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STARTING A LAPAROSCOPIC SURGERY PROGRAMME IN THE SECOND LARGEST TEACHING HOSPITAL IN GHANA

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ABSTRACT

Background: Komfo Anokye Teaching Hospital (KATH) is the second largest hospital in Ghana. Two years have elapsed after performance of the first laparoscopic cholecystectomy.

Objectives: To examine our experience and lessons learned.

Design: Retrospective review.

Setting: Komfo Anokye Teaching Hospital (KATH). **Subjects:** We reviewed leadership support, the role of a surgeon champion, training of physician and OR staff, influence of surgeons from outside Ghana and equipment status. The results of laparoscopic cholecystectomies performed from 2010-2012 were compared with information available from open cholecystectomies over the same period.

Results: Evidence of leadership support included equipment purchase and invitation of outside experts yearly from 2008. A KATH surgeon champion was identified in 2010. A dedicated OR team received training and exhibited excellent ownership of equipment preparation. Since 2010, 25 laparoscopic cholecystectomies have been performed, 17 independently by a single surgeon. Average operative time was 1.41 hours and length of stay (LOS) 1.5 days. Conversion rate was 4.0% (1/25). Complication rate was 20.0% (5/25), none involving haemorrhage or injuries to bile ducts or bowel. Median patient satisfaction score was 5 on a scale of 1-5 where 5 is most satisfied. Complication rates and hospital stay were lower than for open cholecystectomy (20.0% vs 34.5%, $p > 0.05$ and 1.5 days vs 6.6 days, $p < 0.001$ respectively). Operative times were on average 27 min longer for laparoscopic cholecystectomy ($p < 0.01$).

Conclusion: Laparoscopic cholecystectomy at KATH has become a reality with less complications rates, shorter LOS, and trends towards improved patient satisfaction. Expanding laparoscopic surgery in Ghana requires its inclusion into residency training programmes and public education about its benefits for both patients and physicians.

INTRODUCTION

Laparoscopy is now considered the standard for the management of many abdominal, urological and gynaecological conditions in developed countries. This has not been the case in many resource-restricted countries due to a variety of factors, including the increased operative cost of minimally invasive procedures as well as the lack of local training opportunities in laparoscopic techniques (1). As the economic situation in some countries improves, an increased interest in learning minimally invasive

surgical techniques has emerged (2-5). The donation of medical equipment, including laparoscopic instruments and endotowers (camera box, light source, CO₂ insufflators, and laparoscopes), by various organisations to resource-poor countries has also provided the opportunity for surgeons to learn and offer minimally invasive surgical procedures (6).

In Ghana, laparoscopic cholecystectomy was only recently introduced in 2005 at the Korle-Bu Teaching Hospital, the nation's largest teaching hospital. Other factors that have been cited as contributing to the late introduction of laparoscopic cholecystectomy in

Ghana include the low cost of in-patient care and a perceived low value of lost working-time in Ghana as is the case in many developing countries (7).

Komfo Anokye Teaching hospital (KATH), the second largest teaching hospital in Ghana, has a bed capacity of 1000, with the surgeons here performing approximately 1950 operations/year.

Prior to 2010, the department of surgery had one laparoscopic tower and some equipment available. All eight General Surgeons in the department had completed various levels of laparoscopic training from attending workshops and hands-on training programmes to formal training through their residency programmes. However, prior to 2010 no laparoscopic procedures had been done.

From 2008, outside experts visited the department once every year to conduct training, especially for residents, using the fundamentals of laparoscopic surgery (FLS) models and also bringing in more equipment. A surgeon champion from KATH was identified in 2010 and in the same year the first laparoscopic cholecystectomy was performed. Here we examine our first two-year experience with starting the programme and lessons learned.

MATERIALS AND METHODS

We evaluated the surgeons, status of equipment for laparoscopy, environment and processes involved in the development of this programme. We reviewed leadership support, the role of a surgeon champion, training of physician and operating room (OR) staff, and the influence of experienced laparoscopic surgeons from outside Ghana and equipment status. The operation time, conversion rate, length of stay and patient satisfaction score after laparoscopic cholecystectomy were recorded. The Clavien-Dindo classification was used to describe the complications encountered after laparoscopic cholecystectomy. The operation time, length of postoperative hospital stay and complication rates were compared to information

available on open cholecystectomies performed in the department during the same period.

A Likert scale of 1 – 5 was used to measure patient satisfaction on postoperative day 14, where 1 was designated as “not satisfied” and 5 as “most satisfied”.

RESULTS

Strong administrative leadership support was evidenced by the prior purchase of laparoscopic equipment, dedicated time for training of surgeons and invitations of outside experts yearly from 2008. Four US surgeons, including two Ghanaians practicing in the US, and one technical support person met in 2010. A KATH surgeon champion was identified at that time. A dedicated OR team received “pre-run” and “on the job” training, worked with the SAGES trouble shooting guide and exhibited excellent ownership of equipment preparation.

In 2010 minor adjustments were made to the laparoscopic tower mentioned above to make it functional. CO₂ was obtained and biomedical engineering support developed through collaboration with the in-house fertility team of the Obstetrics and Gynaecology Department.

Between September 2010 and August 2012, 25 laparoscopic cholecystectomies were performed at KATH. Seventeen (68%) of the cases were performed independently by a single surgeon. Twenty-four of the patients were females. The average age of the patients was 44.6±8.7 years and the average American Society of Anesthesiology score was 1.2±0.4. The average operative time was 1.43±0.34 hours with the average length of hospital stay being 1.5±1.0 days. A conversion rate of 4.0% (1/25) and a complication rate of 20.0% (5/25) were recorded. A comparison of laparoscopic cholecystectomies performed by the independent surgeon with those performed with the help of invited experts is presented in Table 1.

