

Operative Experience vs. Competence: A Curriculum Concordance and Learning Curve Analysis



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OBJECTIVE: Certification of completion of training in general surgery requires proof of competence of index operations by means of 3, level-4 consultant-validated procedural-based assessments. The aim of this study was to examine the relationship between index operative experience and competence.

DESIGN: Higher surgical trainee procedural-based assessments were compared with e-logbooks to determine the relationship between index operative experience and achievement of a third level 4 competence (L4C) related to the indicative procedures of emergency laparotomy (EL, target 100), Hartmann procedure (5), appendicectomy (80), segmental colectomy (20), laparoscopic cholecystectomy (50), and inguinal hernia (80).

SETTING: All trainees are from a single UK Deanery.

PARTICIPANTS: Consecutive 69 national training number higher surgical trainees were appointed to a single UK Deanery between 2007 and 2014.

RESULTS: EL L4C was achieved at a median of 76 (15-136) cases, Hartmann procedure L4C at 17 (7-27) cases ($p = 0.009$ vs. EL), appendicectomy L4C at 107 (20-206) cases, segmental colectomy L4C at 52 (15-131) cases, laparoscopic cholecystectomy L4C at 72 (40-197) cases, and inguinal hernia L4C at 64 (17-132) cases.

CONCLUSIONS: The learning curve and caseload required to demonstrate L4C related to specific procedure varied over 4-fold, from 0.76 to 3.4 times the national indicative target number guidance. Certification of completion of training operative logbook number targets should be reconsidered to better reflect the competencies demanded by the curriculum. (J Surg Ed 73:694-698. © 2016 Association of

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KEY WORDS: training, competence, workplace-based assessment, procedure-based assessment, ISCP, surgery

COMPETENCIES: Patient Care, Practice-Based Learning and Improvement, Medical Knowledge

INTRODUCTION

Good medical practice and proof of surgical competence have long been considered important. Indeed, the Royal College of Surgeons of Edinburgh original charter of 1505 stated,

“No manner of person [shall] employ our said crafts of surgery unless he be worthy and expert in all the subjects belonging to the said crafts, [and be] diligently and advisedly examined.”¹

Surgical education and postgraduate training is under scrutiny, not least because of its craft specialty status, but because of iterative and progressive initiatives aimed at improving yet shortening training time.^{2,3} The traditional British surgical apprenticeship has undergone profound reconfiguration, culminating in a reformed postgraduate medical training program (modernizing medical careers) which, allied to a competency-based approach, demands quantifiable educational outcomes and unequivocal proof of ability.⁴⁻⁶ The Intercollegiate Surgical Curriculum Programme (ISCP)⁷ and the associated General Medical Council curricula have reshaped surgical training and have contained required levels of competence since their inception, but until 2013 no specific quantitative guidelines existed for the award of a certificate of completion of training (CCT) in general surgery. At this juncture, the UK Joint Committee on Surgical Training published specific CCT guidance, citing among other professional credentials, clinical competence, operative experience, and operative competence.⁸ The caseload components of the above include key procedures, chosen because of their clinical

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importance and because they can be used as a marker of experience across the breadth of the curriculum. Experience in each key procedure is compared with an indicative target number set at a level that corresponds to the first quartile from a modest cohort of successful national CCT applicants in previous years.⁹ These curricular numbers have caused a degree of angst because of fears that the levels may be unrealistic and unachievable in certain specialties and training posts.¹⁰

Validated assessment tools such as the procedural-based assessment (PBA) allow objective assessment of technical skills, with each procedure associated with a generic descriptor-based grading (Fig. 1).¹¹ Evidence of competence for each procedure is required by completion of 3 consultant-validated PBAs at level 4 (competent to perform independently and deal with complications, Fig. 1). The aim of this study was to examine the relationship between the volume of operative experience in the key indicative procedures required of all general surgery trainees and the level of competence achieved within a higher surgical training program in a single UK Deanery.

MATERIALS AND METHODS

All national training number higher surgical trainees (HSTs) within a single UK deanery that had commenced higher surgical training between August 2007 and August 2014 were identified, and the relevant ISCP online portfolios were interrogated through the Head of School report function. Individual HST reports were created with particular reference to PBA dates and competence levels achieved for the 6 indicative procedures required of all general surgery HSTs (Table 1). Access to trainee e-logbooks was obtained through the Head of School Director's page and individual indicative procedure reports created within dates specified. This feature provided logbook data for all of the specified indicative procedures. PBA dates and levels

Levels of Procedure-Based Assessment (Global Summary)

0	Insufficient evidence observed to support a summary judgement
1	Unable to perform the procedure, or perform the procedure part observed, under supervision
2	Able to perform the procedure, or perform the procedure part observed, under supervision
3	Able to perform the procedure with minimum supervision (needed occasional help)
4	Competent to perform the procedure unsupervised (could deal with complications that arose)

FIGURE 1. Procedure-based assessment level descriptors.

TABLE 1. Median Number of Indicative Operations Performed Related to HST Level

n	Median Operative Cases						
	EL	LC	HMN	IH	APX	SC	
ST3	9	22	21	2	16	55	5
ST4	15	41	47	4	48	61	13
ST5	11	63	50	8	52	96	29
ST6	9	78	66	6	65	117	30
ST7	9	111	88	12	86	118	48
ST8/CCT	16	136	87	22	102	144	60
Total	69	67	59	7	64	100	23

n, number of trainees; LC, laparoscopic cholecystectomy; IH, inguinal hernia; APX, appendicectomy.

were cross-referenced with e-logbooks to ascertain the relationship between competence level achievement and the operative volume performed. Assessors for PBAs were all Consultant Clinical Trainers in General Surgery, who were competent to perform the procedure under assessment. Along with written guidance and web-based training via the ISCP, all consultant trainers had attended a Deanery training workshop. Only the PBAs that were consultant trainer validated and undertaken in approved higher surgical training posts were included. Operative experience obtained in posts before commencement of higher surgical training was also included, as this represented global operative experience. Competence commensurate with the award of a CCT and was defined as third level 4 competence (L4C) PBAs.

All data were anonymized, and statistical analysis appropriate for nonparametric data was performed using SPSS 20 (IBM, Chicago, IL). Ethical approval for the study was provided by the Cardiff University research ethics committee.

RESULTS

A total of 69 consecutive HSTs were included in the analysis, and details regarding the grade of the HSTs and the median number of key indicative procedures performed are shown in Table 1.

A total of 8 HSTs had achieved all the PBA operative competences required for CCT (7 specialty trainee year 8 [ST8], 1 ST7 grade), and 7 HSTs had achieved CCT PBA competences in 5 of the 6 procedures (1 ST8, 2 ST7, 3 ST6, and 1 ST5). A total of 18 HSTs met the indicative operative target numbers for all 6 procedures (10 ST8, 5 ST7, 2 ST6, and 1 ST5).

Table 2 shows the median number of procedures at which the first and the third level 4 PBA competencies were achieved. The ratio of the median number of operations at L4C achievement to CCT operative target (L4C/CCT) was defined as the competence ratio (Table 2). A ratio of <1 meant that the competence was achieved within the Joint

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