



## **Bile Culture Results of Benign Biliary Obstruction: No Evidence of Infection and Prolonged Antibiotic Use**

**Saadhi Ikhdin<sup>1\*</sup> and Putra David Perdana<sup>1</sup>**

<sup>1</sup>Resident of Surgery, Faculty of Medicine, Sebelas Maret University, Moewardi General Hospital, Surakarta, Indonesia.

### **Authors' contributions**

*This work was carried out in collaboration between both authors. Author SI Designed the study, reported the case and wrote the first draft of the manuscript. Author PM managed the literature searches. Both authors read and approve final manuscript.*

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**Case Report**

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### **ABSTRACT**

**Aims:** To identify the presence of organism growth in bile culture to determine the need for prolonged antibiotic use.

**Case Description:** We reported five cases of benign biliary obstruction due to common bile duct stone. All patients presented with abdominal pain in the right upper quadrant for months. On physical examination, tenderness in the right upper quadrant of the abdomen and positive murphy sign were found. The ultrasound examination showed the presence of bile stones in all patients and multiple bile stones in two patients. Cholecystectomy, either laparotomy or laparoscopy, was performed on all patients, and the bile was aspirated for culture examination. The culture examination results of all patients showed that there was no growth of organisms. All patients were not administered post-operative antibiotic therapy, and there were no surgical site infections and post-operative morbidity reported.

**Discussion:** There was no growth of organisms in the bile; therefore, antibiotics were not administered to all patients. The absence of postoperative antibiotics did not lead to an increase in postoperative infections. Avoiding unnecessary use of antibiotics will reduce the side effects of antibiotics.

\*Corresponding author: E-mail: [Misterikhdin@gmail.com](mailto:Misterikhdin@gmail.com);

**Conclusion:** In our clinical practices, we found no evidence of bacterial colonization in this benign biliary obstruction case. Bile culture can be performed to determine antibiotic use, thereby avoiding unnecessary use of antibiotics.

*Keywords: Benign biliary obstruction; bile culture; antibiotic; bacterial colonization.*

## 1. INTRODUCTION

The prevalence of gallstones ranges from 10% to 15% in western countries with considerable variations between different ethnic groups. Gallstones are more common in young women and their prevalence increases with age [1]. Cholesterolasis is quite common and can be found in about 6% of men and 9% of women [2]. Choledocholithiasis occurs in about 20% of patients with cholelithiasis. Choledocholithiasis has been identified in 4.6% to 18.8% of patients undergoing cholecystectomy [3,4].

Patients with gallbladder stones (cholecystolithiasis) are mostly asymptomatic. In contrast, bile duct stones (choledocholithiasis) are more likely to cause biliary pain, jaundice, acute biliary pancreatitis, and/or ascending cholangitis [1]. A symptom associated with cholelithiasis is pain in the abdomen. Other presentations that can appear are dyspepsia, nausea and vomiting, fever, acute cholecystitis and gallbladder empyema, and also jaundice and pruritus [5]. Transabdominal ultrasound is the single best examination for diagnosing gallstones. Ultrasound remains the first line and the best imaging modality for diagnosing gallstones. A systematic review estimates that it has a sensitivity of 84% and a specificity of 99% which is better than other modalities [1,6].

Obstruction can cause an infection, cholangitis. The bile duct is usually sterile. However, the presence of gallstones either in the gallbladder or in the bile duct is associated with bacterial colonization [5]. The bacteria can increase the risk of adverse intra and postoperative infections. Therefore, the role of antibiotics in cholecystectomy may be related to the rate of bacterial proliferation in the bile. A single organism isolated from the bile has clinical significance and clinicians should consider the use of antibiotics to mask these organisms [7,8].

