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Impact of laparoscopic cholecystectomy on surgical training

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All cholecystectomies in a single health district were studied during a 5-year period spanning the introduction of laparoscopic cholecystectomy (LC). The number of LCs increased from 2 (1.3%) in year 3 to 86 (56%) in year 5. The number of operative cholangiograms and explorations of the common bile duct performed both fell substantially. The age distribution did not change significantly during the study period, but the percentage of females undergoing cholecystectomy increased. The percentage of trainee operations remained constant in those Firms performing only open cholecystectomy (OC), but fell from 67% to 9% in those adopting LC.

An increase in annual cholecystectomy rate was seen with the laparoscopic surgeons, with a corresponding fall for those surgeons performing only OC.

There was a threefold increase in the percentage of operations performed privately from years 2 to 5, with 73% being laparoscopic in year 5.

The consequences for training of the introduction of LC must be addressed.

The aim of this study was to examine the effect of the introduction of laparoscopic cholecystectomy (LC) on surgical training.

Since the introduction of the technique, laparoscopic cholecystectomy has rapidly become the treatment of choice for symptomatic gallstones *(1)*.

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It is important that this technique is safely and rapidly incorporated into surgical training. However, there do not at present exist any standards for qualification in this new technique, and many of the trainers are themselves largely self-taught *(2–4)*. In addition, concern has arisen as to the operative experience of trainees in the traditional open cholecystectomy (OC), which is a prerequisite to safe laparoscopic surgery *(4)*.

The impact of LC on peroperative cholangiography and exploration of the common bile duct is also controversial.

With a decrease in the number of operating lists, a decrease in the frequency of emergency duties, and a decrease in the overall duration of higher surgical training, a shift in cholecystectomy to a consultant, and often private operation, would have serious consequences for the training of present and future surgeons.

Patients and methods

All cholecystectomies performed in a single health district with a stable population of 260 000 were studied over a 5-year period from July 1988 to the end of June 1993, a total of 725 operations.

The data were obtained from operating theatre registers at both NHS and the one private hospital in the district.

This period spanned the introduction of LC in February 1991.

During the study period, seven consultant surgeons and their trainees performed cholecystectomies. Five consultants performed the majority of the operations (98%) and the data from these five consultants were analysed in more detail.

The junior staff structure comprised a registrar, senior house officer and two house officers. Of these, only the registrar participated in laparoscopic operations.

Of the five consultants, two introduced LC and three

Table I. Overall data for the 5-year study period

	Year					
Procedures	*1*	*2*	*3*	*4*	*5*	*Total*
Total	123	144	152	154	152	725
Emergency	3	7	5	8	2	25
	(2.4%)	(4.9%)	(3.3%)	(5.2%)	(1.3%)	(3.4%)
Laparoscopic cholecystectomy	0	0	2	28	86	116
	(0%)	(0%)	(1.3%)	(18%)	(56%)	(16%)
	Includes laparoscopic cholecystectomy data					
Cholecystectomy only	59	47	69	105	133	413
	(48%)	(32.6%)	(45.3%)	(68%)	(87.5%)	(57%)
Cholecystectomy & O/C*	41	77	57	34	15	224
	(33.3%)	(53.5%)	(37.5%)	(22%)	(9.8%)	(30.9%)
Cholecystectomy & ECBD†	19	15	19	8	4	65
	(15.5%)	(10.4%)	(12.5%)	(5.2%)	(2.6%)	(9%)
Cholecystectomy & other	4	5	7	7	0	23
	(3.3%)	(3.5%)	(4.6%)	(4.5%)	(0%)	(3.2%)

* O/C, Peroperative cholangiogram
† ECBD, Exploration of common bile duct

continued to carry out the open operation. One consultant started LC in February 1991 and the second in July 1992.

The frequency of emergency and elective procedures, operative cholangiography, exploration of the common bile duct or other procedures performed during the same operation was recorded, together with data on the age and sex of the patients.

The grade of principal operator for all operations, ie consultant or trainee was determined. These data were recorded for all seven consultants.

Results

The annual rate of cholecystectomy showed only a small change over the study period, with a 5.3% rise from year 2 to year 5.

The number of emergency operations showed a drop in year 5 from around 4% in the preceding 4 years to 1% (Table I).

The percentage of cholecystectomies performed laparoscopically rose from 1.3% in year 3 to 56% in year 5 (Table I).

