Process and Outcome

Surgical audit : Comparison of the work load and results of two hospitals in the same district

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Summary and conclusions

Surgical audit is being undertaken to monitor and compare (by computer) the type of patient, work load, and results of two similar surgical units. Both units are in the City and Hackney District of London, one at St Bartholomew's Hospital and the other at Hackney Hospital. During 1978, 736 patients were admitted by the unit at St Bartholomew's Hospital and 902 by the unit at Hackney. At St Bartholomew's 70% of admissions were elective compared with 49% at Hackney, where 86% of patients lived within the district compared with only 36% at St Bartholomew's. The wound was the commonest site for complications, infection affecting 9% of those at Hackney and 6% at St Bartholomew's, despite identical antibiotic policies. There were six post-operative deaths at St Bartholomew's and 32 at Hackney. In both hospitals the length of stay was similar, 50% of patients being discharged within one week and 80% within two weeks. As a result of the audit a vigorous venous thrombosis prophylactic regimen has been instituted, and at Hackney the anaesthetic department has been strengthened and a new intensive care unit opened.

Introduction

The clamour for medical audit in Britain in both the medical and lay press is increasing, and was the subject of a hotly debated motion at the last Annual Representative Meeting of the BMA.[1] Audit for the clinician has been best defined by Dudley as "that process of self-assessment in qualitative and quantitative terms which enables him to say 'I have handled this patient or group of patients in an appropriate way.' "[2] The word audit, however, still strikes fear into the hearts of most doctors in this country, since most consider it to be a method of assessment by outsiders of their work load, efficiency, and results.

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In these days of stringency and health care curtailment we considered it important to record our own performance, particularly since few data regarding patient care and cost effectiveness exist in our district. Surgical audit of the type described by Dudley has therefore been undertaken to compare and contrast the type of patient, work load, and results of two similar firms in the same district. We report the results of the first year of this study.

Method

Throughout 1978 an audit was compiled on all patients admitted to two surgical firms, one at St Bartholomew's Hospital (32 beds) and the other at Hackney Hospital (35 beds), both hospitals being within the City and Hackney District of the City and East London Area Health Authority (Teaching). Each firm is under the direction of two consultants, one being common to both.

On admission each patient was allocated a code number. Information regarding name, age, sex, domicile, type of complaint, details of operation, complications, if any, duration of stay in hospital, and type of disposal was recorded, coded, and transferred on to computer for subsequent analysis.

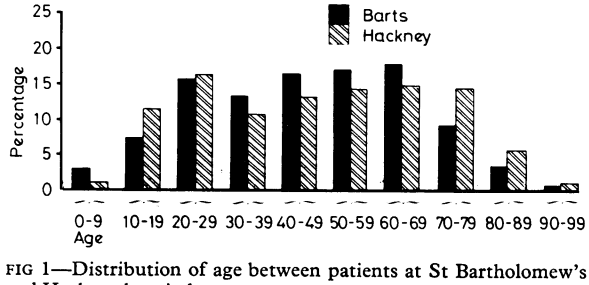

FIG 1—Distribution of age between patients at St Bartholomew's and Hackney hospitals.

Results

PATIENTS

There were 1638 admissions—736 to the firm at St Bartholomew's and 902 to Hackney. At St Bartholomew's 70% of the admissions were elective, whereas at Hackney 51% of all admissions were emergencies. In both hospitals 52% of the patients were men. In both firms emergency admissions were commonest in the under 20-year-old age group and also in the over-70s. For the group aged 20-29 twice as many of the inpatients at Hackney were emergency cases compared with those at St Bartholomew's (58% and 29% respectively). Of admissions to Hackney, 21% were aged over 70 years compared with 12% at St Bartholomew's (fig 1). The number of admissions was fairly

constant throughout the year, January, April, and May being the busiest months and December the quietest.

