Current practice of antibiotic prophylaxis during elective laparoscopic cholecystectomy

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ABSTRACT

INTRODUCTION Current guidelines do not recommend antibiotic prophylaxis in elective laparoscopic cholecystectomy. Despite this, there is wide variation in antibiotic prophylaxis during cholecystectomy in population-based studies. The aim of this survey was to establish the current rationale for antibiotic prophylaxis in elective laparoscopic cholecystectomy.

METHODS A short questionnaire was designed and disseminated across collaborators for a population-based study investigating outcomes following cholecystectomy and via the Association of Upper Gastrointestinal Surgeons, Researchgate and Surginet membership.

RESULTS Responses were received from 234 people; 50.9% had no written policy for the use of prophylactic antibiotics in elective cholecystectomy; 5.6% never used antibiotics, while 30.8% always did and 63.7% selectively used antibiotics. Contamination with bile, stones and pus were scenarios in which antibiotics were most commonly used in selective practices to reduce infective complications. Interestingly, 87% of respondents would be happy to participate in a trial investigating the effectiveness of antibiotics in elective laparoscopic cholecystectomy where contamination has occurred.

CONCLUSIONS The disparity between current practice and guidelines appears to arise because of a lack of evidence to show that antibiotics reduce surgical site infection following elective laparoscopic cholecystectomy where contamination has occurred. This question needs to be addressed before practice will change.

KEYWORDS

Antibiotic prophylaxis – Elective surgical procedures – Cholecystectomy – Laparoscopic

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Introduction

Approximately 115 patients undergo a cholecystectomy for every 100,000 of the world's population for benign gallbladder disease annually. This equates to approximately 70,000 cholecystectomies performed in England alone.¹ There is a wide variation in the management of these patients. One example is antibiotic prophylaxis during cholecystectomy. Level-one evidence has failed to demonstrate any clinical benefit, such as reduction in surgical site infections in patients administered antibiotic prophylaxis during an elective cholecystectomy.² Current guidelines do not recommend antibiotic prophylaxis in such patients.³ Despite this guidance and initiatives, between 20% and 80% of patients undergoing elective laparoscopic cholecystectomy are still given antibiotics in nationally collected datasets.^{4,5} There may be significant cost savings if guidelines are adhered to. Antibiotic stewardship is needed to tackle the

issue of emerging microbial resistance and other problems, such as increasing rates of *Clostridium difficile* infection from inappropriate antibiotic administration.^{6,7}

The aim of this survey was to establish the current antibiotic prophylaxis practice of participants involved in the Clinical Variation in Practice of Cholecystectomy and Surgical Outcomes (CholeS) study⁸ and the rationale for their practice.

Material and Methods

A short questionnaire was designed to determine the proportion of investigators who used antibiotic prophylaxis and the reasons behind their choice. This questionnaire was distributed via the CholeS email mailing list, the Association of Upper Gastrointestinal Surgeons (AUGIS), Twitter, Facebook, Research Gate and the Surginet email listserve. Responses

were collated and proportions are presented here. Error levels for responses of the surgical survey were calculated.

Results

Of the 523 CholeS participants, 234 (44.7%) replies were received. Using a margin of error calculator with a confidence level of 95%, the margin of error was 5%. Respondents identified themselves as consultants (65.8%), senior surgical trainees (20.1%), junior surgical trainees (11.5%), medical student (0.4%) and other (1.7%). Half of all respondents (119; 50.9%) had no local written policy for antibiotic prophylaxis for elective cholecystectomy. Only 13 (5.6%) respondents adhered to the current guidelines and never administered prophylactic antibiotics during elective laparoscopic cholecystectomy, while 72 (30.8%) always used antibiotic prophylaxis. The other 149 (63.7%) respondents selectively used prophylactic antibiotics.

Of these respondents, the scenarios in which antibiotic prophylaxis were used were spillage of pus (56.4%), bile (55.6%), gallstones (54.3%) mucus (34.6%), or intraoperative bleeding (4.7%). High-risk groups (such as patients with diabetes or using steroids) were administered antibiotic prophylaxis by 43.2% of respondents, when laparoscopic surgery was converted to open by 35.5%, when cholecystitis was noted intraoperatively by 32.9% or port site contamination with bile by 25.2%.

Interestingly, 204 (87%) respondents would be happy to participate in a randomised control trial to assess the effectiveness of antibiotic prophylaxis during elective laparoscopic cholecystectomy. In particular, the scenarios in which respondents would be willing to randomise patients were in these high-risk groups where intraoperative bile was spilt (30.3%), stones spilt (26.6%), mucus spilt (26.5%), pus spilt (20.9%), and all such scenarios (63.2%).

Discussion

Despite level-one evidence showing no benefit to patients undergoing elective laparoscopic cholecystectomy, 94.5% of respondents still administered antibiotic prophylaxis in their elective practice. The majority of respondents did so when intraoperative contamination occurred. The randomized control trials considered in the latest systematic review investigating the efficacy of antibiotic prophylaxis failed to explore the intraoperative risks of surgical site infection such as those highlighted by the respondents in this survey (e.g. spillage of pus, gallstones, mucus, bleeding or port site contamination with bile).² For example, the majority of surgeons (87.2%) stated that they would administer antibiotics when bile was spilt. This happens during 20–30% of cholecystectomies.⁹

There are only a few studies investigating the incidence of surgical site infection when intra-abdominal contamination occurs. One prospective longitudinal comparative study compared antibiotic administration versus no antibiotics when bile was spilt intra-operatively. Of 166 patients where bile was spilt, 80 (48.2%) were given antibiotics. There was no statistical difference in surgical site infection between the

two groups.⁹ However, this study was not powered to detect a difference between the groups.

Other independent risk factors identified are acute cholecystitis within 4 weeks prior to surgery, common bile duct stone or ductal exploration, jaundice or morbid obesity. In these high-risk patients, antibiotic prophylaxis is still believed to be effective.¹⁰ However, these studies are historical, dating back over 50 years. Current guidelines recommend antibiotics only in the following circumstances: those over the age of 60 years, in the presence of diabetes, patients with acute colic within 30 days of operation, and those with jaundice, acute cholecystitis or cholangitis.^{5,11}

There are significant risks with antibiotic administration, such as allergic reactions including anaphylaxis and antibiotic-induced diarrhoea. *C. difficile* rates are estimated at 0.2–8% following a single dose of certain antibiotics.⁵ One global health issue is the rising incidence of antibiotic-resistant bacteria. The exact cost is uncertain but has been estimated at over 55 billion dollars. Strict antibiotic stewardship and evidence that answers the critical questions that are needed to change practice are needed.¹²

There is a current focus on appropriate antibiotic use and probably a need for a well-powered trial to investigate the use of antibiotic prophylaxis. The majority of surgeons surveyed here would be willing to recruit to such a study. The results of this study would change practice if key questions are addressed.

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