The percentage of operative cholangiograms performed fell from 41% in the first 3 years to 9.8% in year 5, and of the LC operations, only 3 (2.5%) in year 5 had cholangiography performed (Table I).

The frequency of exploration of the common bile duct (ECBD) fell from 12.8% in the first 3 years to 2.6% in year 5 (Table I).

The age distribution of the patients did not change significantly during the study period, with a mean of 53.2 years and a median of 53 years. The minimum ages ranged from 12 to 20 years and the maximum ages from 87 to 92 years.

The ratio of female to male patients increased steadily each year from 71% in the first 3 years to 80% in year 5.

The two surgeons performing LC showed a combined increase of 51% in year 5 compared with the previous 4 years. Conversely, for the three surgeons practising only open operations, there was an overall fall of 29% in year 5 compared with the previous 4 years (Table II). There were eight conversions from laparoscopic to open cholecystectomy during the study period, one in year 4 and seven in year 5 (all included in laparoscopic data). All of these were consultant-initiated operations, and were divided equally between the two laparoscopic surgeons.

The proportion of operations performed by trainees did not fall with those consultants performing only open cholecystectomy, remaining at around 65%, but for the trainees of the consultants performing LC the rate fell from 67% in the first 2 years, to 36% in year 4 and to 9% in year 5 (Table III).

Although there was a 5.3% increase in the annual rate of cholecystectomy from year 2 to year 5, there was a threefold increase of operations performed in the private sector: 73% of private cholecystectomies in year 5 and all those in the last 6 months of the study were performed laparoscopically (Table IV).

Table II. Annual number of cholecystectomies by consultant firms

	Year				
	1	*2*	*3*	*4*	*5*
Cons. 1 (Lap)	35	30	22	24	20
Cons. 2 (Lap)	30	40	38	45	79
Cons. 3 (Open)	21	21	31	27	18
Cons. 4 (Open)	10	25	23	30	12
Cons. 5 (Open)	19	23	37	28	23
Cons. 1 & 2	65	70	60	69	99
Cons. 3, 4 & 5	50	69	91	85	53

Table III. Percentage of operations performed by trainees

	Year				
	1	*2*	*3*	*4*	*5*
Open cholecystectomy					
Consultants	66%	65%	68%	64%	64%
	33×50	45×69	62×91	54×85	34×53
Laparoscopic cholecystectomy					
Consultants	63%	71%	48%	36%	9%
	41×65	50×70	29×60	25×69	9×99

Table IV. Private operations per year

Year	*No.*	*%*	*LC (%)*
1	8	6.5	0
2	6	4.2	0
3	13	8.5	0
4	15	9.7	13
5	22	14.5	73

Discussion

The decrease in emergency cholecystectomy from 4% to 1% may be due to a policy shift in the management of acute cholecystitis consequent on the introduction of laparoscopic cholecystectomy.

The perceived difficulty of LC on the acutely inflamed gallbladder may have led to conservative management, followed by a laparoscopic operation after an interval.

There was a marked decrease in the number of peroperative cholangiograms performed since the introduction of LC, from 41% to only 9.8%, with only three cholangiograms being performed laparoscopically. This may be because of a general shift in policy away from routine cholangiography, or to a reluctance to attempt the technique laparoscopically either because of its perceived difficulty or because of time pressure on the operating lists.

An initial trend to replace peroperative cholangiography with preoperative endoscopic retrograde cholangiopancreatography (ERCP), has given way to a more pragmatic policy. The similar fall in exploration of the common bile duct, from 12.8% to 2.6%, probably has the same explanation.

There has been a longstanding debate with regard to the performance of peroperative cholangiography that predates the introduction of laparoscopic cholecystectomy. The shift away from routine cholangiography in open cholecystectomy is mirrored in the laparoscopic procedure. Essentially, if there was a history of jaundice or pancreatitis, the liver function tests were elevated or the preoperative ultrasound suggested dilatation of the common or intrahepatic biliary ducts, preoperative ERCP was performed. If there were none of the above findings, routine cholangiography was not attempted.

There was a rise in the proportion of women undergoing cholecystectomy from 71% in years 1–3, to 80% in year 5. It is possible that women are more likely to accept cholecystectomy if a more cosmetic operation can be offered.

The fall in annual cholecystectomy rates of those surgeons practising only OC and the corresponding rise in the rates of the laparoscopic surgeons, suggests that a shift in referral pattern by general practitioners may have occurred. Emergency admission with acute gallstone disease between consultants would not be expected to vary. There was a threefold increase in the number of private cholecystectomies performed since the introduction of LC, with all private cholecystectomies performed in 1993 being laparoscopic. The reasons for this shift of LC away from the NHS is not clear, but it may have implications for the operative experience of trainees.

