

A Reevaluation of Antibiotic Prophylaxis in Laparoscopic Cholecystectomy

CONSTANTINE T. FRANTZIDES, M.D., Ph.D., F.A.C.S. and ANNE SYKES, M.D.

ABSTRACT

Antibiotic prophylaxis for cholecystectomy, although somewhat controversial, is nevertheless a routine component of surgical care. With the advent of laparoscopic cholecystectomy, this routine practice of antibiotic prophylaxis needs to be reevaluated. The present investigation was undertaken to determine the incidence of postsurgical infection in patients receiving antibiotic prophylaxis compared with patients receiving chlorhexidine gluconate scrub the evening before surgery. A total of 448 patients were enrolled in the study. Thirty-two of these patients were excluded because of the presence of intrinsic risk factors for infection. Two hundred twenty-eight patients received antibiotic prophylaxis, and 188 patients were enrolled in the nonantibiotic group. A total of 14 infections occurred in the antibiotic prophylaxis group, whereas no infections occurred in the chlorhexidine group. These results suggest that meticulous antiseptic skin cleansing is sufficient for prevention of postsurgical infection following laparoscopic cholecystectomy. Antibiotic prophylaxis should be used only in those patients exhibiting intrinsic risk factors, such as cholecystitis.

INTRODUCTION

LAPAROSCOPIC CHOLECYSTECTOMY has rapidly gained acceptance since its introduction in 1988 by Dubois et al.¹ It is estimated that 80% of all cholecystectomies are now performed laparoscopically.² Many studies cite the advantages of laparoscopic vs open cholecystectomy.^{3,4}

Major complications of laparoscopic cholecystectomy, such as bowel perforation, bile duct injury, hemorrhage, and retained stones, have been reviewed in the literature.⁵⁻⁸ Such complications are minimized with assimilation of the learning curve.⁹

Postoperative infection and the need for antibiotic prophylaxis are well documented in open biliary surgery. The use of antibiotic prophylaxis, however, for laparoscopic procedures is unfounded, as there are no studies that outline the indications. Mealy et al.¹⁰ studied the metabolic response in patients undergoing laparoscopic vs open cholecystectomy and found a significant decrease in acute-phase reactants in the laparoscopic group. This study gives us objective evidence of the decreased surgical trauma inherent to the laparoscopic technique. Therefore, an analysis of the use of antibiotic prophylaxis is indicated.

The etiology of postlaparoscopic cholecystectomy wound infection is predominantly gram-positive cocci, consistent with skin contaminants. The Southern Surgeons Club¹¹ studied 1518 patients undergoing laparoscopic cholecystectomy and found the most common complication to be superficial wound infection at the site

Department of Surgery, Medical College of Wisconsin, Milwaukee, Wisconsin.

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TABLE 1. EXCLUSION CRITERIA: PATIENTS WITH
INTRINSIC RISK FACTORS

Acute cholecystitis
Nonfunctional gallbladder
Common bile duct stones
Pericholecystic fluid

of the umbilical trocar insertion. The offending organisms were consistent with skin flora.¹¹ In addition, Hambræus et al.¹² and Whyte et al.¹³ reported that in patients undergoing biliary surgery with sterile bile, the incidence of postoperative infection was 12.8%, mostly caused by skin contaminants.

The current investigation was initiated to determine the incidence of postoperative wound infection in patients receiving antibiotic prophylaxis as compared with patients receiving a chlorhexidine gluconate scrub the evening before surgery.

MATERIALS AND METHODS

The study was conducted in an academic setting consisting of a county hospital and a referral center. This is a prospective, nonrandomized study in which the patients were assigned to one or the other group depending on the attending physician's preference for prophylaxis (antibiotic vs detergent). Four hundred forty-eight laparoscopic cholecystectomies were performed during the study period. Thirty-two patients were not included in the study because of intrinsic risk factors. The criteria for exclusion are outlined in Table 1. Group I consisted of 228 patients who received antibiotic prophylaxis before incision for laparoscopic cholecystectomy. A single dose of a second-generation cephalosporin (cefotetan 2 g IV) was administered at the time of induction of anesthesia.