## 2. PRESENTATION OF CASE

We reported five patients with gallstones undergoing intra-operative bile aspiration, and then we observed the growth of organisms by

bile culture examination. There were three male patients and two female patients, and all patients were over 50 years old. The patients came complaining of upper right abdominal pain that had been disturbing recently. Other symptoms experienced by the patients were commonly nausea and vomiting. One patient complained of having a putty-colored stool. The abdominal pain was not triggered by food.

On physical examination, all patients showed upper right quadrant tenderness and three patients had a positive murphy sign. Laboratory studies were performed on all patients and there was a slight increase of total bilirubin levels in one patient. All patients underwent an ultrasound examination. On ultrasound examination, gallstones were found in all patients and two patients had multiple stones.

Based on all examinations, the patients were diagnosed with gallstones or cholelithiasis, and then they underwent cholecystectomy. Laparoscopic cholecystectomy was performed on one patient and laparotomy was performed on the other four. Then, the bile was aspirated for culture examination. The results of bile culture showed that there was no growth of organisms. Postoperatively, all patients were admitted to the ward and received fluid and analgesic therapy. Based on the results of the patient's bile culture, antibiotic therapy was not administered as postoperative care.

## 3. DISCUSSION

This case series reported that all five patients were over 50 years old. The occurrence of gallstones increases with age, increasing sharply after the age of 40 to 4 to 10 times more likely in older people [9]. This series reported two female patients and three male patients. Female gender has the strongest association with gallstone disease, especially in childbearing age. Cholelithiasis is quite common and can be found in about 6% of men and 9% of women [2,9].

On physical examination, we found right upper quadrant tenderness in all patients and a typical positive murphy sign in three patients. The

symptom observed in all cholelithiasis patients is abdominal pain, which can be present as chronic upper abdominal pain and acute upper abdominal pain [5,10]. The findings of a classic physical examination in a person with uncomplicated cholelithiasis during an acute episode of gallstones associated with biliary colic are a positive Murphy's sign. Pain and stop of inspiration on deep palpation below the right costal margin (Murphy's sign) may be present and has a sensitivity and specificity of 65% and 87%, respectively [1,11].

In all patients, there were no significant laboratory abnormalities. The patients were planned to undergo an ultrasound examination. Ultrasound remains the first line and the best imaging modality for diagnosing gallstones. A systematic review estimates that it has a sensitivity of 84% and a specificity of 99%, which is better than other modalities. Magnetic Resonance Cholangiopancreatography (MRCP) has a sensitivity and specificity of 90-95% for the detection of common bile duct stones and is particularly suitable for removing bile duct stones

in patients with low or moderate clinical suspicion [1,5]. Based on Tokyo Guideline (2018), because of limited accessibility, MRI/MRCP is generally only used for imaging when a diagnosis proves difficult or uncertain with abdominal ultrasound or CT [12].

Cholecystectomy was performed on all patients; only one patient underwent a laparoscopy because our center rarely performs minimally invasive procedures. Cholecystectomy performed in cholelithiasis cases is to avoid a 50-70% recurrence rate and a 1-2% risk of complications from gallstone disease [1]. Bile culture examination was performed to determine the presence of the organism's growth. Culture examinations showed that there was no growth of organisms in all patients' bile. Based on the culture results, antibiotic therapy was not administered to all patients. Park et al. (2014) found that organisms in bile were dominated by gram-positive bacteria. A single organism isolated from bile has clinical significance and clinicians should consider the use of antibiotics compatible with these organisms [7,8].

