Medical audit

Is day case surgery the key to basic surgical training?

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The logbooks of 5 senior house officers (SHOs) were audited to determine progression of surgical skills on a single vascular firm.

Total surgical experience and, in particular, experience in varicose vein and arterio-venous fistula surgery, performed in the day-case unit (DCU), were examined. Trainees were divided into those undertaking their first surgical SHO post (group 1, $n = 2$) and those who had had previous surgical exposure (group 2, $n = 3$) on the basic surgical training rotation.

SHOs were exposed to a mean of 273 (± 41 SD) operative cases in 6 months. Emergency work comprised 15% ($\pm 7\%$) of workload. Day cases accounted for 35% ($\pm 3\%$) of elective workload. A mean of 66 (± 5) varicose vein and AVF cases were undertaken in the DCU. This represented 82% ($\pm 6\%$) of day-case operative experience for the firm. SHOs undertook 12 (± 6) VV/AVF cases unassisted, 35 (± 5) cases with senior assistance, and 20 (± 11) as first assistance in the DCU. All SHOs progressed to being able to perform arterial bypass and amputation (with senior assistance) during their time on the firm. There was no significant difference in experience or progression to major vascular surgery between group 1 and group 2 in this study except in lower limb amputation procedures.

It is concluded that vascular surgical firms can provide a good introduction to surgical skills. Most experience as first operator was gained in the DCU and we suggest that those undergoing basic surgical training might benefit from an attachment to the DCU early in their rotations.

Key words: Day-case surgery – Basic surgical training – Vascular surgery

Day-case surgery is the accepted mode of care for most minor or intermediate procedures.¹ The Royal College of Surgeons of England recommends that 50% of all surgical operations should be performed as day cases.² The college and professional guidelines recommend that day-case surgery should be carried out by consultants.³ Historically, it has been with these types of cases that basic surgical trainees (BSTs) have learnt their skills. Increasing pressures to push high volumes of work through surgical units, and the cancellation of minor/intermediate in-patient benign procedures, threatens the ability of junior

surgeons, who operate more slowly when learning, to obtain suitable training in this type of surgery. This may impede development of surgical skill and progression to more demanding surgery.

In vascular surgery, varicose vein and primary haemodialysis access procedures are often performed as day cases. We audited the performance of two day surgical lists to provide training for BSTs and also audited their progression to more major surgery during a 6 month slot on the surgical rotation. We also analysed training and progression to major surgery by seniority on the basic surgical training rotation.

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Table 1 Index procedures for the basic surgical trainee in vascular surgery

Primary varicose vein surgery
Sapheno-femoral disconnection, long saphenous strip and multiple phlebectomies
Sapheno-popliteal disconnection, short saphenous strip and multiple phlebectomies
Primary haemodialysis access surgery
Wrist (radio-cephalic) arterio-venous fistula
Brachial (brachio-cephalic) arterio-venous fistula
Lower limb amputation
Below knee amputation
Through knee amputation
Above knee amputation
Lower limb arterial bypass
Femoro-popliteal bypass
Femoro-distal bypass

Methods

The logbooks of 5 surgical trainees were assessed between 1998 and 2000. Each had completed a Basic Surgical Skills course prior to commencing a 6 month post of senior house officer (SHO) in vascular surgery.

Varicose vein and vascular access operations (performed both as day cases and as in-patients) were audited as well as progression to performing lower limb amputation and vascular anastomoses during limb bypass (Table 1). The number of procedures each trainee had performed independently, with assistance, or as an assistant was counted. For each procedure, it was also noted whether the operation was carried out as a day case or in-patient.

Results

Each trainee performed or assisted at a mean of 273 (± 41 SD) operations in 6 months; 15% ($\pm 7\%$ SD) of this work was undertaken as emergency surgery. A mean of 81 (± 3 SD) operations were performed in the day-case surgery unit.

The four index procedures, shown in Table 1, accounted for a mean of 134 cases (± 12 SD) for each trainee surgeon. A mean of 66 (± 5 SD) and 68 (± 12 SD) cases were performed in the day-case surgery unit and main theatre complex, respectively. Table 2 shows the average number of cases performed by the five trainees studied, for each of the index cases, with day-case procedures highlighted. Table 3 compares the number of cases performed as first operator, with or without senior assistance, of BSTs with different levels of experience. Only lower limb amputation was performed more frequently, with statistical significance, by BSTs who had previously completed a 6-month surgical post.

Table 2 Average number of index cases performed by the five trainees studied

	Mean number of operations performed ($\pm$ SD; $n=5$)		
	Without assistance	With assistance	As 1st or 2nd assistant
Index cases	17 $\pm$ 8	69 $\pm$ 8	47 $\pm$ 17
DCU index cases	12 $\pm$ 6	35 $\pm$ 5	20 $\pm$ 11
Varicose veins			
All	11 $\pm$ 4	39 $\pm$ 8	12 $\pm$ 9
Day-case unit	7 $\pm$ 3	21 $\pm$ 4	4 $\pm$ 3
Primary haemodialysis access surgery			
All	6 $\pm$ 4	17 $\pm$ 7	20 $\pm$ 13
Day-case unit	5 $\pm$ 3	14 $\pm$ 6	16 $\pm$ 11
Lower limb amputations	0	5 $\pm$ 2	3 $\pm$ 2
Lower limb arterial bypass	0	8 $\pm$ 5	13 $\pm$ 7

