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Bacterial Screening from Liquid Bile of Patients Underwent Laparoscopic Cholecystectomy Using Chromoginc Agar

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A B S T R A C T

The main objective is to evaluate the incidence of bacterial pathogens in the liquid bile of patients underwent laparoscopic cholecystectomy using CHROMagar media. A Total of 34 samples were collected from patients suffering from cholecystolithiasis who were subjected to laparoscopic cholecystectomy by the same surgeon at Al-Sadr Teaching Hospital in Basra City for the period (31st of January 2016 to 30th of April 2016). It included 32 (94.1%) females and 2 (5.9%) males, aging between (23 – 61 years). Bile aspirates taken from each gallbladder in the operative room and directly inoculated onto brain heart infusion growth and incubated at 37°C for (24-48 hours). The isolates were identified by routine biochemical tests and CHROMagar media. A total of 34 samples were examined for detection of bacteria showed *E. coil* 11(32.4%), *Enterococcus* spp 7(20.6%), *Pseudomonas aeruginosa* 4(11.8%), *Klebsiella pneumoniae* 3(8.8%), *Salmonella* spp 3(8.8%) and *Staphylococcus aureus* 2(5.9%). A screening procedure using CHROMagar media gives better results and faster in identifying bacteria than conventional methods. Still the stasis secondary to gall stones is the commonest cause for cholecystitis and bacterial infection. Our work wishes to emphasize that *E. coli* presents at high frequency among other bacteria.

Introduction

Gallstone disease remains one of the most common medical problems leading to surgical intervention (Romero *et al.*, 2003). It is a significant health problem in developed societies, affecting 10% to 15% of the adult population (Tazuma, 2006). The most prevalent complication of cholelithiasis is chronic cholecystitis usually necessitating cholecystectomy (Vitetta *et al.*, 2000). Abdominal ultrasonography detects the gallstone and sometimes the associated inflammation. Treatment usually involves antibiotics and cholecystectomy.

Acute cholecystits is the most common complication of cholecystolithiasis. Conversely, more than or equal to 95% of patients with acute cholecystitis have cholelithiasis. When a stone becomes impacted in the cystic duct and persistently obstructs it, acute inflammation results. Bacterial infection can supervene. The vicious circle of fluid secretion and inflammation, when unchecked, leads to necrosis and

perforation (Indar, 2002) If acute inflammation resolves then continues to recur, the gallbladder becomes fibrotic and contracted and does not concentrate bile or empty normally-features of chronic cholecystitis (Reda *et al.,* 2016).

The organisms most commonly isolated in biliary tract infections are *Escherichia coli*, *Klebsiella* sp., *Enterococcus* sp. and anaerobes (Reiss *et al.*, 1982; Brook, 1989).

Acute cholecystitis is an infection of the biliary tract, which results from bile stasis due to chronic obstruction. The obstruction is usually attributed to gallstones in 80% of cases. The causes of acalculous cholecystitis include biliary structures, human immunodeficiency virus, cholangiopathy, biliary parasites and primary sclerosing cholangitis. Other causes include complicated cases of burns, trauma, major surgery, diabetes and unusual bacterial infections of the gallbladder (*Salmonella* spp. or *Vibrio cholerae*) and other systemic infections (tuberculosis and syphilis) (Greenberger and Isselbacher, 1998).

In Saudi Arabia, 25% of patients undergoing laparoscopic cholecystectomy for gallstones were bacterial culture positive, and the most common organisms isolated were *E. coli* (28.1%), *E. faecalis* (15.6%) and *P. aeruginosa* (9.4%) (Al Harbi *et al.*, 2001)

Öztürk *et al.*, (2012) founded the most commonly isolated bacteria were *Enterococcus* spp (%26.6%), *Escherichia coli* (20%) and *Enterobacter* spp (20%). Capoor *et al.*, (2008) found. The most common organisms isolated were *Escherichia coli* (29.7%), *Salmonella enterica* serovar Typhi (8.1%), *Klebsiella pneumoniae* (27%). The aim of the current study evaluates the incidence of bacterial pathogens in liquid bile of patients undergoing cholecystectomy.

