Incidence of Trocar Site Hernia in Fascial Closure Of the Port site Versus Skin Closure Only

Thesis

Submitted for the Complete Fulfillment of the Master Degree in General Surgery

By

Moustafa Ehsan Embaby
M.B.B.Ch
Faculty of Medicine, Ain Shams University

Supervisors

Prof.Dr.Ayman Abd Allah Abd Rabo
Professor of General Surgery
Faculty of Medicine, Ain Shams University

Dr. Amr Hamed Afify
Lecturer of General Surgery
Faculty of Medicine, Ain Shams University

Faculty of Medicine
Ain Shams University
2019

بسم الله الرحمن الرحيم

﴿وَعَلَّمَكَ مَا لَمْ تَكُنْ تَعْلَمُ وَكَانَ فَضْلُ اللَّهِ عَلَيْكَ عَظِيمًا﴾

صدق الله العظيم

سورة النساء آية (١١٣)

Acknowledgment

First and foremost, I feel always indebted to **ALLAH**, *the Most Kind and Most Merciful.*

I'd like to express my respectful thanks and profound gratitude to **Prof. Dr. Ayman Abd Allah Abd Rabo,** *Professor of General Surgery Faculty of Medicine, Ain Shams University for his keen guidance, kind supervision, valuable advice and continuous encouragement, which made possible the completion of this work.*

I am also delighted to express my deepest gratitude and thanks to **Dr. Amr Hamed Afify,** *Lecturer of General Surgery Faculty of Medicine, Ain Shams University, for his kind care, continuous supervision, valuable instructions, constant help and great assistance throughout this work.*

Moustafa Ehsan Embaby

List of Contents

List of Tables

List of Figures

List of Figures Cont...

List of Figures Cont...

List of Abbreviations

Abb.	Full term
BMI	Body mass index
CO2	Carbon dioxide
ECG	Electrocardiography
ePTFE	Polypropylene double-sided mesh
IV	Intravenously
JAVMA	Journal of the American Veterinary Medical Association
LPQ	Laparotomy quotient
N2O	Nitrous oxide
NOTES	natural orifice transluminal endoscopic surgery
PSHs	Port site hernias
SILS	Single incision laparoscopic surgery
TSH	Trocar site hernia

INTRODUCTION

Trocar site hernias (TSHs) are rare complications that occur in approximately 1% of all laparoscopic surgeries. With the use of bladeless, blunt-tipped entry trocars, some surgeons have argued that all port sites do not require fascial closure. Several cases of PSHs, however, have been reported recently with the use of bladeless trocars. The development of non-bladed obturators with integrated stability sleeves allows for creation of a muscle-splitting dilated laparoscopic port site with minimal abdominal wall defects after removal of trocar sleeves ***(Liu and McFadden, 2000).***

It is recommended in literature that preventive measures should be taken to prevent TSHs after laparoscopic surgery ***(Owens et al., 2011).*** Trocar site hernia (TSH) is defined as an incisional hernia which occurs after minimally invasive surgery on the trocar incision site ***(Pamela et al., 2011).***

Treatment of this complications is done by suture or mesh repair. But the best treatment remains is prevention. This prevention requires Knowledge of the risk factors of this condition. Large port sites and increasing number of ports needed for more complex surgeries increase the incidence of PSHs. PSHs tend to develop more frequently at umbilical and midline port sites due to the lack of rectus muscle coverage, weakness of linea alba and the thinness of umbilical skin. Port closure is important after laparoscopic surgeries to prevent

trocar site hernias. Complications related to port sites are most commonly reported to be incisional hernias. Many techniques and devices have been introduced into practice to minimize the risk of port site complications, which occur in 1-6% of cases ***(Khan et al., 1993).***

The PSH depends on the trocar diameter, the trocar design, pre-existing fascial defects, and the direction of the port insertion. The risk of PSH is greater in obese and bariatric patients because of the larger pre-peritoneal space and elevated intra-abdominal pressure and some authors advise closure of holes > 5 mm at the fascial level. The various methods for port closure after laparoscopic surgery are: 1) standard closure (via skin wound); 2) laparoscopic direct visualization fascial closure methods; 3) using a spring-loaded needle or suture passer needle; and 4) angiocatheter technique ***(Hussain et al., 2009; Shah et al., 2010; Botea et al., 2011).***

