

Antibiotic Resistance in Acute Cholecystitis Graded According to Tokyo Guidelines 2018: The First Prospective Study

Hardik Patel, Bhavin B Vasavada *

Shalby Hospitals, Ahmedabad, Gujarat, India

*Corresponding author: drbhavin.liversurgeon@gmail.com

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Abstract Introduction: Single-dose antibiotics are recommended for laparoscopic cholecystectomy, for symptomatic gall stones. However, very few studies are there for subgroup grade-2 and grade-3 cholecystitis according to Tokyo guidelines 2018. Material and methods: We retrospectively analysed outcomes of our protocol of no post-operative antibiotics in grade-2 and grade 3 (moderate to severe) acute cholecystitis according to Tokyo guidelines. We perform laparoscopic cholecystectomies within the first 24 hours of presentation to us without considering time since attack if the patient is not in septic shock where we follow survival sepsis guidelines and also perform percutaneous cholecystostomy. All the data were prospectively analysed. Statistical evaluation was done using SPSS version 21(IBM). Results: We performed 101 laparoscopic cholecystectomies between April 2016 to January 2019. We prefer single dose pre-operative antibiotic (third-generation cephalosporins) in all laparoscopic cholecystectomies and no post-operative antibiotics. A total of 74 patients were having grade 2 or grade 3 cholecystitis. 64 patients were having grade 2 and 9 patients were having grade 3 cholecystitis. One patient was having grade 3 cholecystitis and was having septic shock so he was managed with percutaneous cholecystostomy and according to survival sepsis protocol and lap choly was done after 72 hours and hence excluded from the study. Out of 73 patients included in the study, 2 patients were converted to open; in two patients we performed lap subtotal cholecystectomy due to a difficult calot triangle. Out of this only 1 patient developed port site infection and two patient developed biloma which was managed by percutaneous drainage. All patients were discharged the same day or the next day. Only two patients with biloma were readmitted. Rest all of the patients had an uneventful recovery. Conclusion: Post-operative antibiotics are unnecessary even in grade-2, grade-3 acute cholecystitis without septic shock according to Tokyo guidelines.

Keywords: *laparoscopic cholecystectomy, acute cholecystitis, galls stone, sepsis, surgical site infection*

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1. Introduction

Laparoscopic cholecystectomy is now the standard of care for acute cholecystitis. [1]. However, there is an ongoing debate about the optimum antibiotics schedule in cases of acute cholecystitis. Many authors do not believe in the need for antibiotics in case of elective laparoscopic cholecystitis. [2,3,4]. However, there is limited data available in the case of acute cholecystitis. To our knowledge, this is the first study where the role of Post-operative antibiotics is studied in the case of acute cholecystitis graded according to Tokyo guidelines 2018 [5]. We evaluated the effect of omission of postoperative antibiotics on postoperative septic complications and Surgical Site infections.

2. Materials and Methods

We analysed our data from April 2016 to January 2019 retrospectively. We give a single pre-operative antibiotic to all patients who undergo laparoscopic cholecystectomy at our institute and no post-operative antibiotics. We used Tokyo guidelines 2018 to grade the severity of cholecystitis. All surgeries were done by a team of two surgeons. We perform laparoscopic cholecystectomies within the first 24 hours of presentation to us without considering time since attack if the patient is not in septic shock where we follow survival sepsis guidelines, do percutaneous cholecystostomy, and we do cholecystectomy preferably when shock recovers and risk-benefit ratio tilt towards surgery. Statistical analysis was done using SPSS

version 21. (IBM). Ethical clearance obtained from the hospital ethics committee.

