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Training in oesophageal surgery – The gold standard: A prospective study[☆]

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ABSTRACT

Introduction: Competency in complex oesophagogastric surgery, within the current climate of changes to medical training and reduced hours, requires repeated, focused, hands-on training. We describe the training methods for oesophagectomy in our institution.

Methods: All oesophageal resections under the care of one consultant surgeon are regarded as training cases. When trainees start they are shown the first resection; subsequently, the trainees then perform every case with the consultant scrubbed. Consultant input consists of retraction and tips in difficult situations. All data were collected on a prospective database.

Results: Two hundred and seventy patients (215 males, median age = 64 years) underwent primary oesophagectomy under the consultant, between January 2000 and May 2007. Fifteen resections (6%) were performed solely by the consultant. ASA grading was: I = 15, II = 154, III = 95, IV = 5, and unrecorded = 1. In-hospital mortality and clinically apparent leak rate was 1.9% (5 deaths) and 6.2% ($n = 17$), respectively. Reoperation was required in 15 patients (5.5%). The median length of hospital stay was 14 days (range = 8–95 days). Median lymph node yield was 13 (range = 0–64).

Conclusions: Trainees under supervision can competently perform an oesophagectomy without compromising patient care. An early hands-on approach leads to a rapid ascent of the learning curve and is essential in today's climate of limited training opportunity.

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1. Introduction

Good training is essential for producing competent surgeons. In the past, expertise in complex tertiary subspecialties, such as oesophageal surgery was traditionally gained by spending long periods in senior registrar posts before appointment to consultant grade. This approach is no longer feasible in the UK due to shortened training brought about by Calman, the European Working Time Directive and Modernising Medical Careers. A recent paper from the US felt that the introduction of an 80-h week has had a negative impact on the surgical resident training.¹ There is now genuine concern that surgeons of the future will be failed by the present training system, and be inadequately prepared for consultant

work. Since oesophagogastric cancer services were centralised, training posts in oesophagogastric surgery have become restricted to a few centres per region, and are highly competitive. It is therefore imperative that early hands-on training opportunities are maximised for trainees during placements. The aim of this study was to highlight a single centre experience of consultant supervised, trainee-performed oesophagectomies.

2. Patients and methods

There are two senior clinical fellows and two specialist registrars currently working for two full time oesophagogastric

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surgeons. We looked at the training methods and practice of the senior surgeon. The oesophageal experience of the trainees prior to St Thomas' is usually limited to less than three oesophagectomies. The senior clinical fellows are peri- or post-CCT.

Two hundred and seventy patients underwent primary oesophagectomy under the care of one consultant surgeon between January 2000 and May 2007.

The usual practice of the consultant is to demonstrate his technique once to the new trainee and then subsequently the operation is performed by the trainee irrespective of ASA or built.

Normally two trainees are involved in the operation, with the consultant assisting, each performing an aspect of the procedure. Input from the consultant consists of retraction and tips in difficult situations. In unexpected situations the consultant takes over until the crisis is resolved, following which the trainee reverts to being the primary surgeon.

We excluded benign oesophagectomies as most were revisional complex procedures, which at times required a greater consultant input.

All patients have an identical postoperative protocol. This involves postoperative care in an over-night intensive recovery area (OIR), transfer to a High dependency unit or the ward the following day and a water soluble contrast swallow at day 4 or 7. Feeding is commenced on day 2 via the jejunostomy.

Leaks were all confirmed clinically with enteric contents in the chest drains, radiologically or at reoperation. Chyle leaks were determined by chylomicron estimation in the drains and visually at reoperation.

The data were collected retrospectively from an extensive database of all the patients operated in our unit. Mortality was defined as in-hospital death. Anastomotic leaks, cardiopulmonary complications, chyle leaks and reoperation were the basis of our morbidity data.

It does not make statistical sense to compare the cases solely done by the consultant and the trainees due to large disparity of numbers.

3. Results

Between January 2000 and May 2007, 270 patients underwent an oesophagectomy, for cancer, under the care of the senior surgeon.

There were 215 males, 55 females with a median age of 64 years (29–83 years). A measure of co-morbidities can be ascertained by the ASA grade. ASA grading was: I = 15, II = 154, III = 95, IV = 5, and unrecorded = 1. One hundred and thirty-four (45.6%) had neoadjuvant chemotherapy.

The types of resections ranged from transhiatal oesophagectomies ($n = 185$: 68.5%), left thoracoabdominal ($n = 43$: 16%), right thoracotomy ($n = 23$: 8.5%) and 3-stage resections ($n = 19$: 7%).

Fifteen (6%) resections were performed solely by the senior consultant; these consisted of demonstration cases and members of the staff.

Postoperative histology was adenocarcinomas (71.5%), squamous cell carcinomas (14%), and high-grade dysplasia (6%). There were 4 adenosquamous carcinoma, 2 leiomyomas, 1 myxoid leiomyosarcoma and in 18 there was no evidence of malignancy in the postoperative histology.

