern of work to be broadly similar in scope and severity to that experienced by general surgeons throughout Britain.

We have shown that 70% of the patients requiring surgical operations in this survey were judged not to need admission to a main surgical ward and that the decisions were borne out by a low "error" rate as reflected by delayed discharges, transfers to higher level of care, readmission, or unscheduled return visits to hospital.

The five-day ward accommodated 28% of the patients including selected patients undergoing relatively major procedures such as cholecystectomy, vagotomy, mastectomy, and subtotal thyroidectomy. Operations for which five-day care is ideally suited include herniorrhaphy, ligation and stripping of varicose veins (if day care is contraindicated), haemorrhoidectomy, operations on the genitalia (such as excision of hydrocele), and elective appendicectomy. Clues to relative levels of dependency and therefore nursing requirements were provided by the findings that, as compared with the five-day ward, the main ward population was on average older and included a higher propor-

tion of urgent cases. The greatest impact of the elderly on acute services, both medical and surgical, is, of course, not among the elective admissions that were the subject of this study but among emergency admissions.

This study suggests that hospital inpatient facilities for elective surgery could be used very much more efficiently than is the rule at present. Crucial to such a change is a new approach to the use of outpatient clinics whereby the patient is clerked, examined, investigated, and prepared for operation before admission to a level of care selected for his or her individual needs. Except for the most serious or complex operations the patient can be advised of the probable course and the duration of hospital stay to a high level of accuracy.

In some hospitals day care or short-stay facilities have been established as independent units, geographically and administratively separate from inpatient units. This has been taken to its furthest extreme in the United States, where centres have been established to cater solely for ambulatory surgery.⁴ It is important to emphasise that in isolation neither a five-day ward nor a day care unit could safely provide care of the scope described in this study. Each tier of care provides a margin of safety for the one below. Indeed, it is the integration of the system that is its strength and which ensures the most effective use of the facilities.

Such a system, in our view, works best if the various facilities are geographically close to each other, administered in close liaison one with the other, and staffed by surgeons and nurses who are ready to adopt common aims and policies.

Economies made in the short-stay and day care wards allow staff, especially nurses, to be concentrated in the areas of greatest need with improved quality of care for seriously ill patients. The addition of short stay or day care to an existing surgical service effects no economies unless there is an equivalent reduction in the number of full-time beds.

A five-day ward is at its busiest in midweek. Like most units providing beds for a specific type or intensity of care it tends to run at a lower bed occupancy than an acute ward. Occupancy, however, is not a measure of efficiency unless taken in conjunction with other measurements, such as duration of stay and throughput. In our experience the limitation on the use of beds is set by the availability of staff and theatre sessions.

It is possible to calculate, for a particular surgical population, the appropriate number of beds at each level of care. Each hospital and each referred population will differ in ways that may make the approach outlined in this study more or less appropriate. That the potential of short-stay and day care surgery is underdeveloped there can be no doubt. The most important ingredient is a hospital environment, human and physical, that can adapt in a flexible way to the patient's needs as medicine and surgery evolve.

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