Commentary

Does Experience Meet Expectations Among General Surgical Trainees in Australia and New Zealand?

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Introduction

One of the key aspects to become a skilful surgeon is to acquire the technical competence in performing the various operations safely. Several changes in the general surgical (GS) training curriculum in the United States have highlighted concerns regarding the experience of final year GS residents.[1-4] This study was undertaken to determine if the experiences of the GS trainees under the supervision of the Royal Australasian College of Surgeons (RACS) coincides with their expectations and those of their training supervisors.

Materials and Methods

General surgery is one of the 9 surgical specialties supervised by the RACS. The surgical education and training (SET) programme comprises 5 years of supervised training (SET-1 to SET-5). The adequacy of the training is monitored with regular accreditation of the hospitals by RACS and review of the trainees' logbooks.

For this study, all the GS trainees of the RACS were contacted via email in 2010 to complete an online questionnaire. Participation was voluntary and blinded. A list of 15 surgical skills (Table 1) was compiled after consultation with the Board in GS as to what were considered core surgical skills that should be mastered upon completion of the SET programmes.

The trainees were asked to describe the expected number of cases that they consider should be completed at the end of their training and the actual number of cases that they have performed. Questions on the percentage of skills that the trainees are expected to perform independently without mentor intervention (mentor being scrubbed) and the actual number of cases that they could complete independently were also asked. All the training supervisors in the GS specialty of the RACS were also contacted and asked similar questions regarding their expectations of trainees' competencies. The study protocol was reviewed and approved by our Institutional Ethics Committee. Statistical analysis was carried out using the Mann Whitney U and Wilcoxon test (SPSS program (Chicago, Illinois, USA)).

Table 1. List of 15 Surgical Skills Expected of the Trainees upon Completion of the General Surgery Training Programme

1.	Assessment of shock
2.	Assessment of the acute abdomen
3.	NGT insertion
4.	Skin closure
5.	Chest drain insertion
6.	Insertion of hasson cannula
7.	Open/close abdomen
8.	Open inguinal hernia repair
9.	Open appendectomy
10.	Laparoscopic appendicectomy
11.	Mastectomy
12.	Open cholecystectomy
13.	Laparoscopic cholecystectomy
14.	Hemicolectomy
15.	Colonoscopy

NGT: Nastrogastric tube

Results

A total of 159 of 478 (33.3%) GS SET trainees and 42 of 187 (22.2%) SET supervisors completed the survey. Apart from colonoscopy which the supervisors expected a higher number of cases (P = 0.025), there were no significant differences in the numbers expected to be performed between the trainees and supervisors in the other skills (Table 2).

Among the senior trainees (SET4-5), open cholecystectomy was the only procedure which they did not achieve the caseload expected by the supervisors (P = 0.001) (Table 3).

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Table 2. Median Numbers of General Surgical Skills Expected for Competency and Actually Performed at SET 4-5 Level

Surgical Skills	Expected			Actual
	SET Supervisor	Trainees	SET 4-5	SET 4-5
Number in group	42	159	52	52
Shock	21 – 50	21 – 50	21 – 50	101 – 150
Acute abdomen	51 – 100	51 – 100	51 – 100	>300
NGT	12 – 20	6 – 11	6 – 11	21 – 50
Skin closure	21 – 50	21 – 50	21 – 50	>300
Chest drain	12 – 20	12 – 20	6 – 11	21 – 50
Hasson cannula	21 – 50	21 – 50	21 – 50	>300
Open/close abdomen	21 – 50	21 – 50	21 – 50	151 – 200
Open inguinal hernia	21 – 50	21 – 50	21 – 50	101 – 150
Open appendectomy	21 – 50	21 – 50	21 – 50	51 – 100
Laparoscopic appendectomy	21 – 50	21 – 50	21 – 50	101 – 150
Mastectomy	21 – 50	21 – 50	12 – 20	21 – 50
Open cholecystectomy	21 – 50	21 – 50	21 – 50	12 – 20
Laparoscopic cholecystectomy	51 – 100	51 – 100	51 – 100	101 – 150
Hemicolectomy	51 – 100	51 – 100	21 – 50	51 – 100
Colonoscopy	101 – 150	51 – 100	51 – 100	151 – 200