Materials and Methods

Isolation of bacterial species

A total of 34 samples had collected from patients who attended the Al-Sader Teaching Hospital in Basra City in the period (31 January 2016 –30 April 2016). It included 29 (85%) females and 5 (15%) males, aged between (23 – 61 years).

Bile was aspirated during cholecystectomy and collected in a sterile container contain brain heart infusion growths transport media, bile aspirate were directly inoculated onto blood agar and MacConkey agar and incubated at 37°C for (24-48 hours).

Identification of the isolates

The suspected colonies were examined for their colonial morphology, microscopical examination, biochemical test (Collee *et al.*, 1996) and CHROMagar media.

Results and Discussion

A total of 34 bile samples aspirated from gall bladders excised laparoscopicaly by the same surgeon through four ports with the aid of CO_2 inflation and the usage of bipolar coagulation diathermy and titanium clips applied to the cystic artery and duct (Figure 1, 2, 3, and 4), the patients were suffering from cholecystolithiasis.

The bile examined for detection of bacteria showed *E. coil* 11(32.4%), *Enterococcus* spp 7(20.6%), *P. aeroginosa* 4(11.8%), *Klebsiella pneumonia* 3(8.8%), *Salmonella* spp 3(8.8%) and *S. aureus* 2(5.9%) (Table 1).

In this study the age range was 23-61 years, the median age of the patients was 37 years. 32 (94.1%) females and 2 (5.9%) males and the similar findings have been observed in

previous studies, and agree with local studies, Wajid and Alwan (2015) in Al-Diwaniya city and Al-Zuharri (2011) in Al-Najaf city.

Our study showed the most common isolates was *E. coli* represents 32.4% and this agrees with previous studies (Capoor *et al.*, 2008; Al-Zuharri, 2011). Seven (20.6%) positive samples were identified as *Enterococcus* spp by biochemical tests and confirmed by CHROMagar medium. ÖZTÜRK *et al.*, (2012) founded the most commonly isolated bacteria were *Enterococcus* spp (26.6%) (Fig. 5).

Agree with Wajid and Alwan (2015) In Iraq, Al-Diwaniya city (88% female and 12% male) Wajid and Alwan (2015) founded 7.2% E.coli in bile from cholecystectomy.

Table.1 Identified of bacterial species by chromogenic medium

Bacterial species	No. (%)	Colony Colour	Colony Size and Morphology
E. coli	11(32.4%)	Dark pink to reddish	Small-sized to medium
Enterococcus spp	7(20.6%)	Blue	Tiny, pinlike
P. aeroginosa	4(11.8%)	Blue-green	Serated edges, diffused
K. pneumoniae	3(8.8%)	Metallic blue	Mucoid
Salmonella spp.	3(8.8%)	Mauve	1.0mm, Raised, smooth
S. aureus	2(5.9%)	Pink	1- 3mm, Mucoid

Fig.(1): Isolation and Identification of the Cystic Artery and Duct

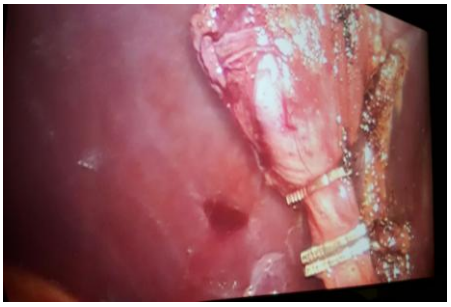
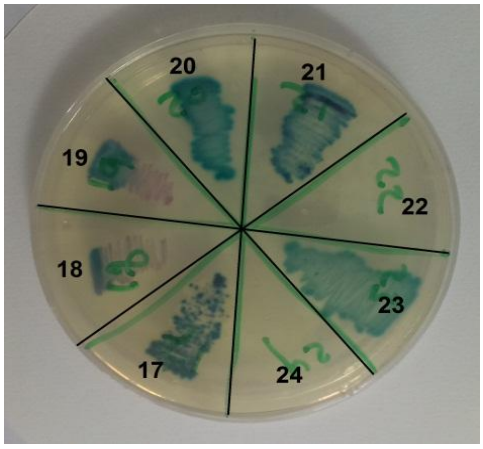


