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Preliminary experience with laparoscopic surgery in Ile-Ife, Nigeria

AO Adisa, OA Arowolo, AA Salako and OO Lawal
Department of Surgery, Obafemi Awolowo University, Ile-Ife, Nigeria.

Summary
This study presents a pioneer experience with laparoscopic operations in a General Surgical unit of the Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Nigeria. Consecutive patients who had laparoscopic operations from April through December 2008 were prospectively studied. Following clinical diagnosis, initial diagnostic laparoscopy was undertaken in all patients, followed by therapeutic open or laparoscopic procedures. All procedures were done under general anaesthesia. Duration of operation and outcome including complications were recorded. In all, there were 12 patients (8 males, 4 females), aged 15 to 50 years. Eight patients had clinical diagnoses of acute appendicitis, one each had undetermined right lower abdominal pain suspected ectopic gestation, adhesive intestinal obstruction and metastatic liver disease. The first 4 patients with inflammed appendix confirmed at laparoscopy had open appendicectomy. Of the next cohort of 5 patients, laparoscopic appendicectomy was completed in four but converted to open procedure in one. Normal findings were noted in the lady with suspected ectopic gestation. Laparoscopic adhesiolysis was done for adhesive intestinal obstruction while a laparoscopic liver biopsy was done for the patient with metastatic liver disease. Operative time ranged from 55-105 minutes with marked reduction in operation time as confidence and experience grew. No intraoperative complication was observed but one patient had superficial port site infection postoperatively. We conclude that with good patient selection and some improvisation, laparoscopic general surgical operations are feasible with acceptable outcome even in a poor resource setting.

Keywords: *Laparascopic surgery, appendicectomy; metastatic, intraoperative*

Résumé
Cette étude présente les premières expériences avec les opérations laparoscopiques a l'unité générale de chirurgie du complexe Hospitalier Universitaire d'Obafemi Awolowo, Ile-Ife , Nigeria. Des patients consécutifs qui ont eu des opérations laparoscopiques d'Avril a Décembre 2008 étaient prospectivement étudiés. Suivant des diagnostiques cliniques, le diagnostique de laparoscopie était initialement fat sur tous les patients, suivie par des procédures laparoscopiques. Toutes les procédures étaient faite sous anesthésie générale. La durée de l'opération, le résultat de même que les complications étaient notées. Il y'avait en tout 12 patients (8 males,4 femelles) âgés de 15 - 50 ans. Huit patients étaient diagnostiques ayant une appendicite sévère, chacun ressentait une douleur indéterminée sous l'abdomen droit suspecte d'être une gestation ectopique, l'abdomen adhésive de l' intestine et le mal de foie. Les 4 premiers patients avec l'inflammation de l'appendice confirmé a laparoscopie avaient une appendicectomie ouverte. Dans la cohorte suivant de 5 patients, l'appendicectomie laparoscopiques était complète chez 4 mais nécessitait une procédure ouverte.

Correspondence: Dr. Adewale O. Adisa, Department of Surgery, Obafemi Awolowo University, Ile Ife 220005, Nigeria. E-mail wadisc@yahoo.com

Introduction

Laparoscopic surgery started gaining popularity since the early 1980s owing to its demonstrable advantages of being associated with lower morbidity rates, shorter duration of hospitalization and higher patient satisfaction [1-3]. Indeed, a recent study reported a very significant reduction in hospital-acquired infection rates and readmission rates of patients who had laparoscopy compared to open operations [4]. At the beginning, laparoscopic procedures were mainly diagnostic but these later progressed to include therapeutic procedures with laparoscopic cholecystectomy being the most commonly performed. With technological advancement and greater experience, procedures that were earlier presumed impossible via laparoscopy are now being performed to the extent that the scope of laparoscopic operations is now almost limitless and laparoscopic colonic, gastric and pancreatic surgeries are nowadays very common especially in developed countries [5-9]. Similarly many conditions earlier

listed as contraindications to laparoscopy in patients are no longer regarded as such. For instance, recent reviews have shown increasing use of laparoscopy in patients with liver cirrhosis with considerably improved outcome compared to open procedures in them [10-11].

In Nigeria, as indeed in many developing countries, laparoscopic surgeries are not yet that commonly practiced in many public tertiary hospitals. This may in part be attributable to the capital intensiveness of laparoscopic surgery equipments, poor health planning and low investment in health sector. At the Obafemi Awolowo University Teaching Hospitals Complex, (OAUTHC) Ile-Ife, South-West Nigeria, routine laparoscopic surgery is at its infancy and is just evolving. This article presents our initial experience and aims to highlight the factors that may influence the practice of laparoscopic surgery minimal access surgery in an underdeveloped environment.

