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Impact of surgeon-specific data reporting on surgical training

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ABSTRACT

INTRODUCTION Since April 2002, collection and publication of surgeon-specific data in adult cardiac surgery has become mandatory in the UK. It has been suggested that this may discourage consultants from allowing trainees to perform cases. The aim of this study was to attempt to analyse the effect of the introduction of surgeon-specific data (SSD) on surgical training in a large cardiac surgical centre.

PATIENTS AND METHODS A retrospective analysis was performed on 2111 consecutive patients undergoing elective coronary artery bypass surgery, aortic and mitral valve surgery at Southampton General Hospital between April 2000 and April 2004. Results were analysed and compared over a 2-year period prior to and a 2-year period following the introduction of SSD.

RESULTS There were no changes in the overall mortality rate following the introduction of SSD. SSD was associated with a reduction in the overall proportion of cases performed by trainees (49% versus 42.8%; $P = 0.004$) and, in particular, a reduction in the proportion of aortic and mitral valve procedures performed by trainees. In addition, the proportion of cases performed by the trainees without consultant supervision declined significantly following SSD (18.7% versus 10.4%; $P < 0.001$).

CONCLUSIONS Publication of surgeon-specific data has coincided with a decrease in both the proportion and variety of cases performed by trainees.

KEYWORDS
Cardiac surgery – Training

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Over the last 10 years, there has been an increasing pressure for greater transparency and accountability within the UK NHS. This pressure has been particularly felt in cardiothoracic surgery, mainly as a result of the well-publicised events at the Bristol Royal Infirmary.[1] As a consequence of this, the UK Government announced that, from April 2002, surgeon-specific mortality data would be collected from all cardiac surgical units, and be published in 2004. The ostensible purpose was to monitor and improve patient outcomes following surgery. However, this move has been criticised on a number of grounds, including the fact that this system does not distinguish between cases actually performed by a consultant and those performed by a trainees.[2] Given the widely held perception that trainee surgeons may be detrimental to patient outcomes,[2] it has been argued that publication of surgeon specific data (SSD) will provide a disincentive for consultants to undertake surgical training. The purpose of this study was to attempt to analyse the impact of SSD on surgical training in a large regional cardiac surgical centre.

Patients and Methods

Between April 2000 and April 2004, the data on consecutive elective coronary artery bypass grafting (CABG), aortic valve and mitral valve procedures performed at Southampton General Hospital were analysed. Exclusion criteria included all re-do procedures, all paediatric cases and all emergency procedures. In addition, we excluded any cases where, in addition to CABG or valve surgery, thoracic aortic or anti-arrthymic procedures were also undertaken. Data were collected from the computerised theatre records, which were entered at the time of surgery. Operating surgeon was defined as the surgeon performing the coronary anastomoses, or implanting the valve or valve ring. Trainees were defined as specialist registrars, clinical

fellows, LAS and LAT appointments. Consultant supervision was defined as a case in which the consultant was scrubbed and acted as primary assistant. It should be noted that, even in cases where the consultant did not provide direct supervision, the named consultant was always present and available in the hospital.

Risk data were also entered prospectively and the Euroscore of the patients recorded prior to surgery. This is a well-validated system designed to predict the risk of post-operative mortality for patients undergoing cardiac surgery.[3] In all cases, the seniority of the surgeon performing the procedure was recorded together with operative mortality (defined as death within 30 days of operation, or during the same hospital admission irrespective of the time elapsed from operation). The data were validated by cross-referencing against the operating lists, intensive care and high dependency unit admissions books and the hospital PAS system. It should be noted that, during the study period, there was a 100% completion of all the data fields within the database.

Analysis

Results were analysed over a 2-year period prior to the introduction of SSD (Group A; April 2000 to March 2002) and a 2-year period following the introduction of SSD (Group B; April 2002 to March 2004). The operative mortality rates between trainees and consultants were compared, as were the proportion and type of cases performed by trainees. Means were compared by one-way analysis of variance with *post hoc* Bonferoni correction; proportions with Chi-square or Fisher's exact test as appropriate. *P*-values of less than 0.05 were considered significant.

Results

The number and variety of cases performed by trainees prior to and following the introduction of SSD are summarised in Table 1. As shown, there has been a decrease in both the total number and proportion of cases performed by trainees, as well as a specific reduction in the proportion of valve procedures undertaken since the introduction of SSD. The clinical outcomes over the 4-year period are summarised in Table 2. As shown, there was no difference in the mortality rates between consultants and trainees; nor were there any differences in the overall mortality rate following the introduction of SSD. There was, however, an increase in the risk profile of the patients since the introduction of SSD (mean Euroscore, 3.66 ± 2.52 versus 4.01 ± 2.62; $P = 0.002$), and this increase in risk profile was confined to the consultant cases (see Table 2).