NGT: Nastrogastric tube

Table 3. Univariate Analysis of Median Numbers of General Surgical Skills Expected for Competency and Actually Performed at SET4-5 Level (*P* values)

Surgical Skills	Expected by Supervisors vs Expected by Trainees	Expected by Supervisors vs Expected by SET 4-5	Expected by Supervisors vs Actually Performed by SET 4-5	Expected by SET 4-5 vs Actually Performed by SET 4-5
Type of Analysis Performed	Mann Whitney U	Mann Whitney U	Mann Whitney U	Wilcoxon
Shock	0.840	0.781	0.001	0.001
Acute abdomen	0.534	0.665	0.001	0.001
NGT	0.105	0.112	0.006	0.001
Skin closure	0.501	0.784	0.001	0.001
Chest drain	0.064	0.032	0.006	0.001
Hasson cannula	0.507	0.588	0.001	0.001
Open/Close abdomen	0.929	0.901	0.001	0.001
Open Inguinal hernia	0.997	0.528	0.001	0.005
Open appendectomy	0.520	0.311	0.004	0.001
Laparoscopic appendectomy	0.919	0.545	0.001	0.001
Mastectomy	0.974	0.105	0.799	0.098
Open cholecystectomy	0.332	0.079	0.001	0.002
Laparoscopic cholecystectomy	0.879	0.526	0.001	0.001
Hemicolectomy	0.700	0.641	0.223	0.337
Colonoscopy	0.025	0.019	0.277	0.002

NGT: Nastrogastric tube

Table 4. Median Percentages of General Surgical Skills Expected to be Performed Without Mentor Intervention and Actually Performed at SET 4-5 Level

Surgical Skills	Expected			Actual
	SET Supervisor	Trainees	SET 4-5	SET 4-5
Number in Group	42	159	52	52
Shock	71 – 80	81 – 90	81 – 90	81 – 90
Acute Abdomen	91 – 100	91 – 100	91 – 100	91 – 100
NGT	91 – 100	91 – 100	91 – 100	91 – 100
Skin Closure	91 – 100	91 – 100	91 – 100	91 – 100
Chest Drain	91 – 100	91 – 100	91 – 100	91 – 100
Hasson Cannula	91 – 100	91 – 100	91 – 100	91 – 100
Open/Close Abdomen	91 – 100	91 – 100	91 – 100	81 – 90
Open Inguinal Hernia	91 – 100	91 – 100	91 – 100	81 – 90
Open Appendectomy	91 – 100	91 – 100	91 – 100	91 – 100
Laparoscopic Appendectomy	91 – 100	91 – 100	91 – 100	91 – 100
Mastectomy	71 – 80	71 – 80	71 – 80	21 – 30
Open Cholecystectomy	61 – 70	61 – 70	61 – 70	1 – 10
Laparoscopic Cholecystectomy	81 – 90	81 – 90	71 – 80	71 – 80
Hemicolectomy	71 – 80	61 – 70	61 – 70	41 – 50
Colonoscopy	81 – 90	81 – 90	81 – 90	81 – 90

NGT: Nastrogastric tube

Table 5. Univariate Analysis of Median Percentages of General Surgical Skills Expected to be Performed Without Mentor Intervention and Actually Performed at SET4-5 level (*P* values)