Fig.(2): Double Clipping of the Cystic Duct Proximally and one Clip Distaly before Cutting the Duct

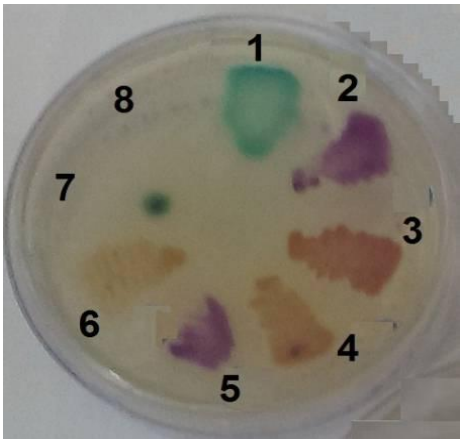
Fig.(3): Cholecystectomy Progress Using Diathermy Coagulation

Fig.(4): Cholecystectomy Completed and Ready for Aspiration of Bile Fluid

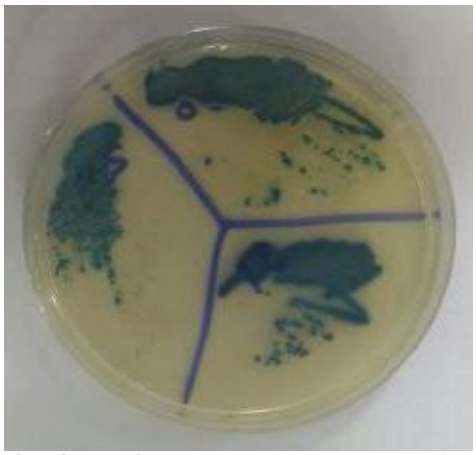
Fig.5 Specific color reactions of microorganisms on CHROMagar media



A. CHROMagar Orientation

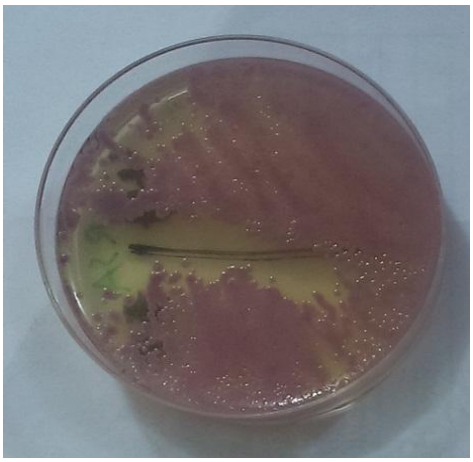


B. CHROMagar Orientation

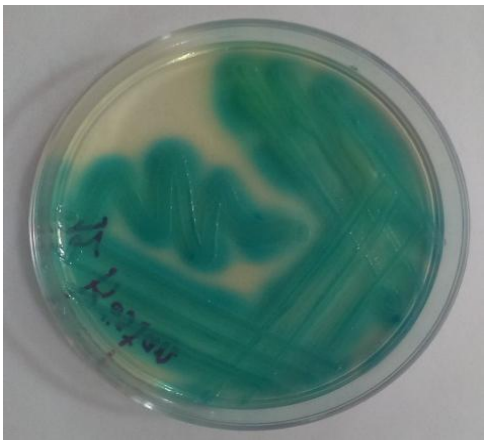


C. CHROMagar *K. pneumoniae*

D. CHROMagar *E. coli*



E. CHROMagar *Staph. aureus*



F. CHROMagar *Pseudomonas*

In one study (Su and Ya, 2015), it has been determined that MRSA can be caused infection in acute cholecystitis.

In an enteric fever endemic country, *Salmonella enterica* serovar *Typhi* and *S. Paratyphi* A are among the major biliary pathogens. Enteric fever persists for many years after convalescence and increases the risk of hepatobiliary malignancy (Vaishnavi *et al.,* 2005; Sharma *et al.,* 2007)

In the present study, CHROMagar was evaluated for the first time in Iraq as a direct isolation medium for bile liquid aspirated directly from the gallbladder at the time of cholecystectomy.

