Whose appendicectomy? – Do laparoscopic appendicectomies impair SHO training?

ANWAR E OWAIS, TIMOTHY R WILSON, NEERAJ SETHI, MUNTHHER I ALDOORI

Department of General Surgery, Huddersfield Royal Infirmary, Huddersfield, UK

ABSTRACT

INTRODUCTION Open appendicectomy is an ideal procedure for junior surgical trainees to develop operative skills. However, in recent years, we have noticed a decline in the number of appendicectomies performed by basic surgical trainees and a shift towards increasing use of laparoscopic appendicectomy. The aim of this study was to determine whether the growing popularity of laparoscopic appendicectomy is having a detrimental impact on the training experience of SHOs.

PATIENTS AND METHODS We undertook a retrospective review of all cases of appendicectomies performed in one district hospital over a 7-year period (August 1999 to August 2006.) A standard per forma was used to extract data from the original case notes of these patients relating to the operating surgeon and technique.

RESULTS Data were obtained for 857 appendicectomies. Between February 2002 and July 2003, there was a significant decline in the proportion of appendicectomies performed by SHOs from 78.7% to 29.3% ($P < 0.001$). Either side of this decline there were no significant changes in the proportion of SHO appendicectomies. The number of appendicectomies performed laparoscopically only began to rise after February 2004, with a year-on-year increase. The number of appendicectomies performed by SHOs remained stable during this time. No laparoscopic appendicectomy was performed by an SHO.

CONCLUSIONS We found no evidence that the popularisation of laparoscopic appendicectomy has contributed to the decline of appendicectomies performed by SHOs. Nevertheless, with the continual rise in popularity of this procedure, it is important to balance training opportunities for both junior and higher surgical trainees.

KEYWORDS

Surgical training – Appendicectomy – SHO – Laparoscopy

CORRESPONDENCE TO

Munther I Aldoori, Consultant Surgeon/Senior Clinical Lecturer, Department of General Surgery, Huddersfield Royal Infirmary, Acre Street, Lindley, Huddersfield HD3 3EA, UK

T: +44 (0)148 434 2326; F: +44 (0)148 434 2888; E: liz.hirst@cht.nhs.uk

Open appendicectomy is an ideal procedure for junior surgical trainees to develop their operative skills. However, we have noticed a decline in the number of appendicectomies performed by basic surgical trainees over recent years. A number of studies published after the implementation of the New Deal in 1993 have demonstrated a dramatic effect of changing in shift patterns of working on junior doctors.^{1,2} One of these studies found that the number of appendicectomies performed by SHOs might have fallen by 40% between 1985 and 1999.

More recently, we have also witnessed a shift towards increasing use of laparoscopic appendicectomy, at the possible expense of SHO training. One study, examining a structured approach to training registrars in laparoscopic appendicectomy, found that the number of open appendicectomies performed by the SHOs after the introduction

of the programme fell by 50%.³ We hypothesised that the growing popularity of laparoscopic appendicectomy is having a deleterious effect on the operative experience of SHOs. The aim of this study was to test this hypothesis by examining recent trends with respect to the use of laparoscopic appendicectomy and SHO appendicectomies at one district training hospital.

Patients and Methods

We undertook a retrospective review of all cases of appendicectomies performed in one district hospital over a 7-year period from August 1999 to August 2006. The operation details for all the patients are entered into a computerised data collection system at the day of the operation. These data were downloaded and used to obtain

Figure 1 The proportion of all appendicectomies performed by SHOs and performed laparoscopically during each 6-month training period.

the original case notes. A standard performa was used to extract data from the original case notes of these patients relating to the operating surgeon and technique. Appendicectomies performed after undergoing laparotomy for another suspected diagnosis and those performed on young children (less than 8 years of age) were excluded. SHOs who performed part of the operation were considered as having performed the operation as they would have gained some operative experience.

To examine the trends in appendicectomies performed by SHOs and by laparoscopy we performed an interrupted time series analysis. Data were analysed in 14 six-month periods, which equated to a 6-month training period for an SHO. Contingency table analysis was used to evaluate the proportion of appendicectomies performed by SHOs or laparoscopically over consecutive training periods. Contingency table analysis was also used to examine these variables with gender. The age of patients undergoing laparoscopic and open surgery was compared using a *t*-test. Spearman's rank correlation was used to assess the correlation between the proportions of appendicectomies performed laparoscopically with time.