Aim of the Work

The aim of this study is to evaluate the outcomes and complications in laparoscopic surgeries without fascial sheath closure of the port site **(Group A)**. We compared the result with another group in which fascial closure of the port site was done by a standard method **(Group B).**

Chapter 1

HISTORY OF LAPAROSCOPY

Laparoscopy or endoscopically examining the peritoneal cavity was first attempted in 1901 by George Kelling, a surgeon from Dresdon, who called this examining procedure "celioscopy." Kelling's first experiments were performed on live dogs. His technique involved insufflating the canine's abdomen with oxygen filtered through sterile cotton and utilizing a cystoscope to inspect the abdominal contents. Kelling went on to attempt this procedure in a few human patients, but he failed to publish his work ***(Peters et al., 1995).***

The investigator generally considered to be the man responsible for popularizing the technique in humans was the Stockholm-born physician Hans Christian Jakobaeus. Jakobaeus's technique involved the use of a trocar to establish pneumoperitoneum. Like Kelling before him, Jakobaeus used a cystoscope to examine the peritoneal contents ***(Gomella et al., 1994).***

In 1912, Jakobaeus published an article entitled "Über Laparo und Thorakosopie12". This article described 109 laparoscopies performed on 69 patients.1 Jakobaeus's work enabled him to visualize many different pathologies. He described conditions such as cirrhosis of the liver, metastatic cancer, and tuberculosis peritonitis. His manuscripts explored

the difficulties of laparoscopic technique and discussed some of the complications that he experienced and some of the controversies involved with the initiation of this new technique. He wrote in the introduction to the article: For laparoscopy to find general application, it must become completely safe. The risk is, of course, in the introduction of needle into the peritoneal cavity. How great this risk actually is cannot be established with any certainty. Certain authors consider the danger relatively insignificant...whereas others, particularly surgeons, estimate the risk to be much higher. The final range of applications of the method cannot yet be foreseen. However... I believe that I have demonstrated that the method is of practical value ***(Gomella et al., 1995).***

The first published use of laparoscopic technique in the United States was in 1911 by Bernheim, a surgeon from Johns Hopkins University. Bernheim used an electric head lamp and a proctoscope inserted into the epigastrium to view the stomach, gallbladder, and liver. During the next few years, laparoscopy was discussed at medical conferences and in the medical literature, but little progress was made in technique, instrumentation, or in clinical application. Perhaps the most important recommendation made during this time period was the idea proposed by Zollikofer in 1924. He wrote about the benefit of utilizing carbon dioxide to obtain pneumoperitoneum. This technique had two fundamental purposes. First, carbon dioxide was quickly reabsorbed from

the peritoneal cavity so that pain resulting from the increased intraperitoneal pressure subsided relatively quickly. Second, the use of carbon dioxide alleviated some of the thermal complications that resulted when the abdomen contacted heat ***(Gaskin et al., 1991).***

In 1929, the German physician Kalk designed a new lens system that permitted oblique (135°) viewing. This improvement was largely responsible for the widespread use of laparoscopy in Europe during this time period. As well, he introduced the "dual trochar" technique. These advances allowed investigators to both visualize the abdominal cavity and simultaneously to pass instruments into the cavities ***(Gomella et al., 1994).***

In 1935, Kalk published a paper in Deutschen Medizinischen Wochenschrift, No. 46, which described his success in diagnostic laparoscopy. He wrote: This method really does not deserve the widespread opposition that still exists today, normally based on total ignorance.... In the more than 250 laparoscopies we performed in a seven year period, we did not have one unpleasant incident and only in the last two and one half years, in a further 100 laparoscopies, did I have the misfortune to puncture the colon. Otherwise, I have never experienced serious complications such as embolism, infection, or perforation of the large vessels ***(Klaiber et al., 1993).***