3. Results

We performed 101 laparoscopic cholecystectomies between April 2016 to January 2019. We prefer single-dose preoperative antibiotic (third-generation cephalosporins) in all laparoscopic cholecystectomies and no postoperative antibiotic. A total of 74 patients were having grade 2 or grade 3 cholecystitis. 64 patients were having grade 2 and 9 patients were having grade 3 cholecystitis. The mean age of patients was 52 years. The median preoperative ASA grade was 2. One patient was having grade 3 cholecystitis and was having septic shock so he was managed with percutaneous cholecystostomy and according to survival sepsis protocol and lap cholecystectomy was done after 72 hours and hence excluded from the study. Out of 73 patients included in study 2 patients were converted to open which were having grade 3 cholecystitis, in two patients we performed lap subtotal cholecystectomy due to a difficult calot triangle. Out of this only 1 patient developed port site infection with grade 3 cholecystitis. And two patients developed biloma which was managed by percutaneous drainage, one of them was grade 3 and one of them grade 2 cholecystitis. [Table 1] Morbidity was significantly associated with grade 3 cholecystitis according to Tokyo guidelines. ($p < 0.001$). [Table 2] All patients were discharged the same day or the next day. Only two patients with biloma were readmitted. Rest all of the patients had an uneventful recovery. The morbidity rate was 8 percent. We considered morbidity as any deviation in recovery or standard procedure in the case of laparoscopic cholecystectomy. Here we considered subtotal cholecystectomy also as a part of morbidity. There was no mortality in our study cohort. We always adhered to Tokyo guidelines to determine the grade of cholecystitis and did not consider the intraoperative difficulty in grading the severity of cholecystitis.

Table 1. Morbidity rates according to the grade of cholecystitis according to Tokyo guidelines

Complications	Grade 2 Cholecystitis	Grade 3 Cholecystitis
Conversion to open		2
Subtotal cholecystectomy		2
Port side infection		1
Biloma	1	1

Table 2. Chi-square test comparing grade of cholecystitis and complication (p-value < 0.0001)

complications	Grade 2 cholecystitis	Grade 3 cholecystitis
Yes	1	6
NO	63	3

4. Discussion

Laparoscopic cholecystectomy is the standard of care for symptomatic and acute cholecystitis [1]. However,

there is no consensus regarding the timing and duration of antibiotics in the case of laparoscopic cholecystectomy. More and more data are coming out regarding the futile role of perioperative antibiotics in the case of laparoscopic cholecystectomy. [2,3,4,5]. Even a few randomised control trials also showed the same results. [6]

However, to our knowledge, this is the first prospective study that evaluated the role of postoperative antibiotics in a selected cohort of acute cholecystitis classified according to Tokyo guidelines. [5]. Tokyo guidelines are an effective way to analyse the severity of cholecystitis. We excluded one patient of grade 4 acute cholecystitis according to Tokyo guidelines with septic shock as we did percutaneous cholecystostomy [7] in that patients and followed survival sepsis guidelines for management. [8]

As seen in Table 1 our overall morbidity rate was 8.2 percent and the mortality rate is 0 percent. The literature describes the morbidity rate of around 5 to 20 percents and a mortality rate of around 0.1 percent to 0.5 percents. [9,10,11]. Here also an important thing to note is we considered subtotal cholecystectomy as a part of morbidity [Table 1], which is nowhere related to antibiotics protocol.

None of the patients who developed biloma required ERCP and none of them developed sepsis. One patient developed port side infection. That patient was having grade 3 cholecystitis. So overall surgical site infection and infectious complications rates in our series are 1.36%. Bogdanic et al described ssi rate of 1.44 % in their studies. [12] As shown in Table 2 in our series morbidity was significantly associated with the grade of cholecystitis according to Tokyo guidelines rather than post-operative antibiotics use.

PEANUTSII trial [13] is currently recruiting patients for a similar kind of randomized control trial and we are expecting similar kind of results to our prospective study.

To our knowledge, this is the first prospective study where the futility of post-operative antibiotics has been studied and proven in the case of grade 2 and grade 3 (moderate to severe) cholecystitis. Avoidance of antibiotics will also increase cost-effectiveness and will prevent multidrug-resistant pathogens in this antibiotic resistance era.

There are certain limitations to the study as it is not a randomised control trial. Biases related to the prospective study will remain in this cohort. This study still have a limited number of patients may be further randomized control trial with larger numbers are needed to evaluate further.

In conclusion, we feel the routine use of post-operative antibiotics in case of severe acute cholecystitis without septic shock that underwent laparoscopic cholecystitis is unnecessary and may increase antibiotic resistance. Acute cholecystitis with septic shock should be treated with per cutaneous cholecystostomy following survival sepsis guidelines.

Abbreviations

SSI (surgical site infections)

Conflict of Interest

None.

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