Discussion

Surgical training in the UK faces a number of formidable challenges. Reduction in junior doctors' hours together with

Table 1 Comparison of trainee case mix over the 4-year period

	Group A	Group B	*P*-value
Total number of cases	1244	867	
Cases performed by trainees (%)	609 (49.0)	369 (42.8)	0.004
Isolated CABG performed by trainees (%)	477 (55.5)	280 (52.6)	0.30
Aortic valve procedures performed by trainees (%)	97 (42.3)	79 (32.1)	0.02
Mitral valve procedures performed by trainees (%)	34 (20.1)	10 (10.3)	0.03
Unsupervised cases performed by trainees (%)	225 (18.7)	90 (10.4)	< 0.001

Table 2 Comparison of consultant and trainee case mix and mortality over the 4-year period

	Group A	Group B	*P*-value
Mean Euroscore – trainee cases	3.02 ± 2.2	3.02 ± 2.15	1
Mean Euroscore – consultant cases	4.28 ± 2.6	4.75 ± 2.71	0.004
Overall mortality (%)	15 (1.2)	13 (1.5)	0.50
Trainee mortality (%)	5 (0.8)	4 (1.1)	0.75
Consultant mortality (%)	10 (1.6)	9 (1.8)	0.76

an increasing emphasis on service provision within the NHS has led to a drastic reduction in the time available for high-quality surgical training.[2] Our study highlights another potential obstacle to training – the publication of surgeon specific data. Our study shows that the introduction of SSD has coincided with a reduction in both the proportion and variety of cases performed by trainees. In addition, there has been an increase in the proportion of cases directly supervised by consultants since the introduction of SSD. Although it could be argued that this increase in consultant supervision is a positive development, it should be noted that independent operating by senior trainees is an important part of their surgical apprenticeship and, as such, the reduction in unsupervised operating may in fact represent a detrimental change to training.

Despite the obvious importance of surgical training within the NHS, there has to date been surprising few studies analysing the importance of the seniority of surgeon on clinical outcome. In a recent study, Renwick *et al.*[4] found no difference in outcomes between trainees and consultants following colorectal resection. By contrast, Marston *et al.*[5] found long-term outcomes were poorer in patients undergoing elective total hip replacement when the surgery was performed by trainees rather than consultants. With reference to cardiac surgery in the UK, previous studies have not shown any association between seniority of surgeon and clinical outcomes following CABG.[6,7] Similarly, Alexiou *et al.*[8] have shown that cardiothoracic trainees can be taught mitral valve repair surgery without any negative effects on early or late surgical results. In this context, our data compare favourably with these previous reports,[6–8] both in terms of trainee experience and clinical outcomes. Indeed, our results show that, despite the increasing risk profile of the patients following the introduction of SSD, there was no corresponding increase in the overall mortality rate.

Clearly, all the trends seen over time in our study cannot be purely attributed to the impact of SSD. For a start, the reduction in absolute numbers of cases is more likely to be a reflection of changes in the referral practice of cardiologists and of increasing use of waiting list initiatives performed at independent hospitals. In addition, it should be noted that the reduction in the proportion of trainee cases has coincided with an increase in the risk profile of patients over the 4-year period (as reflected in the higher mean Euroscores); hence, it is likely that consultants are understandably more reluctant to allow trainees to undertake these higher risk cases. Moreover, with advances in coronary stent technology, it is possible that patients referred for coronary surgery in the later part of the study had more severe disease in their distal coronary vessels. This would make the surgery technically more demanding, making it less likely that a trainee would possess the necessary technical proficiency to undertake the case. Finally, although SSD was introduced in April 2002, the issues and concerns regarding SSD had been debated for several years prior to its commencement. As such, it could be argued that any changes in training ethos attributable to SSD may already have occurred in the years prior to its formal adoption. Indeed, the retrospective and non-randomised nature of this study makes it virtually impossible to demonstrate a causal link between SSD and surgical training irrefutably. What is undeniable, however, is that there has been a reduction in the surgical training of junior doctors over time in our unit – a trend which may, in part, be explained by increased public scrutiny of results. Given the planned introduction of SSD to other branches of surgery, we hope this report will encourage other centres to conduct a prospective study on the impact of this policy change on training.

References

1. The Bristol Royal Infirmary Enquiry. <http://www.bristol-inquiry.org.uk>.
2. Chikwe J, de Souza AC, Pepper JR. No time to train the surgeons. *BMJ* 2004; **328**: 418–9.
3. Roques F, Nashef SA, Michel P, Gauducheau E, de Vincentiis C, Baudet E *et al.* Risk factors and outcome in European cardiac surgery: analysis of the EuroSCORE multinational database of 19030 patients. *Eur J Cardiothorac Surg* 1999; **15**: 816–22.
4. Renwick AA, Bokey EL, Chapuis PH, Zelas P, Stewart PJ, Rickard MJ *et al.* Effect of supervised surgical training on outcomes after resection of colorectal cancer. *Br J Surg* 2005; **92**: 631–6.
5. Marston RA, Cobb AG, Bentley G. Stanmore compared with Charnley total hip replacement. A prospective study of 413 arthroplasties. *J Bone Joint Surg Br* 1996; **78**: 178–84.
6. Goodwin AT, Birdi I, Ramesh TP, Taylor GJ, Nashef SA, Dunning JJ *et al.* Effect of surgical training on outcome and hospital costs in coronary surgery. *Heart* 2001; **85**: 454–7.
7. Oo AY, Grayson AD, Rashid A. Effect of training on outcomes following coronary artery bypass graft surgery. *Eur J Cardiothorac Surg* 2004; **25**: 591–6.
8. Alexiou C, Doukas G, Oc M, Oc B, Hadjinikolaou L, Spyt TJ. Effect of training in mitral valve repair surgery on the early and late outcome. *Ann Thorac Surg* 2005; **80**: 183–8.