An analysis of the patients' place of residence (fig 2) shows that 86% of those admitted to Hackney lived within the district compared with only 36% of those admitted to St Bartholomew's. A considerable difference is again seen in cases being admitted to the firms from outside the London area—32% of patients at St Bartholomew's compared with only 3% at Hackney.

FIG 2—Comparison of catchment areas for patients at St Bartholomew's and Hackney hospitals.

MANAGEMENT

Conservative

Of the patients admitted, 491 (30%) did not require surgery. At Hackney 36% of admissions came in this category compared with 23% at St Bartholomew's. Investigations for abdominal pain were the commonest cause for admission without surgery, followed by head injuries and soft tissue trauma (table I).

TABLE I—*Comparison between the types of non-operative admissions at St Bartholomew's and Hackney hospitals*

	No and % of total No of non-operative cases			
	St Bartholomew's		Hackney	
	No	%	No	%
Head injury	30	18	52	16
Investigation of abdominal pain	73	43	131	40
Trauma (non-head)	8	5	30	9
Terminal care	17	10	4	1
Infection	11	7	21	7
Skin ulcer	3	2	6	2
Other conditions	26	15	79	25
Total	168 of 736 admissions		323 of 902 admissions	

Surgical

At St Bartholomew's 568 (77%) of the patients admitted underwent surgery, but only 5% required an emergency procedure. The comparable figures at Hackney Hospital were 578 (64%) and 13% respectively. Table II gives the number and types of operation undertaken. A total of 445 operations was performed on the gastrointestinal tract, 234 at St Bartholomew's and 211 at Hackney. At St Bartholomew's, the senior registrar performed 37% of all the operations, whereas at Hackney the registrar performed 49% of the total.

Seven hundred of the operations, 60% in each hospital, were classified as clean procedures, when no hollow viscus was opened. There were 265 potentially contaminated operations, when a hollow viscus was incised or resected. In 120 operations (10%) there was peritonitis, and in 61 (5%) an abscess or pus was encountered. At Hackney 124 patients came in these latter categories compared with only 57 at St Bartholomew's. Perioperative (three dose) antibiotic prophylaxis, starting with the induction of anaesthesia, was used in 219 patients who were considered to have a high risk of developing postoperative infections. The detailed results of an identical antibiotic policy adhered to in both hospitals will be reported elsewhere.

TABLE II—*Types of operations performed at St Bartholomew's and Hackney hospitals*

Site of operation	No of patients undergoing operation	
	St Bartholomew's	Hackney
Oesophagus, stomach, and duodenum	27	31
Small intestine	32	11
Colon and rectum	65	38
Anus	42	36
Biliary, hepatic, or pancreatic	55	40
Appendix	13	53
Breast	39	30
Salivary glands and thyroid	13	8
Vascular surgery and varicose veins	50	35
Hernia	97	64
Testes, scrotum, or penis	27	28
Skin lesions	81	49
Endoscopy	6	59

COMPLICATIONS AND DEATHS

Of the 1146 patients operated on, 982 made an uninterrupted recovery. The wound was the commonest site for complications, infection affecting 9% of those at Hackney and 6% of those at St Bartholomew's. Of patients undergoing surgery at St Bartholomew's, 3% developed other complications, mainly respiratory, compared with 11% at Hackney, where the incidence of respiratory, cardiac, and thrombotic complications was greater (table III).

TABLE III—*Incidence of postoperative complications*

	No of complications and % of total No of operative patients			
	St Bartholomew's		Hackney	
	No	%	No	%
Without complications	524	92	472	82
Wound complications	32	6	53	9
Respiratory	10	2	26	4
Cardiac	0	—	17	3
Deep-vien thrombosis/pulmonary embolism	1	—	6	1
Urinary	4	1	11	2
Sepsis (other than wound)	4	1	11	2

During the year six patients died after operation at St Bartholomew's and 32 at Hackney. At St Bartholomew's two died of carcinomatosis, three of bronchopneumonia, and one of a pulmonary embolus. At Hackney five died of carcinomatosis, 11 of bronchopneumonia, 12 of cardiac complications, and four from generalised sepsis after emergency surgery.

