COLORECTAL OPERATIVE EXPERIENCE IN GENERAL SURGICAL TRAINING AT KING FAISAL SPECIALIST HOSPITAL AND RESEARCH CENTRE

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Surgical residents in Saudi Arabia, like trainees the world over, complain that their operative surgical experience is inadequate. Trainers, on the other hand, stress the importance of judgement and book knowledge[1] over operative experience. In a recent North American study, it was claimed that anorectal surgical training in General Surgery residency programs was inadequate.[2] The present study examines the operative colorectal surgical experience of a group of advanced general surgical residents at King Faisal Specialist Hospital and Research Centre (KFSH&RC) and compares this experience with a group of trainees attached to a single colorectal service at a University Hospital in New Zealand in an Australasian surgical training program.

Materials and Methods

KFSH&RC is a tertiary referral hospital in the Kingdom of Saudi Arabia and all residents in the Saudi Surgical Board Program at the hospital have the opportunity to rotate through the colorectal service. Patients are referred to the service from all over the Kingdom and the colorectal case mix is thus biased towards the more complicated and major procedures. The size of the population served is unknown. Wellington Hospital is a base teaching hospital serving a local community of about 150,000 people. It is also a tertiary referral center for about one million inhabitants of the southern half of the North Island of New Zealand.

Both of the colorectal services consisted of one full-time consultant surgeon whose practice was limited to colorectal surgery, one advanced trainee or senior resident and one pre-registration house surgeon or first-year resident.

All patients presenting to the service in Wellington between April 1975, when the service was founded, and March 1990, and all patients presenting to the service at KFSH&RC between March 1990 and March 1998 were recorded in a computerized database.[3] Postoperative mortality was documented for all patients dying within 30 days of surgery. The data were analyzed in order to determine the distribution of operative activity between consultants and trainee surgeons working in the services. Initially trainees assisted the consultant with a particular procedure, then they performed the procedure with the consultant assisting and finally they were allowed to perform the procedure on their own when they were considered to have shown their ability to do so. Procedures performed by the trainee with consultant assistance or alone were considered to be trainee operations. Data relating to the type of surgery, the surgeon, the patient's disease, the operation performed and the postoperative complications were examined and compared for trainees in both centers. Operative workloads were expressed as the average number of cases operated on by the respective trainees in a twelve-month period.

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TABLE 1. *Type of operation and number of patients per year.*

	NZ		KFSH&RC	
	Consultant	Trainee	Consultant	Trainee
Elective	50	32	95	30
Emergency	2.9	32	4.1	2.8
Semi-urgent	7.6	3.8	4.9	2.9

NZ=New Zealand; KFSH&RC=King Faisal Specialist Hospital and Research Centre.

Results

In Wellington, 1959 colorectal surgical procedures were performed, with 1012 operations being performed by trainees. At KFSH&RC, 1143 procedures were undertaken, with 287 procedures being performed by residents. Proportionally more males were operated on by consultants than trainees in Wellington (M:F ratio 1:1.1 and 1:0.6, respectively), whereas at KFSH&RC the ratios were similar (M:F 1:0.5). The average age of patients operated upon by trainees was lower than those of patients operated upon by consultants in Wellington (39 years vs. 55 years), but this difference was not found at KFSH&RC (45 years vs. 42 years). Consultants performed more elective surgery at KFSH&RC than in Wellington and trainees performed more emergency surgery in Wellington (Table 1).

TABLE 2. *Minor surgery, numbers of patients per year (NZ, KFSH&RC), and average number of cases per resident, per five-year residency (USA).*[2]

	New Zealand		KFSH&RC		USA
	Cons	Trainee	Cons	Resident	GS Resident
Condyloma excision	1.1	4.4	1.5	0.8	–
Pilonidal sinus (abscess) - lay open	2.0 (0.1)	19.9 (12.0)	8.3 (0.9)	4.7 (0.6)	4.2
Fissure - anal dilatation	1.9	5.6	5.1	0.8	–
Fistula - lay open	3.2	2.9	20	5.1	4.8
Fistula - insert seton	0	0	9.6	3	–
Hemorrhoidectomy	3.7	7.3	8.8	5.4	8.3

Cons=consultant; GS=general surgery.

