# Wound Complications Following Laparoscopic Surgery in a Nigerian Hospital

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## ABSTRACT

**Background:** Different complications may occur at laparoscopic port sites. The incidence of these varies with the size of the ports and the types of procedure performed through them. **Objectives:** The aim was to observe the rate and types of complications attending laparoscopic port wounds and to identify risk factors for their occurrence. **Patients and Methods:** This is a prospective descriptive study of all patients who had laparoscopic operations in one general surgery unit of a University Teaching Hospital in Nigeria between January 2009 and December 2012. **Results:** A total of 236 (155 female and 81 male) patients were included. The laparoscopic procedures include 63 cholecystectomies, 49 appendectomies, 62 diagnostic, biopsy and staging procedures, 22 adhesiolyses, six colonic surgeries, eight hernia repairs and 22 others. Port site complications occurred in 18 (2.8%) ports on 16 (6.8%) patients including port site infections in 12 (5.1%) and hypertrophic scars in 4 (1.7%) patients, while one patient each had port site bleeding and port site metastasis. Nine of 11 infections were superficial, while eight involved the umbilical port wound. **Conclusion:** Port site complications are few following laparoscopic surgeries in our setting. We advocate increased adoption of laparoscopic surgeries in Nigeria to reduce wound complications that commonly follow conventional open surgeries.

**KEYWORDS:** Laparoscopy, Nigeria, wound complications

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## INTRODUCTION

Laparoscopic surgery offers many proven advantages over conventional open surgery for many procedures.[1,2] These advantages have increased the utilization and acceptability of laparoscopy and indeed other forms of minimally invasive procedures over the past few decades. In Nigeria, there is a recent surge in interest in laparoscopic surgery among general surgeons with many private and public hospitals adopting the technique for different conditions. Our hospital has had her share of similar enthusiasm and has been able to sustain routine practice of laparoscopy in general surgery.[3-5] Still, there exist some worries about the safety and overall outcome of laparoscopy for different conditions in our developing setting.

Creation of laparoscopic ports may be attended by intraoperative complications such as bleeding and puncture injuries to abdominal viscera.[6] Postoperatively, infections and its sequelae, hernia formation and port site metastasis are commonly reported.[7] The occurrence and frequency of these complications vary widely in many series depending on the type, location, and size of ports created, as well as the types of material employed in creating them.[8,9] This study aims to determine the frequency and types of morbidity associated with laparoscopic surgery in our setting.

## PATIENTS AND METHODS

We prospectively evaluated the port sites of all patients undergoing laparoscopic procedures in one of two general surgery units at the Ife Hospital Unit of the Obafemi Awolowo University Teaching Hospital, Ile-Ife, Nigeria between January 2009 and December 2012. Patients were excluded when their procedures were converted to open laparotomy. Preoperative sociodemographic and anthropometric data of each patient were recorded. All procedures were carried out under general anesthesia and preoperative antibiotics were administered. We generally employed the Veress needle for carbon dioxide insufflations except in those with intra-abdominal malignancies and those who have had laparotomies. We operated all patients with re-useable trocar and cannulae except for three retroviral positive patients and nine others who requested for disposable materials. Conventional laparoscopy was performed in all instances as we do not yet perform single port procedures. The ports wounds were observed intra-operatively for bleeding and

on completion of the procedure, the cannulae were removed under direct vision with closure of fascia in ports 10 mm or more. Postoperatively, all port sites were examined for bleeding, infection, herniation, metastasis and or chronic pain. Wounds were classified according to the Center for Disease Classification system.[10] Data generated were entered into a personal computer and subjected to descriptive and inferential statistics using the Statistical Package for Social Sciences version 16.0 for Windows (IBM SPSS Statistics, USA). Possible influences of patients' sociodemographic and anthropometric characteristics on the observed port site complications were investigated. The level of statistical significance was set at $P < 0.05$.