Deaths for non-operative cases included 15 at St Bartholomew's and 13 at Hackney, most of these being admitted for terminal care.

DURATION OF STAY AND DISPOSAL

In most respects the duration of inpatient care was similar in both hospitals. Over 50% of patients were discharged within a week and 80% within two weeks, 3% at Hackney Hospital and 2% at St Bartholomew's stayed more than six weeks. Table IV shows what happened to the patients after their stay in hospital: 96% of patients in St Bartholomew's went directly home compared with 83% at Hackney. Only three patients (0·4%) were transferred from St Bartholomew's to another hospital or department compared with 84 (9·3%) at Hackney.

TABLE IV—*Disposal patterns at St Bartholomew's and Hackney hospitals*

	No and % total Nos of patients			
	St Bartholomew's (n = 736)		Hackney (n = 902)	
	No	%	No	%
Home	710	96·5	751	83·5
Convalescence	0	—	9	1·0
Death	20	3·0	40	4·5
Institution	3	0·5	10	1·0
Geriatric	0	—	8	1·0
Transfer to another hospital	3	0·5	84	9·5

Discussion

The establishment of audit allows and encourages critical assessment of patient care, the unit itself, and individual performances. It also highlights strengths and weaknesses and encourages necessary changes. Audit enables comparisons to be made between different hospitals and units and also within the same department from year to year. At a time of high inflation we can thus monitor the effect of financial restrictions on patient care.

For an audit to be accurate it is important to record details of patient's care and complications as they occur. Preferably this should be done by one person so that facts are characterised uniformly for the computer. In our audit data are coded on to computer sheets by the same person at both hospitals, and thus the allocation of information to the various categories is controlled, and we hope that erroneous conclusions are avoided.

The results of the audit indicate that St Bartholomew's and Hackney hospitals are complementary both in terms of patient care and for undergraduate and postgraduate teaching purposes. Because of its geographical location within the district, Hackney deals with more local people, has more emergency admissions, and thus does more emergency surgery. The siting of the hospital also accounts for the higher incidence of trauma and older patients. That the registrar at Hackney did a greater percentage of the operations than the registrar at St Bartholomew's reflects the emergency work load and is related to the fact that the unit is on duty more frequently.

At St Bartholomew's only one-third of the patients lived within the district and one-third came from outside London. The reasons for this are again partly geographical. St Bartholomew's Hospital is on the edge of the district and within the City of London, into which two million people commute each day. Several patients were referred from outside London for specialised gastrointestinal surgery. In addition some patients from outside the district were referred by other specialist units within the hospital. The main reason why the incidence of postoperative complications was higher at Hackney than at St Bartholomew's (table III) was the greater number of older patients with advanced disease undergoing emergency procedures.

Three changes have resulted from our audit over the year 1978. Because there were five clearly documented cases of massive pulmonary embolism at Hackney during the year, a vigorous prophylactic regimen has now been instituted. Electronic garters, which deliver a regular galvanic stimulus, have been purchased and are now used on every patient undergoing intermediate or major surgery. In addition, those aged over 40 are given calcium heparin (5000 units, twice daily) from the time of premedication until the patient is ambulant. Many patients with urological problems were transferred from Hackney to other hospitals. These required specialised urological treatment, and this had led to the appointment of a four-session consultant urologist at Hackney. The higher incidence of postoperative respiratory and cardiac problems at Hackney has led to a strengthening of the anaesthetic department, both at consultant and registrar level, and the opening of a new intensive care unit.

Although sceptics may say these changes would have occurred in any case, undoubtedly hard facts speak louder than reminiscences and strengthen any argument. Just as important, however, is the fact that continuous audit, as we have set up, allows a monthly review of the firm's work load and results. This enables the consultant to keep his finger on the pulse of the unit, thus facilitating the early recognition of bradycardia, arrhythmias, or even infarction.