There was a marked reduction in the operative experience of trainees working for those consultants performing LC, from 67% to 9%, compared with those working for consultants who continued to practice OC, where the trainee operation rate remained unchanged at 65%. The reasons for this are complex but may reflect the trainers' learning curves as well as their concern for ductal injury.

Other workers have failed to show any difference in complications, conversion rates or operating times between trainers and trainees, though patient selection, with the more difficult cases being performed by the trainer, may be partially responsible for this *(4)*.

There is as yet no consensus as to the number of LCs that should be performed before a trainee (or for that matter a trainer) is considered competent to operate unsupervised *(3,4)*. Indeed, this is true of any surgical procedure. The number of cases will have to vary with the surgeons' innate aptitude for laparoscopic work, but the teaching of laparoscopic surgery must become a formal requirement of training in general surgery *(5–7)*.

There is a progressive move in higher surgical training towards a reduction in hours, on-call duties and unsupervised out-of-hours operating. There will be fewer operating lists with increased time pressure on each list and an overall decrease in the duration of higher surgical training.

It is proposed to counter the reduction of training experience by more structured supervision, teaching and assessment.

Unless the trends seen in this study are addressed, there may be serious consequences for the cohort of trainees who are being trained at the same time as their trainers are learning new techniques.

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Book reviews

Concept and Practice of Rural Surgery by J K Banerjee. 269 pages, illustrated. Churchill Livingstone. 1993. Rs 150.00. ISBN 81 7042 056 3.

Too few operations are performed in rural areas of India and Africa. People die for lack of surgical expertise, where communications are poor and transport to the nearest surgical centre is difficult.

This 270-page book attempts to address some of these issues. Given that resources are scarce and trained surgeons are not available, are there different options that can be considered? Given that 90% of the population of India lives in the rural areas, should not the development of surgical services in these areas be a priority? The support for high-quality surgery, such as radiology and physiotherapy, will not be available for many decades—how then should the committed surgeon address the problems that he will be confronted with?

Banerjee addresses the practical problems of the provision of sterilisation procedures, the provision of anaesthesia and managing specialties beyond the scope of the general surgeon. Inevitably, flexibility and adaptability will be the hallmark of the surgeon working in rural areas—often hampered by the absence of drugs, anti-biotics, oxygen and essential equipment such as gloves and sutures. This book will encourage those surgeons in India who battle on against seemingly impossible odds.

For some years it has been acknowledged that 75–80% of surgery in the Third World is not complex. The implication of this is that procedures do not need to be performed by a surgeon who has undergone formal training. Several initiatives in Africa and India are now showing that paramedics or GPs in rural areas, trained in a limited number of emergency procedures over a period of months, can begin to make an impact on surgical pathology. Pilot studies in Zambia and Ethiopia, and specialist orthopaedic and trauma courses for paramedics in Malawi, have opened up a new approach to developing world surgery.

This perspective on rural surgery might have been mentioned in this book. Faced with the bare statistics and the exceedingly slow rate of change, the future might indeed look gloomy. However, education of a new breed of surgeons, already committed to the rural areas by choice or by political whim, and with an appropriate minimum of training, heralds a new era in the fate of rural communities.

We must congratulate Dr Banerjee for bringing together so many concepts and practices and for presenting the future for rural surgery in such a positive manner.

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Spinal Trauma: Current Evaluation and Management edited by G L Rea and C A Miller. 237 pages, illustrated. American Association of Neurological Surgeons—Neurosurgical Topics Series. 1994. $90.00. ISBN 1 879284 20 0.

The 14 chapters beautifully review the biomechanics and management of the problems of stability after spinal trauma with splendid line drawings, but do not include any discussion of the management of spinal cord trauma, its pathophysiology, randomised controlled trials of therapy or late sequelae such as syringomyelia. There is some repetition within the first six chapters on cervical spine injury, but they form a most helpful and reassuring review for the neurosurgeon who has to perform his own bone work. Three chapters each are devoted to thoracolumbar and lumbosacral fractures. Finally, there are two rather isolated and brief chapters devoted respectively to calcium paradox in secondary CNS injury and to the use of a bone bank.

I enjoyed reading the chapters on the cervical spine. The book as a whole is a hopelessly incomplete survey of the problems of spinal trauma. The second edition must do better.

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