In-hospital mortality was 1.9% ($n = 5$). Causes of death are shown in Table 1. Clinically apparent leakage was 6.2% ($n = 17$), 12 were treated conservatively. Chylothorax occurred in 6 (2.2%) patients of which only one required specific operative intervention. Fifteen (5.5%) patients required reoperation; the indications are listed in Table 2.

The median length of hospital stay was 14 days (range = 8–95 days). Median lymph node yield was 13 (range = 0–64). Completions of resection were R0 – 58%, R1– 40% and R2– 2%.

4. Discussion

Training is essentially the instructing of others, in information new to them and its application. The most important element

Table 1 – In-patient mortality

Age	Co-morbidities	Operation	Complications	Histology	Cause of death (1A)	Postoperative day
75	R pneumonectomy 1995 for Ca lung; MI 1992; PVD; hypertension; Coeliac disease	THO	Failed extubation postoperative chylothorax	Adenocarcinoma T3N0M0	Aspiration pneumonia	44
59	None	IL	Anastomotic leak – clinical MOF	Adenocarcinoma T3N1M0	Oesophageal leak	37
73	None	LTA	Anastomotic leak – clinical reoperation chyle leak	Adenocarcinoma T3N0M0	Intrathoracic and GI Heamorrhage	39
68	COPD, MI, NIDDM	THO	NSTEMI causing LVF	Adenocarcinoma T2bN1M0	Died following angio + stent insertion (No PM)	18
77	Smoker	ILO	Leak, D4 perforation t-tube	Adenocarcinoma T3N3M0	MOF and sepsis (No PM)	27

THO, Transhiatal oesophagectomy; IL, Ivor Lewis oesophagectomy; LTA, left thoracoabdominal oesophagectomy.

Table 2 – Indications of reoperations

Indication	Number
Anastomotic leak	4
Leak from jejunostomy	1
Leak from gastric tube	1
Perforated D4	1
Chylothorax	1
Sepsis	1
Bleeding	4
Bowel obstruction	2

in a training situation is the trainer. Traditionally a variable period of apprenticeship with a specialist would enable the trainee to develop the skills and confidence needed in order to be able to operate independently.

Evolution of training lead to the introduction of a fixed time, structured training programme, whereby the trainee could be assessed on a regular basis and on completion was comparable internationally.

In order to account for the time constraints placed on training new methods were introduced, this leads to the development of simulations and virtual operating.^{2,3} The advantages are that it enables practicing of surgical skills in a laboratory environment with no risk to patients. Though valuable for training they should never be considered as a substitute for actual operating but as a valuable adjunct.

The literature has numerous reports that state senior trainees, across surgical specialities, have acceptable mortality and morbidity when closely supervised by a consultant.⁴⁻⁸ A striking feature in the majority of these reports is the high degree of case selection for the trainee; they are the uncomplicated “easy” cases. Unfortunately this limits the experience of the trainee in preparing them for independent practice.

Major resectional oesophagogastric oncological surgery is now centralised, this has profound implications for training. Cases from the unit are under close scrutiny and undergo regular peer review to assess efficiency. Consultants are under pressure to cut down operating times, maintain an acceptable level of mortality and morbidity yet adequately train registrars. Where before trainees had exposure to major oesophageal resections prior to year V/VI at district general hospitals, this is now limited, for the majority, in the last two years of training. One comes to a major resectional centre with hardly any operative experience in major oesophageal surgery. Furthermore due to the introduction of the shift system and increase in the number of trainee grouped together in the centre, the time actually involved in learning how to operate is severely limited.

With the influx of more complex minimally invasive procedures the trainee gets less exposure to open procedures which forms a necessary foundation in order to advance the laparoscopic procedures, and is delegated to holding the camera as their trainer ascends their learning curve.

The last paper to come out regarding training in oesophagogastric surgery came out in 1999. Looking at the oesophagogastric resections only 65.7% were performed by the trainee this number according to the paper was high because of the

large number of gastric resections performed by the trainee. The paper also attributed a selection bias as the trainees were given the more straightforward operations.⁴

Our paper looks at only oesophageal resections, there is no case selection bias and yet the results are comparable nationally.⁹ This adds weight to the fact that senior trainees can safely perform primary oesophageal resections under close supervision. Furthermore even with limited prior experience in a complex procedure if the opportunity is available to operate one can ascend the learning curve fairly, quickly and competently. Each trainee is involved in a minimum of about 30 oesophagectomies a year, which forms a good basis for applying for a consultant post.

The adage that assisting is an important form of learning could be apt in the old system of training when the trainee was exposed to a much larger volume of cases and was guaranteed to perform a significant number prior to taking up a consultant post. In today's era and limited training opportunities one does not have time to adhere to such traditional methods of training, assisting is valuable but unless the trainee actually is allowed to operate he/she cannot ascend the learning curve.

5. Conclusion

We feel that an early, no-restriction hands-on training method under close supervision by a senior consultant is the ideal method of training in today's era of time limitations and limited opportunities for training.

Conflict of interest

None declared.

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Ethical approval

None declared.

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