Results

Over the 7 years, 1166 patients underwent an appendicectomy; of these, 102 patients were excluded because they were less

than 8 years of age ($n = 53$) or because they had an appendicectomy performed at a full laparotomy ($n = 49$). Of the remaining 1064 patients, operation notes could not be identified for 207 (19.5%) patients. The extent of missing data was evenly spread throughout the 14 training cohorts analysed.

During the 7 years studied, the median number of appendicectomies performed during each training period (excluding those at laparotomy or in children under 8 years of age) was 79 (range, 48–97). Despite the fluctuation in the number of appendicectomies performed during each 6-month period, there was no evidence that the number of appendicectomies being performed changed substantially during the overall study period. The mean age of patients undergoing appendicectomy was 25.5 years (range, 8–85 years) and 55.2% were male.

Figure 1 shows the percentage of appendicectomies performed by SHOs for each 6-month training period. Between February 2002 and July 2003, there was a significant decline in the proportion of appendicectomies performed by SHOs ($P < 0.001$). Before this decline, the proportion of appendicectomies performed by SHOs did not significantly differ between each training period (median, 78.7%; range, 73.7–84.8%; $P = 0.482$). Nor was there a significant difference in the proportion of SHO appendicectomies performed during each training period after July 2003 (median, 29.3%; range, 21.0–43.1%; $P = 0.361$.) Over the 7 years of study,

non-SHO grades were significantly more likely to perform appendicectomy than SHOs on patients who were older than 60 years (Odds Ratio 2.8; 95% Confidence Interval, 1.1–7.2). The gender of the patient was not associated with the grade of the surgeon ($P = 0.477$).

Figure 1 also shows the proportion of appendicectomies that were performed laparoscopically. Until February 2004, relative few appendicectomies were performed laparoscopically and there was no significant difference in the proportion of appendicectomies performed laparoscopically during each 6-month training period during this time (median, 5.9%; range, 0–8.3%; $P = 0.117$). After February 2004, the number of appendicectomies performed laparoscopically rose steadily. The observed rise during this period was significantly correlated with time ($P < 0.001$; $r = 0.503$). The mean age of those who underwent laparoscopic appendicectomies was significantly higher than that of those who had open appendicectomies (31.2 years versus 24.6 years; $P < 0.001$). Women were significantly more likely to undergo laparoscopic appendicectomy than men (Odds Ratio 1.8; 95% Confidence Interval, 1.2–2.9). The majority of laparoscopic appendicectomies were performed by specialist registrars (62.6%), with fewer performed by staff grades (21.2%) and consultants (16.2%). None were performed by SHOs. There was no evidence that the rise in popularity of laparoscopic appendicectomy was associated with a reduction in the number of open operations performed by SHOs.

Discussion

With the recent changes in the working patterns affecting the NHS over the last decade, surgical training remains a hotly debated issue. Several studies have examined the effects of the New Deal, European Working Time Directive (EWTD) and Hospital at Night on junior doctors' training.^{1–7} Our study showed a dramatic decline in the number of appendicectomies performed by SHOs over a 1-year period, between February 2002 and February 2003. Prior to this time, doctors worked an average of 61.2 h/week as part of a 1 in 6 on-call rota. By February 2003, the working pattern had changed to a 1 in 8 full shift, with 50.4 h/week, in order to remain compliant with the New Deal. Shift working patterns not only result in fewer working hours, but have also lead to dissolution of the firm structure, with SHOs having to cross-cover for colleagues during the day and work without pre-registration house offices at night. So far, the implementation of the EWTD in 2004 has had little impact on the working patterns of junior trainees; however, by 2009, the number of weekly hours permissible drops to 48 h/week and it is estimated that a further third of training time will be lost.⁵ This reduction may further threaten the level of operative experience to which surgical trainees are exposed.