Identification of clinical bacterial samples by using CHROMagar medium give easily and rapid results by color and morphology characteristics to differentiate between the bacterial colonies and this may impact directly on the type and duration of antibiotic choice given for these patients in the future.

References

Al-Harbi, M. (2001). Tract microflora in Saudi patients with cholelithiasis. Trop. Med. Int. Health. 6 (7):570-4.

Al-Zuharri O.A.R. 2011. Isolation and identification of bacteria from patients with cholecystits and cholelithiasis undergoing cholecystectomy. Al-Kufa J. for Biology. 3(1).

Brook, I. Aerobic and anaerobic microbiology of biliary tract disease. J. Clin. Microbiol, 27:2373-2375, 1989.

Capoor M.R., Nair D., Ranji, Khanna, Krishna S. V., Chintamani M.S. and Aggrawal P. Microflora of Bile Aspirates in Patients With Acute Cholecystitis With or Without Cholelithiasis: A Tropical Experience. BJID 2008. 12 (June). Pp. 222-225.

Collee, J.G.; fraser, A.G.; Marmion, B.P. and Simmons, A. (1996). Mackie and McCartney, practical Medical Microbiology, 14th edn. Churchil living stone, New York.

Greenberger N.J., Isselbacher K.J. Diseases of the gallbladder and bile ducts. In: Fauci S.A., Braunwald E., Isselbacher K.J., *et al.,* (eds). Harrison's Principles of Internal Medicine. Mc Graw-Hill, New York, 1998.

Indar A.A . 2002. Acute cholecystitis.BMJ. 325(7365): 639–643.

Öztürk A., Bozkurtoğlu H., Kaya C., Tan N., Çaşkurlu H. and Akinci Ö. F.. 2012. Bacteriologic Analysis of Bile in Cholecystectomy Patients. The New Journal of Medicine. 29(1):43-46.

Reda A. S., Aboulkhair L. A., Almsarri M. Y.2016. The Effect of Seasonal Variation on Developing Acute Cholecystitis among Adult Patients in Jeddah, Saudi Arabia. International Journal of Healthcare Science. 3(2).274-277.

Reiss, R., Eliashiv, A., and Deutsch, A.A.Septic complications and bile cultures in 800 consecutive cholecystectomies. World J. Surg. 6:195-199, 1982.

Romero Y, Thistle JL, Longstreth GF, Harmsen WS, Schleck CD, Zinsmeister AR, *et al.,* A questionnaire for the assessment of biliary symptoms. Am J Gastroenterol. 2003 May; 98[(5)]:1042-51.

Sharma V., Chauhan V.K., Nath G., Kumar A., Shukla V.K. Role of bile bacteria in gall bladder carcinoma. Hepatogastroenterol 2007; 54:1622-5.

Su Po-An and Yu. Wen-Liang Acute Cholecystitis Caused by Methicillin-resistant *Staphylococcus aureus*: A Rare Case Report. Austin J Emergency & Crit Care Med. 2015; 2(1): 1010

Tazuma S. Gallstone disease: epidemiology, pathogenesis, and classification of biliary stones (common bile duct and intrahepatic) Best Pract Res Clin Gastroenterol. 2006; 20:1075–1083.

Vaishnavi C., Singh S., Kochhar R. Prevalence of *Salmonella enterica* serovar *Typhi* in bile and stool of patients with biliary diseases and those requiring biliary drainage for other purposes. Jpn J Infect Dis 2005; 58:363-5.

Vitetta L, Best SP, Sali A. Single and multiple cholesterol gallstones and the influence of bacteria. Med Hypotheses. 2000; 55(6):502–6.

Wajid A.R. and Alwan S. K. 2015. Bacteriological and genetic study on *Echerichia coli* Causing Acute Calculus Cholecystitis for Diabetes Patients in Al-Diwanyia City. International Journal of Advanced Research. 3(6). 13774-1382.

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