We are exceedingly grateful to the following house surgeons, without whose help this audit would not have been possible: Dr J Kaye, Dr L Newbold, Dr M Samuel, Dr J Frappell, Dr J Glading, Dr J Frame, Dr J Williams, Dr J Ramsay, Dr J Powell, and Dr P Crane.

References

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2 Dudley HAF. Audit and the pathologist. *Proc R Soc Med* 1975;**68**:634.

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A 35-year-old married woman with two children diagnosed 12 years ago as having polycystic ovaries has been treated ever since with ethinyl-oestradiol 0·05 mg daily for 21 days and norethisterone 5 mg for the last five days of this. On this regimen she has a regular though very light period, and her previous occasional and painful periods and hirsuties have been well controlled. She has now asked whether it is safe for her to continue oestrogen treatment. What should I advise?

The endocrine abnormality in polycystic ovarian disease is thought to be increased ovarian production of androgens.[1] As well as causing hirsutism, these androgens are converted by adipose tissue to oestrogens, which act on the pituitary to produce amenorrhoea. Untreated patients are therefore continuously exposed to unopposed oestrogen—which probably explains the increased incidence of endometrial carcinoma observed in this condition. This patient's treatment is designed to suppress ovarian function. Although this could be achieved by oral contraceptives, oestrogen is preferred because prolonged exposure to progestogens (which are mildly androgenic) might exacerbate her hirsutism.[2] Her brief five-day exposure to progestogen each month induces secretory change in the endometrium and allows it to be shed normally at menstruation: so far as we can tell at the moment this regimen should decrease rather than increase her risk of developing endometrial carcinoma.

Although the regimen is not identical with oral contraception, the oestrogen dosage is just the same, and she probably runs exactly the same risks as any woman aged over 35 and taking the pill—a 1 in 5000 mortality from cardiovascular complications.[3] It would be reasonable to advise her to stop treatment and see if her symptoms return—her disease may have remitted spontaneously during the past ten years. If her symptoms do return there is little alternative to her current treatment. Clomiphene is not of proved value in relieving hirsutism, and would require her to use some other form of contraception. Wedge resection of the ovaries is unreliable, and oophorectomy would bring the problems of a premature menopause. Polycystic disease does not influence the age at the menopause, and so going without treatment would mean 15 years of misery and possible complications of her disease. If she is a non-smoker she can be advised that the risks of her continuing treatment are real but slight, and if she is given the facts there is no reason why she should not accept this risk. At least she knows exactly where she stands regarding the risks of her present regimen—unlike many other treatments that we prescribe.

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2 Ginsburg J, Havard CWH. Polycystic ovary syndrome. *Br Med J* 1976;ii:737-40.
3 Vessey MP. Contraceptive methods: risks and benefits. *Br Med J* 1978;ii:721-2.

A patient has suffered from pemphigus for several years. He thinks the condition arose after clearing his garden of plants that were dry after being killed by a herbicide that contains dioxin. Is this a likely explanation?

Pemphigus is an autoimmune disease in which disease-specific autoantibodies, and complement, bind to the intercellular material of epidermis. It may be associated with other autoimmune disorders. Some drugs, notably penicillamine and rifampicin, can apparently precipitate pemphigus, clinically and immunologically indistinguishable from pemphigus vulgaris, but clearing, sometimes only slowly, when the drug is discontinued. Had the patient who attributes his pemphigus to exposure to a herbicide containing dioxin recovered spontaneously after a few weeks or months, the possible link with the chemical would at least have been worth investigating, but as the pemphigus has continued for several years any association with the chemical is highly improbable.

Sparrow GP. Penicillamine pemphigus and the nephrotic syndrome occurring simultaneously. *Br J Dermatol* 1978;**98**:103-5.