Assessment of Port Site Complication in Laparoscopic Abdominal Surgery

Thesis

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Abstract

Background: Rapid expansion in the volume and complexities of laparoscopic surgeries has been accompanied by complications, many of which can be directly attributed to abdominal access with laparoscopic trocars including visceral injury, vascular injuries, air embolism, subcutaneous emphysema, port site infections, incisional hernia and metastasis occurred post operatively.

Objectives: This study aimed to detect the different port site complications encountered in laparoscopic abdominal surgery in terms of incidence and management.

Patients and Methods*:* This study was conducted in the surgical operating theatre of Ain-Shams University Hospitals (Demerdash and Ain Shams University Specialized Hospital), Cairo, Egypt, from January 2018 till July 2018.

Results: In this study complications occurred in **37** cases out of the 400 cases (Study subjects). The incidence of port site complications in our study was **9.25%. Vessel injury** occurred in **19** out of the 400 cases with incidence **4.75%**. **Port site infection** occurred in **11** out of the 400 cases with incidence **2.75%. Visceral injury** occurred in **4** out of the 400 cases with incidence 1 %. **Port site hernia** occurred in **3** out of the 400 case with incidence **0.75%.**

Conclusion: Study incorporated 400 subjects operated for different indications laparoscopically and patients developing any kind of complications were recorded and analyzed. The results showed 3(0.75%) port site hernias, 11(2.75%) port site infections,19 (4.75%) vessel injury, 4(1%) visceral injury and no port site metastasis was detected.

Keywords: Laparoscopy, port site complications, port site hernia, port site infection

INTRODUCTION

Nowadays more and more surgeries are being performed laparoscopically as a result of advancement in medical science. However a rapid expansion in the volume and complexities of laparoscopic surgeries has been accompanied by complications, many of which can be directly attributed to abdominal access with laparoscopic trocars including visceral injury, vascular injuries, air embolism, subcutaneous emphysema, port site infections, incisional hernia and metastasis occurred post operatively. Obesity has been shown to be a major risk factor for port site complications due to the need for a larger skin incision, longer trochars, limitation in mobility of the instrument due to increased subcutaneous tissue and poorer wound healing. Port site complication rate increases with the number of ports used ***(Moloney et al., 2014).***

Port site complications have been reported at a rate of 2.7 per 1000 procedures for diagnostic laparoscopy and 17.9 per 1000 procedures for operative laparoscopy. Post-operative laparoscopic port site complications can have an early or delayed presentation. Laparoscopic cholecystectomy has been shown to be the commonest procedure associated with port site complications ***(Agaba et al., 2014).***

Immediate port complications include vascular injury, bowel injury, air embolus and subcutaneous emphysema. Common delayed port site complications include including hernia, seeding of malignancy, bowel obstruction, haematoma and infection/abscess ***(Park, Kim and Yoon, 2015).***

A port site incisional hernia is an important complication of laparoscopic surgery, which carries a high risk of strangulation due to small size of defect involved. Larger port size carries a higher risk of hernias ***(Agaba et al., 2014).***

Port-site infection after laparoscopic procedure is lower than that of open surgery because laparoscopic ports are smaller in length than incisions made for open surgeries. Epigastric port-site infection was predominant due to frequent retrieval of gall bladder from epigastric port. Port site infection may occur due to contamination following spillage of gut or biliary contents, hematoma formation or breach in aseptic technique ***(Sharma, Patel and Anchalia, 2013).***

Vascular injury and visceral injuries are rare, but mandates early recognition and consideration of prompt exploratory laparotomy ***(Sharma, Patel and Anchalia, 2013).***

In recent years, after laparoscopic oncological procedures, several reports of trocar site recurrence have been published. The exact mechanism of development of metastasis of the abdominal wall is unknown. However, various explanations are given in the literature. Studies show that recurrence of tumour at the port site probably can be avoided by the use of plastic bags or wound protectors to avoid direct contact between the tumour and the wound. It is also essential that extraction of the specimen is done through an abdominal incision wide enough to allow easy passage of the specimen ***(Karthik et al., 2013).***

AIM OF THE WORK

To study the different port site complications encountered in laparoscopic abdominal surgery in terms of incidence and management.