Group II consisted of 188 patients who received the chlorhexidine gluconate scrub. Patients were instructed to scrub the evening and morning before surgery, being sure that the detergent was in contact with the skin surface for a minimum of 5 min. Special emphasis was given in instructing the patients to meticulously clean the umbilicus. After induction of anesthesia, the abdomen was shaved, prepared, and draped in the usual manner in both groups.

RESULTS

A total of 228 patients received antibiotic prophylaxis and were enrolled in group I. One hundred eighty-eight patients received the chlorhexidine gluconate scrub before surgery and were enrolled in group II.

An infection was defined as wound suppuration. The management of such infections encompassed antibiotics suited to cover the offending pathogen and/or wound opening and drainage.

TABLE 2. POSTOPERATIVE WOUND INFECTIONS

<i>Group I (n = 228)</i>		<i>Group II (n = 188)</i>	
<i>Organism</i>	<i>Number</i>	<i>Organism</i>	<i>Number</i>
<i>Staphylococcus</i>	12	none ^a	0
<i>Streptococcus viridans</i>	1	none	
<i>Klebsiella</i>	1	none	

^aNo infections were found in Group II.

ANTIBIOTICS VS. DETERGENT PROPHYLAXIS

TABLE 3. MANAGEMENT OF POSTOPERATIVE WOUND INFECTIONS

<i>Diagnosis</i>	<i>Treatment</i>	<i>Number</i>
Superficial wound infection	Wound opened	6
Superficial wound infection	Tetracycline	2
Superficial wound infection	Cefazolin + wound opened	2
Superficial wound infection	Cephalexin	1
Deep wound infection	Cefoxitin + wound opened	2
Deep wound infection	Ampicillin + sulbactam + wound opened	1

Fourteen infections occurred in the antibiotic prophylaxis group. Twelve of the 14 infections were gram-positive cocci, consistent with skin flora. *Streptococcus viridans* was cultured in 1 patient, and *Klebsiella* in another in whom a bile leakage was suspected (Table 2). The most common site of wound infection was the umbilical incision (13 of 14 patients). Table 3 summarizes the management of wound infections in group I. No infections occurred in the chlorhexidine gluconate group (group II).

Pathology findings on all gallbladders examined were consistent with cholelithiasis and chronic cholecystitis. Those patients who were found to have acute cholecystitis were excluded from the study. All patients were followed for a minimum of 30 days postoperatively.

DISCUSSION

Antibiotic prophylaxis is a standard component of biliary tract surgery. Many reviews showed a 50% decrease in the incidence of postoperative wound infection with the use of prophylactic antibiotics.¹⁴ These data, however, cannot be extrapolated to include laparoscopic procedures.

Laparoscopy may be the most significant advance in general surgery in the past decade. It has proven to minimize surgical trauma, shorten the hospital stay, minimize analgesic use, and increase the rate of return to work.^{3,10,15,16} In less than 4 years, laparoscopic cholecystectomy has become the gold standard for the treatment of cholelithiasis. Therefore, assessment of antibiotic prophylaxis and its indications for minimally invasive procedures is warranted. Based on our findings, it appears that careful patient selection with thorough preoperative evaluation for intrinsic risk factors is crucial in determining the indications for a detergent scrub alone. Those patients with intrinsic risk factors should be treated with antibiotics targeting the flora of the biliary tree, as well as the skin flora, until further data are available.

Our data suggest that the chlorhexidine gluconate scrub will be a valuable adjunct to laparoscopic procedures in reducing the incidence of postoperative wound infections. The chlorhexidine gluconate scrub may, in fact, supersede the use of prophylactic antibiotics. The appropriate use of prophylactic antibiotics will further decrease cost and morbidity for this optimal operative technique.

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Address reprint requests to:
Constantine T. Frantzides, M.D., Ph.D., F.A.C.S.
Associate Professor of Surgery
Medical College of Wisconsin
Froedtert Memorial Lutheran Hospital
9200 West Wisconsin Avenue
Milwaukee, WI 53226