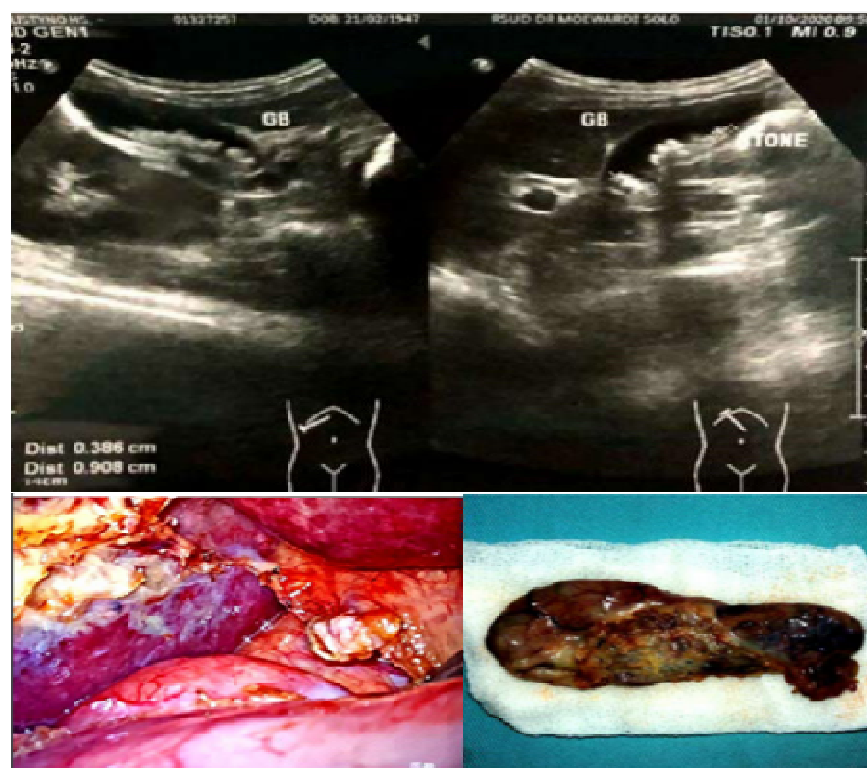


Fig. 1a. Ultrasound examination results b. Laparoscopic cholecystectomy, c. Clinical macroscopic vesicafellea

Salvador et al. (2011) showed that patients with biliary obstruction can have bacteriobilia in bile cultures and the bacteria most frequently isolated are gram-negative bacteria including *Escherichia coli* and *Pseudomonas* [13]. There is a tendency for a higher incidence of postoperative infectious complications in patients with bacteriobilia [13,14]. The presence of gallstones either in the gallbladder or in the bile duct is associated with bacterial colonization. Obstruction can cause an infection called cholangitis [6]. There was no growth of organisms in the bile; therefore, antibiotics were not administered to all patients. A study conducted by Bagus et al. (2020) evaluated 158 patients, followed up after 30 days. It was found that 1 (0.6%) patient had a superficial surgical site infection on the 10th postoperative day. This patient had a BMI of > 30. Cholecystectomy was performed using the laparotomy technique and could be managed conservatively without the need for additional antibiotics. Based on this study, it is considered that antibiotics did not lead to an increase in postoperative infections [15]. For patients undergoing laparoscopic cholecystectomy (LC), prophylactic antibiotics do not play an important role in infection prevention; these antibiotics do not appear to be needed in treatment [16]. No continuous oral antibiotic is safe and feasible in mild and moderate calcified cholecystitis [15]. Likewise, with the use of postoperative antibiotics, a meta-analysis by Regina et al. (2018) showed no significant benefit of extended antibiotic therapy in reducing surgical site infection after cholecystectomy [17].

#### **4. CONCLUSION**

In conclusion, in our case series, there was no evidence of bacterial colonization in benign biliary obstruction. Bile culture can be performed to determine antibiotic use; thereby unnecessary antibiotic use can be avoided.

#### **CONSENT AND ETHICAL APPROVAL**

As per university standard guidelines, participant consent and ethical approval have been collected and preserved by the authors.

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#### **COMPETING INTERESTS**

Authors have declared that no competing interests exist.