Surgical Skills	Expected by Supervisors vs Expected by Trainees	Expected by Supervisors vs Expected by SET 4-5	Expected by supervisors vs Actually Performed by SET 4-5	Expected by SET 4-5 vs Actually Performed by SET 4-5
Type of Analysis Performed	Mann Whitney U	Mann Whitney U	Mann Whitney U	Wilcoxon
Shock	0.303	0.524	0.907	0.185
Acute Abdomen	0.853	0.908	0.896	0.351
NGT	0.496	0.803	0.292	0.063
Skin Closure	0.155	0.085	0.530	0.207
Chest Drain	0.673	0.595	0.642	0.464
Hasson Cannula	0.286	0.341	0.137	0.596
Open/Close Abdomen	0.126	0.042	0.002	0.211
Open Inguinal Hernia	0.419	0.404	0.043	0.098
Open Appendectomy	0.274	0.586	0.203	0.131
Laparoscopic Appendectomy	0.911	0.951	0.823	0.442
Mastectomy	0.831	0.903	0.001	0.001
Open Cholecystectomy	0.765	0.354	0.002	0.001
Laparoscopic Cholecystectomy	0.526	0.361	0.116	0.376
Hemicolectomy	0.146	0.377	0.003	0.003
Colonoscopy	0.394	0.750	0.372	0.355

NGT: Nastrogastric tube

The SET 4-5 trainees actually performed more cases in 12 of 15 (80%) listed skills than expected by the supervisors.

Independence of Trainees

The SET 4-5 trainees were able to complete 8 of 15 (53%) skills independently at the same levels expected by the supervisors (Tables 4 and 5). The 5 skills they were not able to perform independently at levels expected by supervisors included opening and closing the abdomen ($P = 0.002$), open inguinal hernia ($P = 0.043$), mastectomy ($P = 0.001$), open cholecystectomy ($P = 0.002$) and hemicolectomy ($P = 0.003$).

Discussion

In this study, the trainees and supervisors largely agreed on the expected number of cases that are required of each trainee to perform at the end of their training. What is more worrying is that senior trainees were unable to fulfil their expected caseload in 5 of the procedures independently. For opening and closing of abdomen and open inguinal hernia, the numbers of cases performed, with and without mentor intervention, were considerably different. The underlying reason is likely multifactorial. These may include operative time constraints, and assistance provided by the mentor in parts of the procedure.[5-8]

Perhaps even more concerning was the lower numbers being achieved for mastectomy, hemicolectomy and especially open cholecystectomy. This is likely due to the continual expansion of fellowship programs (Breast, colorectal and upper gastrointestinal) in Australia and New Zealand. This trend was also noted in the United States with more than 80% of the general surgical residents opting for further training in various fellowship programmes.[9-12] Although the presence of the fellows does not necessary imply that the cases of the residents would drop, the fellows or the attending consultant may remained scrubbed longer and intervene earlier during the operations. This trend will likely create a vicious cycle whereby the cases that were previously deemed to be mastered by the senior trainees will only be performed during the fellowship years. It is imperative that the training board needs to be proactive and be explicit in determining which core skill must be taught and mastered in general surgery.

Teaching the next generation of surgeons can no longer be one-dimensional; the continual advancement in technology should be gradually embraced. Although simulation does not create the same environment and experience as in the operative theatre, there is no doubt that tools such as endoscopy models and laparoscopic modules can help shorten the learning curve of trainee.[13-16] Moreover, mastering simpler procedures would also aid the subsequent acquisition of the expertise necessary for a more challenging operation. The concept of skill transference would be applicable in the various laparoscopic procedures and types of bowel anastomoses.

While a response rate of 33.3% among trainees could be viewed as disappointing and a significant limitation of our study, this is the first time that such an endeavour has been achieved in the GS fraternity within the RACS. Our study highlights that regular feedback between the trainees and supervisors is essential to ensure the transparency of the programme. The surgical experience of each trainee should not be the only factor to determine for competency. Knowledge, decision-making, and pre- and post-operative management skills are also vital to ensure that the outcomes of the patients are not jeopardised. The impact of the fellowship programmes on the general surgical trainees can no longer be underestimated.

Conclusion

The experiences of the general surgical trainees concur well with their own expectations, as well as that of their supervisors. A multitude of factors are likely accountable for the lower number of independent operative experience in certain procedures encountered by the trainees.

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