## Results

A total of 242 patients had laparoscopic procedures over the study period. We excluded six patients whose procedures were converted to open laparotomy and subsequently included the remaining 236 patients in our analysis. There were 155 (65.7%) females and 81 (34.3%) male patients on whom 644 laparoscopic ports were created giving an average of 2.7 ports per procedure. Of the 236 procedures, 63 (26.7%) were cholecystectomies, 62 (26.3%) staging and biopsies of intra-abdominal tumors, 49 (20.8%) appendectomies, 22 (9.3%) adhesiolysis, 11 (4.7%) diagnostic procedures, 8 (3.4%) groin and ventral hernia repairs, 6 (2.5%) colon cancer surgeries, and 11 (4.7%) other varied procedures. We used transcutaneous sutures for closure of the ports in 41 (17.4%), subcuticular suture in 151 (64.0%) patients, skin staples in 38 (16.1%) and cyanoacrylate glue in 6 (2.5%) others. Patients' mean age was 38.1 years (range = 16-82 years), mean weight was 56.2 kg (range = 32.5-102 kg) and mean body mass index was 26.3 (range = 16.1-33.4).

At a median follow-up duration of 11.3 months (range 5-34 months), port site complications had occurred in 18 (2.8%) port wounds on 16 (6.8%) patients. This includes port site infections (PSIs) in 12 ports occurring in 10 patients with two patients having PSIs of two different ports. Of these, nine were superficial infections and two were deep infections. The infections involved the umbilical port in nine cases, suprapubic port in two patients and right upper quadrant port in one patient [Table 1]. Occurrence of wound infection was not significantly associated with the type of procedure ($P = 0.34$), its duration ($P = 0.84$) or the closure technique employed ($P = 0.06$). A statistically significant association was however found between occurrence of wound infection on one hand and the site of the ports ($P = 0.004$) as well as the class of wound created ($P = 0.036$) on the other hand [Table 2].

Other port site complications recorded includes hypertrophic scars in 4 (1.7%) patients. Two of these occurred at the epigastric port following laparoscopic cholecystectomy, one occurred at the umbilicus following cholecystectomy and one at the suprapubic port following appendectomy. There was port site bleeding in 1 (0.4%) patient who was undergoing biopsy of an advanced intra-abdominal tumor, and port site metastasis in another patient following laparoscopic assisted right hemicolectomy for a caecal tumor [Figure 1].

The superficial port infections were managed with wound dressings and this was combined with antibiotics therapy in patients with deep infections. The hypertrophic scars were managed with topical steroid application by the plastic surgery units, while the patient with port site metastasis had a wide local excision biopsy after initial fine-needle aspiration cytology confirmed presence of malignant cells.

## Discussion

Overall, wound complications were observed at laparoscopic port sites in 2.8% port wounds on 6.8% of patients in this study. This is high compared with 3% patients recorded by Karthik *et al.* in India[8] who however included a larger sample size and we are hopeful that the rate in our center will decline with increasing number of laparoscopic procedures.

The majority, 12 of 18 (66.7%) of the complications were PSIs. This translates to 12 of 644 ports (1.9%) and 10 of 236 (4.2%) patients being involved. These rates are comparable to that of many studies published earlier.[8,11,12] We have included a number of contaminated and dirty wounds in this analysis as we adopted laparoscopy for

**Table 1: Occurrence of complications in laparoscopic port sites**

| Procedures | Port site complications | | | | |
|---|---|---|---|---|---|
| | Umbilical | Epigastric | Suprapubic | Right upper abdominal | Others |
| Cholecystectomy (*n*=63) | 4/63 | 1/63 | - | 1/126 | - |
| Appendectomy (*n*=49) | 3/49 | - | 1/49 | 0/35 | 0/14 |
| Staging and biopsy of intraabdominal tumors (*n*=62) | 2/31 | 0/15 | 0/25 | 0/34 | 0/65 |
| Adhesiolysis (*n*=22) | 0/12 | 2/13 | 1/11 | 0/6 | 0/10 |
| Groin hernia repair (*n*=5) | 0/5 | - | 0/5 | - | 0/5 |
| Ventral hernia repair (*n*=3) | - | 0/1 | 0/2 | | 0/2 |
| Colon cancer surgeries (*n*=6) | 1/6 | 0/4 | 0/5 | 0/4 | 0/4 |
| Other diagnostic procedures (*n*=11) | 0/10 | 0/8 | - | - | 0/11 |
| V-P shunt repositioning (*n*=2) | - | 0/2 | 0/1 | - | 0/1 |
| Feeding tube placement (*n*=2) | 0/2 | 0/2 | - | - | - |
| Others (*n*=7) | 0/5 | 0/2 | 1/2 | 0/4 | 0/5 |

