

Role of prophylactic antibiotics in minimizing surgical site infection in clean contaminated wounds (Laparoscopic cholecystectomy)

Thesis

Submitted for fulfillment of master degree
In general surgery

By

Ibrahim Ahmed Ismail Mostafa

M.B.B.ch
Cairo University

Supervised by

Prof. Dr: Mostafa Soliman

Professor of general surgery
Faculty of Medicine
Cairo University

Dr: Mohamed El masry

Lecture of general surgery
Faculty of Medicine
Cairo University

Cairo University
2010

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

ACKNOWLEDGEMENT

ACKNOWLEDGMENT

First and foremost, I feel always indebted to God, the kind and merciful.

I am greatly honored to express my deep respect and gratitude to Prof. **Dr. Mostafa Abd el hamid Soliman**, the eminent professor of General Surgery, Cairo University, for his faithful supervision, understanding, help and encouragement in initiating and completing this work whose sincere guidance and support had a significant impact on the structure and relevance of the research. I do feel too much indebted and too much grateful to him, now and for the rest of my life.

I am very much obliged and most grateful to **Dr. Mohamed Abd el monem Elmasry**, Lecturer of General Surgery, Cairo University for his overall supervision to all steps of the work, great help and support throughout all the steps of this work

I am also obliged to all my professors, my seniors and my colleagues for their continuous help and encouragement.

TABLE OF CONTENTS

Introduction	1
Review of literature	3
Anatomy & anatomical variations of the biliary tract	3
Embryology of the biliary tract	3
Anatomy of the biliary tree and the gall bladder	4
Anatomical variations of the biliary tract	11
Pathology of the bile secretion	16
Gall stones pathogenesis	22
Gall stones incidence and risk factors	27
Natural history of gall stones	30
Management of gall bladder stones	36
Surgical site infections	51
Patients and methods	78
Results	80
Discussion and conclusion	87
Summary	95
Reference	97
الملخص العربي	113

LIST OF TABLES

Table 1 composition of hepatic bile	17
Table 2: natural history of gallstones	31
Table 3: indications/contraindications: indications for prophylactic cholecystectomy.	32
Table 4: classification: wound classification	60
Table 5: category 1 recommendations from the hospital infection control practices advisory committee for the prevention of surgical site infections	61
Table 6: risk factors for development of surgical site infections	63
Table 7: Prophylactic use of antibiotics	69
Table 8: sex distribution	81
Table 9: Age distribution in different groups.	82
Table 10: Mean operative time in different groups.	83
Table 11: Incidence of wound infection in the three groups	85

LIST OF FIGURES

Figure (1). Cross section of the gallbladder and cystic duct.(Greenfield;2005)	4
Figure (2). The relations of the common bile duct. (Morris;2000)	7
Figure (3): Anatomy of the sphincter of Oddi. (Morris, 2000)	9
Figure (4). The arterial supply of gallbladder and Callot's triangle. (Britton and Savage; 2006)	10
Figure (5) The main variations in gall bladder and cystic duct anatomy. (Bailey 2000)	11
Figure (6) Variations in the cystic duct(Morris,2000)	12
Figure (7) Variations in the accessory bile ducts(Morris,2000)	13
Figure (8) classification of biliary atresia. (Bailey 2000)	13
Figure (9) Vascular anomalies. (Greenfield , 1997)	15
Figure (10) (A) Cholesterol gallstones. (B) Black pigment gallstones. (C) Brown pigment gallstone. (Greenfield, 1997)	23
Figure (11) Phases of cholesterol in bile.	24
Figure (12) Equilibrium phase diagram for bile salt“lecithin“cholesterol“water at a concentration of 10% solids, 90% water. The monomeric phase is not depicted as a phase because it exists at the same concentration throughout. The one-phase zone contains only micelles. Several other zones exist, but only the two on the left above the one-phase zone apply to human gallbladder bile, and both contain	25

cholesterol monohydrate crystals at equilibrium.	
Figure (13):Influence of age and gender on gallstone incidence. (After the National Health and Nutrition Examination and Survey III (1988-1994). The National Center for Health Statistics, Division of Health Examination Studies, Center for Disease Control and Prevention, October 1996.	28
Figure (14): Abdominal ultrasound of gallbladder with multiple echogenic gallstones.	37
Figure (15): Trocar placement for laparoscopic cholecystectomy. The laparoscope is placed through a 10-mm port just above the umbilicus. Additional ports are placed in the epigastrium, subcostally in the mid clavicular, and near the anterior axillary lines.	44
Figure (16): Incorrect (A) and correct (B) methods of retracting the gallbladder brings the cystic and common ducts into alignment and makes them appear as one.	45
Figure (17): The critical view of safety. The triangle of Calot is dissected free of all tissue except for the cystic duct and artery, and the base of the liver bed is exposed. When this view is achieved, the two structures entering the gallbladder can only be the cystic duct and artery. Visualization of the common bile duct is not necessary. (After Strasberg SM, Hertl M, Soper NJ. An analysis of the problem of biliary injury during laparoscopic cholecystectomy. J Am Coll Surg. 1995; 180:101.)	46
Figure (18): (A) the peritoneum overlying the cystic duct gallbladder junction is opened with blunt dissection. (B) The cystic duct is isolated. (C) The cystic duct is clipped proximal and distal and divided with the hook scissors. (D) The cystic artery is dissected, clipped and divided. (E) The gallbladder is dissected from the liver by scoring the serosa with electrocautery.	47