Materials and methods

Our set-up comprise of an analogue carbon dioxide insufflation system fitted with facilities to monitor gas flow rate, volume of gas used and intra-abdominal pressure. A 250-D CCD camera fitted to a 17 inch Sony monitor was used for the vision system. In addition, light source, electrosurgical and diathermy machines were included [Figure 1]. A combination of re-useable (and some donated disposable) laparoscopic access instrument and hand instruments were used for the different procedures.

Patients

Consecutive patients who had laparoscopic general surgical procedures at the Ife Hospital Unit of the OAUTHC, Ile-Ife, Nigeria from April through December 2008 were the subjects of this study. Patients' sociodemographic characteristics, preoperative clinical findings and results of investigation findings were noted and recorded in proforma. Following clinical evaluations, patients for laparoscopy were identified and selected. Initial diagnostic laparoscopy was undertaken in all patients. Where the findings indicate therapeutic procedure, open surgery was done in the first few patients while operative laparoscopy was carried out in subsequent

Table 1: Patients' characteristics, clinical diagnoses and procedures performed.

Patient's code	Age / Sex	Clinical diagnosis	Diagnostic laparoscopy	Procedures performed	Postoperative complication
# 1	38/M	Acute Appendicitis	Inflammed Appendix	Open Appendectomy	None
# 2	22/F	Acute Appendicitis	Inflammed Appendix	Open Appendectomy	None
# 3	19/M	Acute Appendicitis	Inflammed Appendix	Open Appendectomy	None
# 4	32/F	?Ectopic Gestation	Normal pelvic strutures	None	None
# 5	35/F	Recurrent Lower Abdominal Pain	Appendiceal Adhesions	Open Appendectomy	None
# 6	32/F Appendicitis	Acute	Inflammed Appendix	Laparoscopic Appendectomy	None
# 7	15/F	Acute Appendicitis	Inflammed Appendix	Laparoscopic Appendectomy	Port site infection
# 8	18/M	Acute Appendicitis	Inflammed Appendix	Laparoscopy converted to Open Appendectomy	None
# 9	50/M	Acute Appendicitis	Inflammed Appendix	Laparoscopic Appendectomy	None
# 10	18/M	Acute Appendicitis	Inflammed Appendix	Laparoscopic Appendectomy	None
# 11	22/M	Recurrent intestinal obstruction	Adhesive intestinal obstruction	Laparoscopic adhesiolysis	None
# 12	29/M	? Metastatic liver disease	Multiple liver masses	Laparoscopic liver biopsy	None