Table 1
Results of laparoscopic cholecystectomies performed at KATH, 2010-2012

	Independent (n = 17)	Assisted (n = 8)	Total (n = 25)
Mean operation time (hr)	1.53±0.33	1.13±0.17	1.43±0.34
Conversion (no.)	1	0	1
Complication rate (no.)	5	0	5
Satisfaction score (median)	5	5	5
Mean length of hospital stay (day)	1.6±1.1	1±0.0	1.5±1.0

Five complications were recorded after laparoscopic cholecystectomy during the period. None of the complications involved haemorrhage or injuries to either bile ducts or bowel. All of them were encountered in patients operated by the independent surgeon in the absence of the invited experts. Three of the complications were grade I on the Clavien-Dindo classification and the other two were grade III and V respectively. Details of the complications and their management are presented in Table 2.

Table 2
Complications after laparoscopic cholecystectomy at KATH, 2010-2012

Patient	Clavien-Dindo grade	Details	Management
1	I	Hypovolemia secondary to diarrhea two days after discharge	I. V. fluids Oral rehydration salts
2	I	Persistent postoperative abdominal pain secondary to peptic ulcer disease (PUD) in a known PUD patient whose status was not picked up preoperatively.	Oral proton pump inhibitors
3	I	Persistent severe postoperative abdominal pain two days after discharge. She had stopped taking the prescribed analgesics	I. V. fluids Oral analgesics
4	III	Sub-hepatic abscess, which developed 3 weeks postoperatively from an unexpected inflammatory process involving the hepatic flexure of colon and anterior abdominal wall noticed during the laparoscopic procedure	Percutaneous drainage
5	V	33 year-old female with Hb SC disease for whom a converted open subtotal cholecystectomy was performed because of extensive scarring of the gallbladder and Calot's triangle. She died in the night, presumably, from a sickling crisis.	-

During the same period, 58 open cholecystectomies were performed in the department. Complete information was, however, available on 29. The mean operation time and length of post-operative hospital stay were 1.16 ± 0.34 hours and 6.6 ± 3.4 days respectively. A complication rate of 34.5% (10/29)

was recorded. Five were of Clavien-Dindo grade I. Three were of grade II and two were of grade V. A comparison of the results of laparoscopic and open cholecystectomy performed in KATH over the period is presented in Table 3.

Table 3
Comparing laparoscopic vs. open cholecystectomies performed at KATH, 2010-2012

	Laparoscopic (n = 25)	Open (n=58)	P-value
Mean operative time (hr)	1.43 ± 0.34	1.16 ± 0.34	<0.05
Mean length of hospital stay (days)	1.5 ± 1.0	6.6 ± 3.4	<0.001
Complication rate (%)	20.0	34.5	>0.05
Mortality rate (%)	4.0	6.9	>0.05

Complete information was available on 29/58 open cholecystectomies

DISCUSSION

Laparoscopic surgery is becoming the preferred surgical approach for an increasing range of indications across the world (5, 8, 9).

The advantages of laparoscopic surgery are reduced post-operative morbidity that translates into a reduced hospital stay and early return to a normal life-style and better cosmesis (10-12). Despite these advantages it is not yet widely practiced in many developing countries in Africa. The main drawback

in setting and maintaining the service appears to be the high cost of procuring equipment, the dearth of trained personnel and the steep learning curve as well as the reluctance of local surgeons to venture into performing laparoscopic surgery since they still have to contend with lack of basic healthcare infrastructure (13-15).

Appropriate training in laparoscopy has remained a significant challenge, as these techniques are not routinely taught in many residency programmes in Africa. In addition, the cost of travel to

other international training centres to learn minimally invasive techniques is prohibitive for most surgeons in developing countries (6).

Strong administrative leadership support is vital in the establishment of a laparoscopic programme in our setting as evidenced by the purchase of equipment, support for the training of interested surgeons and frequent invitation of outside experts to come and train local surgeons and residents. The willingness of experts to provide yearly training combined with their assistance with equipment and infrastructure development and the resolve of the surgeon champion, with his team, to carry on with the programme has contributed to this initial success.

Laparoscopic cholecystectomy had a significantly reduced length of hospital stay and fewer overall and severe complication rates, which were not statistically significant. Operative times were also significantly longer for laparoscopic cholecystectomy. A limitation of our comparison was that we could only get full data on 29 open cholecystectomies. This could pose a selection bias for cases with more complications and longer lengths of hospital stay.

With continued increased experience, even complication rates, operative times, and length of hospital stay are likely to decrease similar to the introduction of laparoscopic cholecystectomy in other countries (16).

Problems that were encountered include the lack of readily available consumable products (e.g. clips) and lack of patient demand for laparoscopy. Although patients may not be aware of the existence of the service for them to make an informed choice, the main reason for this lack of demand appears to be the higher cost involved compared to having an open procedure. One way of making laparoscopy affordable and hence increase its acceptance among patients has been pointed out by Afuwape *et al.* (17) and Adisa *et al.* (18) whose respective hospitals heavily subsidised the operation cost of laparoscopic procedures. This is important in supporting a young laparoscopic programme in terms of increasing patient demand. There is also a certain resistant to change on the part of local surgeons, which can be overcome by incorporating laparoscopic surgical skills in the usual residency training program.

In conclusion, laparoscopic surgery at KATH has become a reality with laparoscopic cholecystectomy having less complication rates, a shorter length of stay, and trends towards improved patient satisfaction than with the open surgery. Strong leadership support, the presence of local champion and continued collaborative training programmes has contributed to this initial success. Expanding laparoscopic surgery in Ghana requires inclusion of laparoscopic training

into residency programmes and public education about its benefits for both the patients and physicians.

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