#### **REFERENCES**

1. Dumoulin FL, Sauerbruch T, Hawkey CJ, Bosch J, Richter JE, Garcia-Tsao G, Chan FKL. Cholelithiasis, Choledocholithiasis and cholecystitis. In: Textbook of Clinical Gastroenterology and Hepatology, 2nd edition, Blackwell Publishing; 2012.
2. Tanaja J, Lopez RA, Meer JM. Cholelithiasis. [Updated 2020 Aug 10]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing. Accessed: 30 October 2020. Available: <https://www.ncbi.nlm.nih.gov/books/NBK470440/>
3. Mc Nicoll CF, Pastorino A, Farooq U, St Hill CR. Choledocholithiasis. Accessed: 30 October 2020. [Updated 2020 Jun 18]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing. Available: <https://www.ncbi.nlm.nih.gov/books/NBK441961>
4. Molvar C, Glaenger B. Choledocholithiasis: Evaluation, Treatment, and Outcomes. *Semin Intervent Radiol.* 2016;33(4):268-276.
5. Englesbe, MJ, Dawes LG. Resistant pathogens in biliary obstruction: Importance of cultures to guide antibiotic therapy', *Hpb*, 2005;7(2):144-148.
6. Coucke EM, Akbar H, Kahloon A, Lopez P. Biliary Obstruction. Treasure Island (FL): Stat Pearls Publishing. Accessed: 30 October 2020. [Updated 2020 Jun 22]. In: StatPearls [Internet]. Available: <https://www.ncbi.nlm.nih.gov/books/NBK539698/>
7. Yun SP, Seo H. Clinical aspects of bile culture in patients undergoing laparoscopic cholecystectomy. *Medicine (United States)*, 2018;97(26):1-4.
8. Park JW, Lee JK, Lee KT, Lee KH, Sung YK, Kang C. How to interpret the bile culture results of patients with biliary tract infections. *Clinics and Research in Hepatology and Gastroenterology.* Elsevier Masson SAS. 2014;38(3):300-309.
9. Stinton LM, Shaffer EA. Epidemiology of gallbladder disease: cholelithiasis and cancer. *Gut Liver.* 2012;6(2):172-187.
10. Pimpale R, Katakwar P, Akhtar M. Cholelithiasis: causative factors, clinical

- manifestations and management. *International Surgery Journal*. 2019; 6(6):2133.
11. Littlefield A, Lenahan C. Cholelithiasis: Presentation and management. *Journal of Midwifery and Women's Health*. 2019; 64(3):289–297.
  12. Kiriya S, Kozaka K, Takada T, Strasberg SM, Pitt HA, Gabata T et al. Tokyo guidelines 2018: Diagnostic criteria and severity grading of acute cholangitis (with videos). *J Hepatobiliary Pancreat Sci*. 2018;25:17-30.
  13. Salvador VB, Lozada MC, Consunji RJ. Microbiology and antibiotic susceptibility of organisms in bile cultures from patients with and without cholangitis at an Asian academic medical center. *Surg Infect (Larchmt)*. 2011;12(2):105-11. DOI: 10.1089/sur.2010.005
  14. Kaya M, Beştaş R, Bacalan F, Bacaksız F, Arslan EG, Kaplan MA. Microbial profile and antibiotic sensitivity pattern in bile cultures from endoscopic retrograde cholangiography patients. *World Journal of Gastroenterology*. 2012;18(27):3585–3589.
  15. Bagus BI, Kade MIA, Laely S, Bagus MI, Ayu SI. No need for the continuation of oral antibiotic on mild and moderate calculous cholecystitis undergoing elective cholecystectomy. *BJS*. 2020;107(S3):25–234
  16. Darzi AA, Nikmanesh A, Bagherian F. The effect of prophylactic antibiotics on post laparoscopic cholecystectomy infectious complications: A double-blinded clinical trial. *Electron Physician*. 2016;8(5):2308-2314.
  17. La Regina D, Di Giuseppe M, Cafarotti S, Saporito A, Ceppi M, Mongelli F et al. Antibiotic administration after cholecystectomy for acute mild-moderate cholecystitis: A PRISMA-compliant meta-analysis. *Surgical Endoscopy*; 2018.

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