TABLE 3. *Major operations, number of patients per year (NZ, KFSH&RC), and average number of cases per resident, per five-year residency (USA).*[5]

	New Zealand		KFSH&RC		USA
	Cons	Trainee	Cons	Resident	GS Resident
Rt hemicolectomy	5.2	2.3	4	1.8	}
Lt hemicolectomy	2.3	0.4	0.9	0.3	} 37. 2
Sigmoid colectomy	7.2	1.4	2	1.6	}
Anterior resection rectum	4.3	0.5	7	1.8	
Abdominoperineal resection rectum	2.9	0.3	7	1.4	3.2
Hartmann's operation	2.8	1.3	3.3	0.6	–
Panproctocolectomy	0.7	0	0.4	0	–
Total colectomy	2.7	0.1	3.3	0	–
Ileo-anal pouch	0.4	0	3.6	0	1.5

TABLE 4. *Stomata, number of patients per year (NZ, KFSH&RC), average number of cases per resident, per five-year residency (USA).*[5]

	New Zealand		KFSH&RC		USA
	Cons	Trainee	Cons	Resident	GS Resident
Colostomy (loop)	3.5	2.5	8.4	4.3	7.5
Ileostomy	3.1	0.2	7.9	0	2.3
Close stoma	3.6	1.3	5.4	5.5	7.5
Close Hartmann's stoma	2.5	0.3	2.4	0.1	–

The numbers of minor surgical procedures performed overall differed between Wellington and KFSH&RC (Table 2). Trainees in Wellington, for instance, performed more operations for pilonidal abscess and anal fissure, but residents at KFSH&RC had much greater exposure with anal fistula surgery. Similarly, KFSH&RC residents saw and performed more major rectal surgery than their counterparts in Wellington (Table 3). KFSH&RC residents were generally exposed to more stoma surgery (Table 4), and also managed more patients with colorectal cancer (Table 5). Postoperative morbidity and mortality were similar in both centers (Table 6).

The yearly workloads for minor anorectal conditions in both the Wellington and KFSH&RC specialist units were similar to the average number of cases operated upon for a total five-year residency in the USA (Table 2).

Discussion

There will probably always be debate between trainers and trainees with regard to the learning of operative surgery. Do trainees undertake enough operative surgical procedures during training? What is reasonable operative experience based on an individual trainee's training needs? What is possible and reasonable based on a unit's clinical workload? What is possible and what is needed may not match. Training log books have now become an integral part of surgical assessment in the exit examinations of most of the Royal Colleges,[4] but to date no clear guidelines have been made available to trainees with regard to what constitutes adequate "log book experience." In contrast, residents in Saudi Arabia do know what is expected because the Saudi Surgical Board has published log book guidelines (Table 7). There thus exist Saudi Board criteria against which to judge the findings of this study.

The case load/case mix differed considerably between Wellington and KFSH&RC, as evidenced by the age, sex and frequency of emergency surgery. Referral bias in Riyadh and the differing incidence of colorectal surgical problems in the two countries probably accounted for the case mix differences and thus the case mix available for resident training at KFSH&RC. In general, there were more patients with rectal cancer and complex anal fistulae at KFSH&RC, and this difference is reflected in the training experience of the residents. The overall differences in the number of operations performed by trainees in Wellington and residents at KFSH&RC is explained by the shorter study period for KFSH&RC data and the greater number of minor surgical emergency procedures performed in Wellington.

KFSH&RC residents clearly do not get exposed to very much emergency colorectal surgery, another function of the referral bias, and this deficiency in the program is presently overcome by rotating all residents to other acute hospitals in Riyadh during their training period. Data regarding workload and operative experience, however, is not available for these rotations. In general, it would appear that KFSH&RC residents are easily able to satisfy the Saudi Board criteria for colorectal surgical experience (Table 7).

The overall experience gained by residents in training at KFSH&RC was very similar to that available in New Zealand. North American general surgical residents,[2,5] for the most part, performed a similar number of minor anorectal procedures but a slightly greater number of major colorectal procedures than either Wellington trainees or KFSH&RC residents (Tables 2, 3 and 4). There was thus some support for the idea that both KFSH&RC and Wellington trainees should spend a further period of post-