HISTORICAL BACKGROUND OF LAPAROSCOPY

The field of laparoscopic surgery has experienced tremendous growth in the last three decades. The important events among them have been the invention of incandescent bulbs by Thomas Edison, the development of lens scopes (1870-1980s), the invention of rod lens system by Hopkins (1950s), the fiberoptic cold light transmission (1960s) and the computer chip video camera (1980s). Technological Advancements have produced progressively smaller laparoscopic instruments and higher quality imaging that allow laparoscopic surgeons to perform precise dissection with minimal bleeding through most dissection plans, and the major limitations of standard laparoscopy procedures are overcome with these advances. The introduction and evolution of minimally invasive surgery has drastically changed the entire scenario of the ways in which surgeons are treating patients ***(Meenakshi, Dilip and Akshay, 2017).***

Laparoscopic surgery was initially introduced at the beginning of this century by Dimitri Ott, George Killing and Hans Christian Jacobaeus. Von Ott inspected the abdominal cavity of a pregnant woman in 1901, and, afterwards, George Killing performed a procedure called “koelioscopie” closer to the definition of modern laparoscopy. In the same year Jacobaeus published his first report of what he called “Laparothorakoskopie”. In the following years several authors

in Europe and the United States performed laparoscopic procedures for diagnostic purposes, diagnosis of liver disorders, and abdominal trauma until the intuition of Lukichev in 1983 and Muhe in 1985 who performed their first personal technique of laparoscopic cholecystectomy in humans ***(Vecchio et al., 2000).***

Kussmaul (1868) first to use instrument down the esophagus & into his gueina pig. ***Nitze, (1879)*** invented the first cystoscope using heated platinum wire to illuminate. ***George Killing, (1901)*** insufflated the abdomen of a dog and used Nitze cystoscope. ***Hans Jacobaeus, (1910)*** the first thoracoscopic diagnosis with a cystoscope. ***Bertram Bernheim, (1911)*** performed the first laparoscopy at Johns Hopkins, 12 mm proctoscope into epigastric incision to stage pancreatic cancer, called his procedure "organoscopy" confirmed same findings on laparotomy. ***Janos Verres, (1938)*** Introduced Verres needle for safe entry into abdominal cavity. ***Kurt Semm, (1966)*** introduced automatic insufflator allowed for safer laparoscopy and allowed bowel perforations and vascular injuries to be declined. ***Harrith Hasson, (1974)*** proposed a minilaparotomy which permitted direct visualization of the trochar entry into the peritoneal cavity "Hassons Technique. ***Camran Nezhat, (1986)*** is considered to be the founding father of operative video laparoscopy ***(Meenakshi, Dilip and Akshay, 2017).***

Evolution of laparoscopic procedures in gatsrointestinal procedures (Meenakshi, Dilip and Akshay, 2017):

- First operation of lap cholecystectomy in September 12, 1985 by Dr Eric Muhe.
- 1988: first lap cholecystectomy in the USA, surgiport first available.
- 1989: US TV picks up on "Key Hole" surgery, Endo Clip released.
- 1990: Cuschieri (Aberdeen) warns on the explosion of endoscopy.
- 1990: Bailey and Zucker popularized lap anterior highly selective vagatomy with post truncal vagotomy.
- 1991:"Lap Cholecystectomy" is accepted and becomes routine procedure.
- 1991: Berci describes lap intra-op cholangiogram.
- 1991: Sackier and Stroker reported laparoscopic common bile duct exploration.
- 1991: First Laparoscopic fundoplication by Dallemagne.
- 1991: First Laparoscopic splenectomy by Delaitre and Maignien.
- 1991: First Laparoscopic gastrectomy by Goh.
- 1991: First Laparoscopic colectomy by Jacobs.
- 1992: First Laparoscopic placement of Gastric band by Bernard Cadiere.
- 1993: First Laparoscopic Roux En Y Gastric bypass by Witt grove.

ANATOMY OF THE ANTERIOR ABDOMINAL WALL

The abdominal wall surrounds the anterolateral aspect of the abdominal cavity. Chief layers of the abdominal wall include ***(Tamai et al., 2015):***

- Skin
- Superficial fascia
- Muscle
- Fascia
- Parietal peritoneum

Superficial fascia is the subcutaneous tissue which forms the thin, single layer above the umbilicus. Below the umbilicus, it is divided into the fatty superficial layer called Camper's fascia and the deep layer called Scarpa's fascia. Blood vessels and nerves run between these two layers ***(Tamai et al., 2015)***.

The anterior abdominal wall muscles may be considered to have two parts: An antero-lateral portion composed of the external oblique, internal oblique and transversus abdominis muscles; and a mid line portion composed of the rectus abdominis and pyramidalis muscles ***(Tamai et al., 2015)***.