Table 3 A comparison of BSTs with different levels of experience as 1st operator (either independently or with senior assistance)

	Group 1 ($n=2$)	Group 2 ($n=3$)	P value
Index cases	89 $\pm$ 13	86 $\pm$ 16	0.85
DCU index cases	38 $\pm$ 6	52 $\pm$ 7	0.12
Varicose veins			
All	58 $\pm$ 7	45 $\pm$ 8	0.14
Day case unit	27 $\pm$ 4	28 $\pm$ 3	0.71
Primary haemodialysis access			
All	17 $\pm$ 14	28 $\pm$ 6	0.29
Day case unit	12 $\pm$ 9	24 $\pm$ 5	0.13
Lower limb amputation	3 $\pm$ 1	7 $\pm$ 2	0.04*
Lower limb bypass	12 $\pm$ 4	6 $\pm$ 4	0.22

Group 1: 1st surgical SHO post – mean number ($\pm$ SD) of cases as 1st operator; Group 2: 1st surgical SHO post – mean number ($\pm$ SD) of cases as 1st operator; P value: determined by unpaired *t*-test for group 1 ($n=2$) versus group 2 ($n=3$) – *P < 0.05 is significant.

A mean of 52.0% ($\pm 7\%$ SD) of all elective index cases were performed by trainees with senior assistance. In the day-case unit, a mean of 52.5% ($\pm 9\%$ SD) of the index procedures were performed by the SHO with assistance.

Primary varicose vein surgery and primary arterio-venous fistula formation are mainly undertaken as day-case procedures in our institution. An average of 82% ($\pm 6\%$ SD) of the trainees' time in the day-case unit was spent performing these operations.

All trainees studied progressed to performing lower limb amputation, exposure of femoral vessels in the groin and arterio-venous anastomosis as part of femoropopliteal bypass.

The upper end of a femoropopliteal bypass was performed by the trainee under senior supervision, in an average of 41% ($\pm$ 21% SD) of all lower limb bypass procedures.

Discussion

Attracting trainees into surgery and the training of junior surgeons is an increasingly important issue as recruitment falls and the period of training shortens. Concern has been expressed at the lack of skills of trainees at all levels of training.

Since 1996, basic surgical trainees must undertake a 3-day Basic Surgical Skills course before being eligible to sit postgraduate exams allowing progression to higher surgical training. The skills course aims to introduce the trainee to the basic principles of surgery including knot tying, skin closure, bowel and vascular anastomosis and laparoscopic techniques.⁴ There is currently no formal reinforcement or re-assessment of these skills during basic surgical training.

Day-case surgery provides opportunities for basic surgical training when there is a one-to-one, trainee-to-consultant ratio. Trainees are exposed to a limited number of procedures, which are rarely complex. In our small retrospective study, an average of 82% ($\pm$ 6% SD) of the trainees' time in the day-case unit was spent doing varicose vein surgery or vascular access procedures. By the repetitive nature of the cases, a trainee can assist at the same procedure on a number of occasions before undertaking the component tasks of the operations under supervision. It is accepted that repetition of a specific task results in better performance than general training in a variety of tasks. The retention of skills depends on the degree to which a skill was perfected.⁵

The trainees studied were first operator, with assistance on an average of 52.0% ($\pm$ 7% SD) of the elective index procedures. Trainees operated with assistance in 52.5% ($\pm$ 9% SD) of all day-case index procedures studied. Trainees were able to progress from this to independent operating and to more complex operating in the main theatre complex. This was independent of the trainees' position in the SHO rotation for lower limb bypass procedures. Those in their first post demonstrated the same ability to progress as those who already had some operative experience except in lower limb amputation.

This study demonstrates that development of operating skills in junior surgeons is dependent on opportunity, not seniority. The argument for using the day-case unit for training applies equally to all the surgical sub-specialities.

The Royal College of Surgeons of England has recommended that 50% of all elective operating should be

carried out as day-case surgery. Should basic surgical trainees be spending half of the time they operate in the day-case unit? The five trainees undertook an average of 35% ($\pm$ 3% SD) of their elective workload in the day-case unit.

The question remains whether this is the right place for trainees to gain operative experience. Here it is demonstrated that a consultant-led service can deliver training in the day surgery unit, with supervised progression to more complex procedures. A separate study involving varicose vein surgery on this unit has demonstrated that outcomes are not compromised by this approach.⁶ Papp *et al.*⁷ have shown, over a 15-year period, that supervised training in infra-inguinal bypass surgery does not compromise early or long-term outcomes.

It is also argued that there is an increase in operative time associated with training.³ It is important for the trainee to realise that there is a temporal component to operating. It is accepted that there is pressure to run lists as efficiently as possible, and thus reduce waiting lists. This needs to be balanced against the need to improve surgical training in the face of reducing hours of work and total training time.

Conclusions

The day-case unit is an ideal environment for learning operative skills. Its use as such should be encouraged and protected. In view of the European Working Time Directive, the way juniors work will have to be altered. It is suggested that as an alternative to 6 months in a surgical sub-speciality, trainees could spend time specifically in the day surgery unit learning how to operate. Perhaps then trainees will be better prepared for the operative demands of higher surgical training.

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