Laparoscopic appendicectomy may offer some benefit to patients in terms of reduced convalescence and lower rates of wound infection.^{8,9} However, the benefits of laparoscopic appendicectomy have not been recognised to the extent that the operation has universal acceptance. Specialist registrars consider laparoscopic appendicectomy as a good procedure to consolidate their laparoscopic skills as reflected by the fact that the majority of laparoscopic appendicectomies were performed by specialist registrars in our study (62.6%). However, the opportunities for SHOs to gain laparoscopic exposure via this procedure are limited. In a study examining the implementation of a laparoscopic appendicectomy training programme, it was found that SHOs sacrificed a third of their open appendicectomies for the registrar to be trained in the laparoscopic procedure, with the SHO attempting just two out of 22 laparoscopic appendicectomies over a 5-month period in recompense.⁵ It is notable that no SHO performed a laparoscopic appendicectomy in our series.

Nevertheless, in our study, the proportion of appendicectomies performed by SHOs has stayed roughly the same during a period of prolific growth in laparoscopic appendicectomy. To maintain this equilibrium, the proportion of open appendicectomies performed by SHOs has been increasing. This may be due to the introduction of a specific time-table for SHOs to attend CEPD lists, thereby providing a consistent training opportunity for SHOs. If the proportion of laparoscopic appendicectomies had not increased then we might have witnessed some recovery in the numbers of appendicectomies performed by SHOs. Moreover, if the proportion of laparoscopic appendicectomies performed by specialist registrars continues to rise in the future, we might witness a further decline in the proportion of appendicectomies performed by SHOs. Such a decline in the surgical skills of SHOs will reflect on the surgical skills of junior specialist registrars in the near future.

Study limitations

Our study does have some limitations. As a retrospective study, it suffers from a degree of missing data, with operative notes being unobtainable in nearly 20% of cases. However, analysis of the theatre data for the missing cases shows that this sample is evenly spread throughout the cohorts analysed and does not contain a biased sample with respect to type of operation or grade of surgeon as documented in the theatre record. It is also difficult to guarantee the accuracy of the operating surgeon, even from the operation notes. However, any inconsistencies would not be expected to alter over the period of study. Finally, it should be recognised that this study focuses on only one aspect of SHO training. Appendicectomies are a good indicator of SHO experience,¹⁰ but surgical training

should not be judged purely on one's exposure to appendicitis or appendicectomies.

Conclusions

We found no evidence that the popularisation of laparoscopic appendicectomy has contributed to the decline of appendicectomies performed by SHOs in our hospital. Nevertheless, with the continued rise in popularity of this procedure, the clinical needs of the patients and the training needs of both junior and senior surgical trainees needs to be keenly balanced.

References

1. Underwood SM, McIndoe AK. Influence of changing work patterns on training in anaesthesia: an analysis of activity in a UK teaching hospital from 1996 to 2004. *Br J Anaesth* 2005; **95**: 616–21.
2. McIndoe AK, Underwood SM. A detailed analysis of theatre training activity in a UK teaching hospital. *Br J Anaesth* 2000; **84**: 591–5.
3. Botha AJ, Elton C, Moore EE, Sauven P. Laparoscopic appendicectomy: a trainee's perspective. *Ann R Coll Surg Engl* 1995; **77**: 259–62.
4. Drew PJ, Cule N, Gough M, Heer K, Monson JR, Lee PW *et al*. Optimal education techniques for basic surgical trainees: lessons from education theory. *J R Coll Surg Edinb* 1999; **44**: 55–6.
5. Chesser S, Bowman K, Phillips H. The European Working Time Directive and the training of surgeons. *BMJ* 2002; **325**: S69.
6. Last GC, Curley P, Galloway JM, Wilkinson A. Impact of the New Deal on vascular surgical training. *Ann R Coll Surg Engl Suppl* 1996; **78**: 263–6.
7. Gossage JA, Modarai B, McGuinness CL, Burnand KG. The modernisation of the surgical house officer. *Ann R Coll Surg Engl* 2005; **87**: 369–72.
8. Attwood SE, Hill AD, Murphy PG, Thornton J, Stephens RB. A prospective randomized trial of laparoscopic versus open appendicectomy. *Surgery* 1992; **112**: 497–501.
9. McAnena OJ, Austin O, O'Connell PR, Hederman WP, Gorey TF, Fitzpatrick J. Laparoscopic versus open appendicectomy: a prospective evaluation. *Br J Surg* 1992; **79**: 818–20.
10. Collins RE. Surgeons and the New Deal – good deal or raw deal? *Ann R Coll Surg Engl Suppl* 1995; **77**: 297–8.