**Table 2: Relating occurrence of port site infection to wound class**

| Wound class[10] | No | SSI | Analysis |
|---|---|---|---|
| I | 59 | 0 | $\chi^2$=18.13 |
| II | 144 | 3 | Df=3 |
| III | 22 | 5 | *P*=0.036 |
| IV | 11 | 4 | |
| Total | 232 | 12 | |

SSI: Surgical site infection

**Figure 1:** Port site metastasis in a 68-year-old woman

treatment of gallbladder empyemas and mucoceles as well as a number of ruptured appendixes with localized abscesses. We observed a statistically significant association between the occurrence of PSI and the class of wound created as shown in Table 2.

The majority of PSIs (9 of 12, 75%) recorded was superficial and involved the umbilical wound. This is similar to findings in previous studies.[8,13,14] The majority of these occurred in the 1st year of this study. This observation led us to advocate for a change in the routine antiseptic used for preoperative skin preparation in our center from chlorhexidine/cetrimide to povidone iodine. We have observed a marked reduction in the PSI rate particularly with the umbilical wound since then. A randomized prospective study is currently being carried out in the unit regarding the use of these two antiseptics.

Hypertrophic and keloidal scars are fairly common complications of abdominal wounds in our practice.[15] It is hence not surprising that four patients presented with hypertrophic scars. Two of these occurred in the epigastric port and one of these patients had been treated for keloidal scars 2 years earlier. All four patients were managed conservatively by the plastic surgery unit with topical agents and the scars regressed in all instances between 5 and 19 months of follow-up.

Port site metastasis occurred in one of 71 (1.4%) patients who had laparoscopy for malignant conditions in this study. The 68-year-old female had a laparoscopic assisted right hemicolectomy with exteriorization of a particularly bulky cecal mass for extracorporeal resection and anastomosis. A nodular swelling was felt at the extraction site 12 weeks after surgery, while she was on chemotherapy. A wide local excision was carried out and the nodule did not extend into the abdominal cavity. Histopathology confirmed metastatic adenocarcinoma and the excision margins were free of malignant cells. She continued chemotherapy and had no recurrence at the site after 13 months follow-up. The extraction site in laparoscopic colon surgeries has been known for a high incidence of complications particularly hernias and port site metastasis.[16,17] We however recorded no incisional hernias among the few patients who had colon extraction from midline wounds in this study.

There was undue bleeding from one port site during a diagnostic laparoscopy and biopsy of an intra-abdominal mass. This necessitated wound exploration and ligation of the bleeding vessel. Other complications such as gastrointestinal or genitourinary injuries and port site hernia were absent in this cohort. There were no omentum related complications as well. Several studies have attributed the occurrence of hernias to the use of large size trocars.[9,18] Perhaps, our scanty use of such trocars and the routine adoption of closure of all 10 mm ports led to the absence of hernias in our patients.

This study and its findings have certain inherent limitations. Laparoscopy is currently performed in only one of the two general surgery units of the hospital and this along with other challenges in our setting have limited the number of cases recruited for this study. We have also included a wide range of cases and the location and number of ports differs with the procedures carried out. We however minimized this limitation by using the same technique for each procedure. Finally, our primary objective was port site complications including immediate and long-term complications but our period of follow-up may be too short for certain long-term complication like incisional hernia from extraction site. The patients who had such extractions were however very few in this study.

Overall, port site complications are few following laparoscopic surgeries in our center. This, along with other benefits, has aided patients' acceptance and enthusiasm toward laparoscopic surgeries in our hospital. We advocate increased adoption of the laparoscopic surgeries in Nigeria and similar developing countries to reduce the wound complications that commonly attend conventional open surgeries in our environment.

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