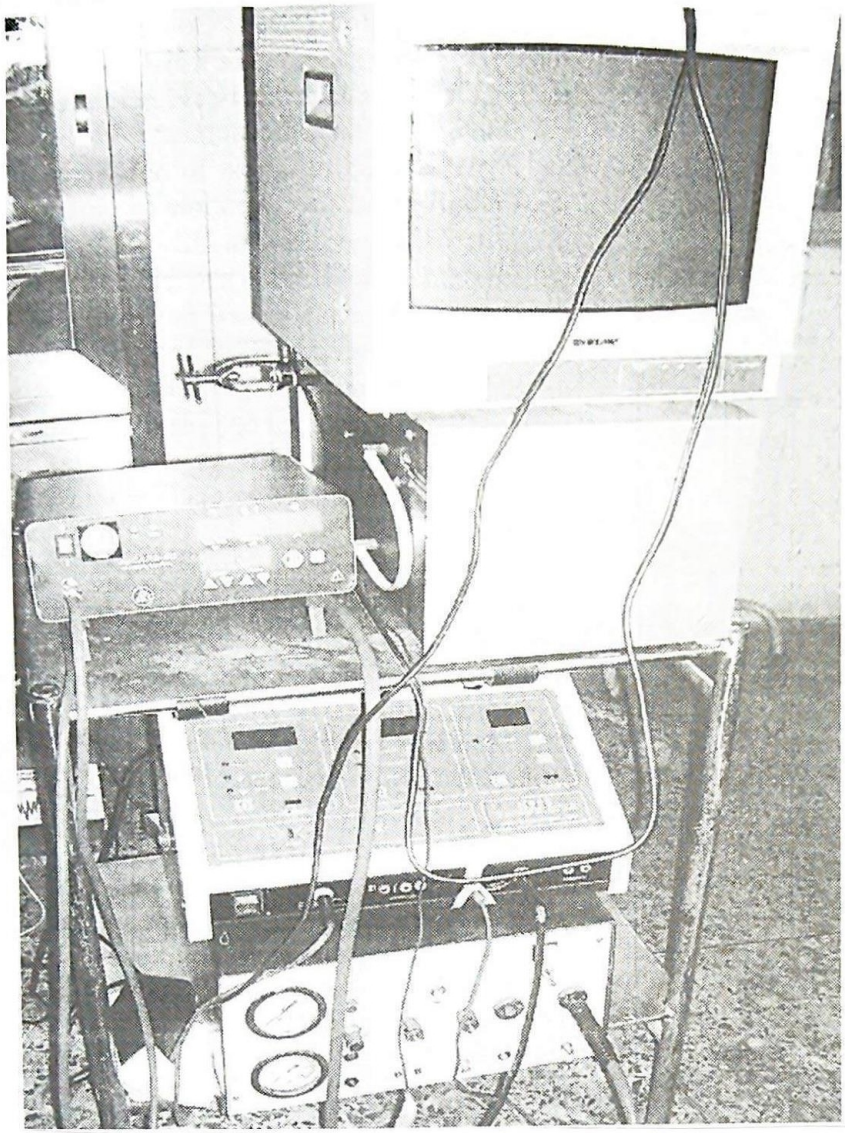

Fig. 1: Laparoscopic equipment set-up excluding hand instruments

patients as experience and confidence grew. All procedures were carried out under general anaesthesia. Laparoscopic operation was converted to open where difficulties such as persistent power outage were encountered. Duration of operation, intraoperative and postoperative findings as well as complications were recorded.

Results

There were twelve patients, eight males and four females aged between 15 to 50years with a mean age of 27 years. Nine patients were diagnosed as having acute or subacute appendicitis while one patient each was suspected of having ectopic gestation, recurrent intestinal obstruction and an undetermined liver mass. All patients with suspected appendicitis and the lady with suspected ectopic gestation had initial diagnostic laparoscopy under general anaesthesia which revealed inflammed appendix in five patients, periappendiceal adhesions in three and normal appendix in two patients including the one with suspected ectopic gestation. The first set of four patients with appendiceal conditions had open appendicectomy after the diagnostic laparoscopy. Laparoscopic appendicectomy was attempted in the next cohort of five patients and successfully performed in four while one patient had conversion to open procedure due to prolonged power outage giving a conversion rate of 20%. One patient had laparoscopic adhesiolysis to relieve adhesive intestinal obstruction while another patient had laparoscopic biopsy of a hepatic mass. Duration of operation averaged 55 minutes for patients that had only diagnostic procedure and ranged from 85 to 108 minutes for those who had therapeutic laparoscopic procedures. No intraoperative complication was recorded. One patient (8%) had a superficial port

site infection which healed well after a week of wound dressing on out-patient basis.

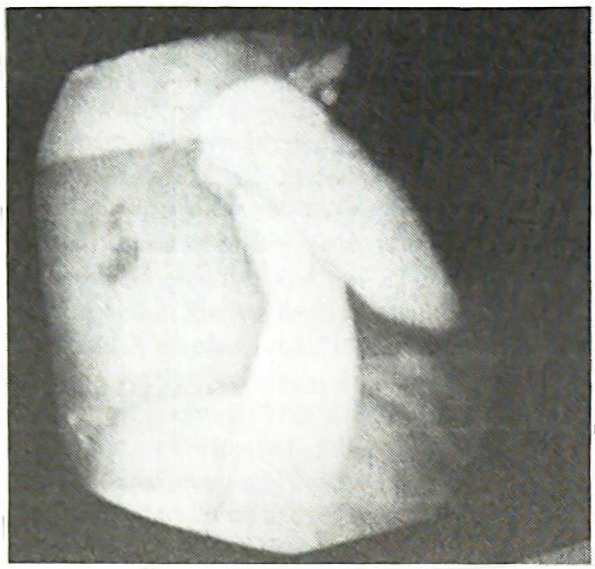

Fig. 2: Laparoscopic view of an inflammed appendix.