Fellowship/Board training overseas before being allowed to practice colorectal surgical procedures independently. It is doubtful whether training programs in either Wellington or Riyadh will enable greater operative experience in the future, because the limitations identified in this study are primarily determined by the incidence of disease in the community. Training in Saudi Arabia is thus greatly limited by the much lower frequency in the Kingdom of any of the "Western type" surgical conditions commonly included in overseas training programs. In effect, training in the Kingdom is training with what is available rather than training with what is needed for a comprehensive "Western type" exposure. Whether an overseas component of training is either necessary or justified under these circumstances can be questioned. Whether the Saudi Board should accept Saudi training without an extra overseas portion, being that it is more relevant to the population served, remains to be determined. Certainly the concept of training country/rural surgeons in a different way from surgeons who expect to work in the Kingdom's tertiary hospitals has much to commend it. The former might need some trauma experience in addition to simple obstetric and gynecological training and basic general surgery, whereas the tertiary surgeon in a large metropolitan hospital would undoubtedly benefit from time in a specialized overseas fellowship.

It is often argued that surgical training is for the most part based on an apprenticeship system[6] in which graded supervision, as described in this study, ensures that patients come to no harm. It has been reported, however, that trainee surgeons have higher complication rates than the consultants who train them,[7] but this did not appear to be the case in the present study in either Wellington or KFSH&RC.

The operative workloads of trainee surgeons rightly or wrongly depend upon expediency (the availability of elective and emergency work), the willingness of consultants to "give" cases to trainees (sometimes surgeons enjoy operating), the operative ability of the trainee, the keenness of the trainee in general, and in particular, the way in which he or she manages patients in the wards and clinics, and finally, the case mix and difficulty in the unit. Consultants often allow a good and competent trainee to gain operative experience as a reward for good patient care outside of the operating room. Training is thus in major part determined by the trainee and has to be earned. This aspect of training in the Kingdom could be improved by the trainees themselves if they applied themselves more and thus "earned" more operative experience.

Experience without training increases confidence but not competence.[8] Training in surgery is thus not simply a question of teaching operative techniques. Most problems with trainees occur in relation to attitudes and behavior.[9] These problems themselves, if present, may have a major impact on the gaining of operative experience. While psychomotor skills may be learned in a laboratory or animal setting, all-round operative competence can only be learned with a real patient.[9]

TABLE 5. *Colorectal cancer patients, primary treatment and number of patients per year.*

	New Zealand		KFSH&RC	
Dukes stage	Consultant	Trainee	Consultant	Resident
A	3.5	0.9	3.4	0.9
B	7.9	1.6	8.1	2.1
C	6.1	1.5	6.8	2.1
Metastases	4.2	0.8	3.9	3.4
Total	22	4.8	22	8.5

TABLE 6. *Postoperative complications and number of patients per year.*

	New Zealand		KFSH&RC	
	Consultant	Trainee	Consultant	Resident
Atelectasis	4.6	0.7	12	5
Pulmonary infection	3.5	0.5	1.6	0.3
Pulmonary embolism	0.6	0.1	0.4	0.3
Myocardial infarction	0.3	0.3	0	0
Congestive heart failure	0.8	0.2	0.1	0
Stroke	0.2	0.2	0.6	0
Wound infection	10	1.6	11	2.4
Wound dehiscence	0.9	0.2	0.6	0
Anastomotic leak	0.7	0.1	1.3	0.3
Urinary tract infection	11	1.7	10	2.5
Central line sepsis	2.3	0.3	3.8	0.5
Deep vein thrombosis	0.9	0.1	0.3	0.3
Abdominal abscess	1.5	0	1.3	0.4
Postoperative obstruction leading to surgery	0.7	0.1	0.5	0.3
Postoperative deaths (30 days)	1.7	0.5	1.1	0.1

TABLE 7. *Saudi Board of Surgery criteria for colorectal surgical training.*

Procedure	Performed as assistant	Performed as surgeon
Drain anorectal abscess	5	10
Pilonidal sinus surgery	3	5
Anal fistula surgery	5	10
Hemorrhoidectomy	10	15
Anal fissure surgery	5	10
Colostomy	2	2
Colectomy	6	3
Abdominoperineal resection of rectum	3	–

On the basis of the data presented in this study it is tempting to conclude that colorectal procedures are insufficiently frequently performed by general surgeons in training at KFSH&RC. Saudi Board criteria are likely to be met, however, and the need for more complex additional training overseas still remains to be determined by the Saudi Board at a future date. Until similar unit

audits and careful evaluation and analysis of log book data are undertaken more widely it will not be possible to determine the overall adequacy of training in general surgical programs in the Kingdom of Saudi Arabia.

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