Figure (19): Pathophysiology of acute cholecystitis.	81
Figure (20): Computed tomography of a patient with acute cholecystitis showing gallbladder wall thickening and pericholecystic fluid.	82
Figure (21): Schematic demonstration of the technique of percutaneous placement of a pigtail catheter into the gallbladder.	83
Figure (22): Operative photograph demonstrating removal of a large gallstone from the ileum.	86

(ALGORITHM - 1) Managing potential surgical site infections.	71
---	-----------

ABSTRACT

Post-operative infections at the site of surgery are common and are one of the main nosocomial causes of complications that increase medical costs, morbidity, and even mortality. So the prevention of surgical site infection remains a focus of attention because wound infections continue to be a major source of expense.

The incidence of infection increases with the type of operation from clean, clean contaminated, contaminated and dirty operations respectively.

Antimicrobial prophylaxis is used to reduce the incidence of postoperative wound infections. Laparoscopic cholecystectomy, after rapidly substituting traditional cholecystectomy, represented the gold standard for surgical treatment of gall stones.

Compared with open cholecystectomy (OC), laparoscopic cholecystectomy LC is associated with lower postoperative infections, which make the role of routine antibiotic prophylaxis (ABP) in this minimally invasive clean contaminated procedure debatable.

This study aimed to evaluate the role of prophylactic antibiotics in minimizing surgical site infection mainly in laparoscopic cholecystectomy comparing between single preoperative dose versus the traditional three doses; comparing them with patients operated upon without any antibiotics.

Keywords:

Prophylactic

Antibiotics

Laparoscopic cholecystectomy

INTRODUCTION

Introduction

Post-operative infections at the site of surgery are common and are one of the main nosocomial causes of complications and increased medical costs. **(Smyth; et.al, 2000)**

The incidence of infection increases with the type of operation from clean, clean contaminated, contaminated and dirty operations respectively. **(Nuzzo; et al, 2005).**

The laparoscopic technique for cholecystectomy was first performed by Philippe Mouret in Lyon, France in 1987 and was developed and spread among general surgeons all over the world **(Dubois; et al, 2001).**

Laparoscopic cholecystectomy, after rapidly substituting traditional cholecystectomy, represented the gold standard for surgical treatment of gall stones. **(Nuzzo; et al, 2005).**

Laparoscopic cholecystectomy affords considerable benefits in many regards. The drop in infection rate is one of the most significant since its incidence is very low both in chronic and acute cholecystitis, whether or not there was gallbladder injury. **(Diez et al, 2005).**

It should be pointed out that following gallbladder injury umbilical wound infections are more frequent, and persistent suppuration may be due to remnants of stones in the subcutaneous layer, which requires early exploration. Lastly, sub hepatic fluid collections failing to respond to antibiotics should be drained by percutaneous puncture rather than by reoperation. Bearing in mind the extension of laparoscopic surgery to other pathologies, more stringent indices of acceptable infection should be drawn up for this minimally invasive procedure**(Diez et al, 2005).**

Antimicrobial prophylaxis can decrease the incidence of infection, particularly surgical site infection, after certain procedures (**Abramowicz; et.al, 2006**).

Antimicrobial prophylaxis has been used extensively to reduce the likelihood of post-operative infections (**Tang et al; 2001**).

It is usual practice to give prophylactic antibiotic during the 30 minutes prior to the incision and to maintain sufficient antimicrobial level in the whole time of operation and repeated every 3 hours during long operation (**Stone; et al; 1976**).

Recently single preoperative injection of antibiotics is extensively used. Septic complications are rare following laparoscopic cholecystectomy if prophylactic antibiotics are given (**Ann R Coll Surg Engl.2000; 82**).

Aim of the work:

To evaluate the role of prophylactic antibiotics in minimizing surgical site infection mainly in laparoscopic cholecystectomy comparing between single preoperative dose versus the traditional three doses; comparing them with patients operated upon without any antibiotics

REVIEW OF LITERATURE

**ANATOMY & ANATOMICAL
VARIATIONS OF THE BILIARY
TRACT**