Discussion

Facilities for laparoscopic surgery are capital intensive and frail economies such as ours cannot fully support this. To get started, we therefore had to rely on bits and pieces of instruments at our disposal. Our vision system consists of a monitor that has been in use for endourological procedures along with a modest camera and a light source [Figure 1]. An old insufflator that had been used for diagnostic purposes for gynaecological conditions was also repaired for use along with the conventional diathermy and suction machines available. We combined these equipments with a few hand instruments that we were able to procure for the commencement of our procedures. Since we were starting with such a set-up, our initial attempts were limited to diagnostic procedures. This afforded us time to adapt to the equipments and gain confidence. We are aware that in many other centres in Nigeria, many surgeons who trained in laparoscopic procedures in developed countries are not able to practice due to inability to purchase standard equipments. With the prevailing global economic meltdown and its implication on the resources available to most of our governments, it may be difficult for many hospitals to afford the expensive complete laparoscopy sets. From our initial experience, we believe that each laparoscopic surgeon may be able to perform some procedures using such locally assembled set-up. Going by the cost of disposable hand instruments, it also became obvious to us that it would be cost-saving to invest in re-useable ones in our environment.

The need to adjust to our "home-made" set-up informed the decision to perform only diagnostic procedures in the first set of five patients. Once stabilization and familiarization were achieved, the next seven patients had more definitive procedures. Lack of necessary instruments for more complex procedures however limited the spectrum and complexity of procedures performed. Persistent power outage also necessitated conversion to open operation in one instance.

Diagnostic laparoscopy could be of value in the third world as a substitute for many investigation modalities that are either expensive or unavailable in our environment. It may also serve to reduce the incidence of negative laparotomies that some patients would have been subjected to. Negative laparotomy rates have been reported to be up to 15% of patients who had laparotomy for trauma [12-14]. Also, histopathology of appendix specimen removed for acute appendicitis may show normal appendix in up to 10% of cases [15]. One of our patients (#4) presented with amenorrhoea, vaginal bleeding, a right lower abdominal pain and equivocal right iliac fossa tenderness. Diagnostic laparoscopy examination revealed normal uninflammed appendix, normal uterus, fallopian tubes and other pelvic organs and saved the patient an exploratory laparotomy. She was subsequently further diagnosed as having dysfunctional uterine bleeding. In a 50 year old man who presented with acute right iliac fossa pain suggestive of acute appendicitis, the possibility of caecal tumour was also entertained but the duration and severity of the pain necessitated urgent surgery. Diagnostic laparoscopy afforded us the opportunity to confirm that he had an inflammed appendix and a grossly normal caecum for which he had laparoscopic appendicectomy. These cases illustrate how diagnostic laparoscopy can augment investigations in our patients and limit the rate of negative open surgical procedures.

Laparoscopic surgery, due to its minimal access approach has many proven advantages to the patients. These include early postoperative operative recovery, shorter duration of hospital admission, less postoperative pain and fewer incidence and severity of postoperative wound

complications. In many instances, laparoscopic surgery offers the opportunity for the surgeon to operate upon many patients who would have otherwise been unfit for open surgeries or those in who open surgery might be attended by significant postoperative morbidity or mortality. In our series, a 28year old man was seen with metastatic liver disease with difficulty in identifying the primary tumour site. He had extensive clinical review, abdominal ultrasound and Computerized Tomographic (CT) axial scan and gastrointestinal endoscopy, yet the primary site could not be conclusively identified. The patient's frail condition with jaundice, deranged liver and renal function tests indicated that a laparotomy may be perilous in him. We therefore opted for diagnostic laparoscopy. It was equally difficult to identify a primary site at laparoscopy owing to the advanced condition with carcinoma peritonei. He however had a laparoscopic biopsy of the hepatic mass for histopathology. He recovered well and was fit for discharge on the first postoperative day. We had similar experiences with all the four patients who had laparoscopic appendicectomies as they were all discharged on the first postoperative day.

We however faced a number of challenges in this pioneering experience. The unstable power supply in the country necessitated that we rely on the hospital's power generating set for most of the procedures. In one instance, the generator developed a sudden fault that could not be rectified immediately forcing us to abandon the procedure and convert to open surgery. In many other countries, power supply is guaranteed. We believe that availability of steady power supply in the country will facilitate the development of many modern technologically driven healthcare services. Lack of funds also limited the number and range of equipments we had to start with which in turn limited the range of procedures we could attempt. Better funding of our tertiary hospitals will enable us provide these services with the attendant advantages to the patients and the society at large. Adequate training of other members of the team in the peculiarities of laparoscopic surgery is also vital for a good outcome. Training and re-training of the surgeons, laparoscopic nurses, anaesthetists and biomedical engineers is necessary.

In conclusion, our experience has shown that the many advantages of laparoscopic surgeries can be realized in a limited resource setting with a careful selection of equipments and gradual acquisition of skill and experience. We advocate that surgeon in developing countries who are trained in laparoscopic surgery should strive to perform the operations by modifying the set-up with locally available equipments.

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