

Investigation of Carrier Persons of Salmonella Typhi in Cholelithiasis Patients in Kirkuk Province

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Abstract

The aim of this study was to investigate person carries bacteria that cause typhoid fever (*Salmonella typhi*) in patients with cholelithiasis. For this purpose 50 sample of gallbladder tissue and 21 sample only of bile salts (available only) collected from the same patients with cholelithiasis who subject to surgical removal in Azadi Teaching Hospital and Kirkuk General Hospital, in period from September 2016 to March 2017. The result showed that there was three out of 50 patients with gallstones were carried the bacteria which causes typhoid fever and this give ratio 6%. Females they was more than male in carried the pathogenic bacteria that give ratio 6.89% and 4.67% for females and males, respectively. Our study shows an association between presence stone in gallbladder and the presence of bacteria caused typhoid fever.

Keywords: S.typhi, Cholelithiasis, Typhoid fever, Gallstones

التحري عن الاشخاص الحاملين لجرثومة السالمونيلا التيفوئيدية لدى مرضى حصى المرارة في محافظة كركوك

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الملخص

الهدف من هذه الدراسة التحري عن الاشخاص الحاملين للجرثومة المسببة لحمى التيفوئيد (*Salmonella typhi*) في المرضى المصابين بحصى المرارة . ولهذا الغرض جمعت 50 عينة نسيجية من المرارة و 21 عينة فقط من سائل الصفراء (المتوفرة فقط) من نفس المرضى المصابين بحصى المرارة (Cholelithiasis) والخاضعين للاستئصال الجراحي في مستشفى ازادي التعليمي ومستشفى كركوك العام . واستمرت فترة الدراسة من ايلول 2016 الى اذار 2017. وأظهرت النتائج ان هنا ثلاث حالات من اصل 50 مريض مصاب بحصى المرارة حاملين للجرثومة المسببة للمرض وهذا يعطي نسبة 6%. وكانت الاناث اكثر من الذكور في حمل الجرثومة المسببة للمرض اذ كانت النسبة المئوية لعزل الجرثومة 6.89% و 4.67% للاناث والذكور على التوالي. أظهرت دراستنا وجود علاقة بين وجود حصى المرارة و وجود الجرثومة المسببة لحمى التيفوئيد.

الكلمات المفتاحية: السالمونيلا التيفوئيدية، التحصي الصفراوي ، حمى التيفوئيد ، حصى المرارة.

1. Introduction

Typhoid fever is caused by *Salmonella entericaserovartyphi*, and this disease is limited to infected humans only, the number of Infected with this disease is estimated at 21 million, resulting in nearly 200,000 deaths worldwide each year [1]. The infection occurs after eating contaminated food and water. Bacteria pass through the barrier of the intestinal mucous cells and then devour through macrophage, which spread to all members of the body and result in a cute infection [2]. 3-5% of infected cases with typhoid fever become chronic carriers of the disease [3]. The chronic cases of typhoid fever is public health problem. Chronic carriers contribute to the spread of the disease by sheading the pathogenic bacteria in the stool and urine. Chronic cases did not prove to be treated colonization in gallbladder, in contrast acute infection. Even prolonged, high-dose of antibiotic therapy resolves less than two-thirds of chronic infections, and treatment with ampicillin has been shown to be effective only in patients without gallstones [4, 5]. Cholecystectomy increases the cure rate, but it does not Secures the elimination of carrier state [6]. And this belong to foci of infection can persist in the biliary tree, mesenteric lymph nodes or liver [7, 8]. Therefore; the most effective treatment is a combination of surgery and antibiotics [9].

2. Material and methods:

A- Samples collection

Fifty tissue samples of gallbladder and (21) bile salt samples were collected from patients with gallstones surgically removal in Azadi Teaching Hospital and Kirkuk General Hospital, The research period continued from September 2016 to march 2017 .

B- Bacterial isolation and diagnosis

Salmonella bacteria were isolated from people undergoing gallbladder removal according to [10, 11]:

- Isolatin from bile salt: (2-5 ml) of bile salt were taken from patients whose under surgical removal and placed it in a sterile container, transferred directly to the laboratory and inoculated on macConkey agar, Salmonella-shigella agar and XLD agar .
- Isolation from gallbladder: (1gram) of gallbladder tissue were taken and put it in a sterile container and transfer directly to the laboratory and place in a sterile mortar containing 1

ml of normal saline and be homogenized to get stuck and then placed in Brain heart infusion broth (BHIB) and Tetrathionate Broth and incubated at a temperature of 37 ° C For 24 hours and then subculture on macconkeyagar, *Salmonella shigella* agar and XLD agar.

Diagnosis of bacteria :

The isolation bacteria were diagnosis depending on morphological characteristics, gram stain, biochemical tests according to [12] , and API 20 E.

3. Results and discussion:

The bacteria isolates were characterized by Non-lactose fermentation colonies on macconkey agar, colonies on *Salmonella shigella* agar were pale yellow with or without black color in center, On XLD agar the colonies were large red color with a bright black center **Fig. 1**. In biochemical tests Bacteria isolates on TSI agar showed their inability to ferment lactose, while glucose sugar was fermented and producing H₂S. On Simon citrate medium, the isolates showed that they could not consume citrate. On urea medium, all the isolates were unable to produce urease. And all isolate were motility and fermented for mannitol on a semi-solid mannitol. And all isolates were negative to the indol test. Also, all isolated characterized that belong to *Salmonella typhi* tested by API 20 E **Fig. 2**.

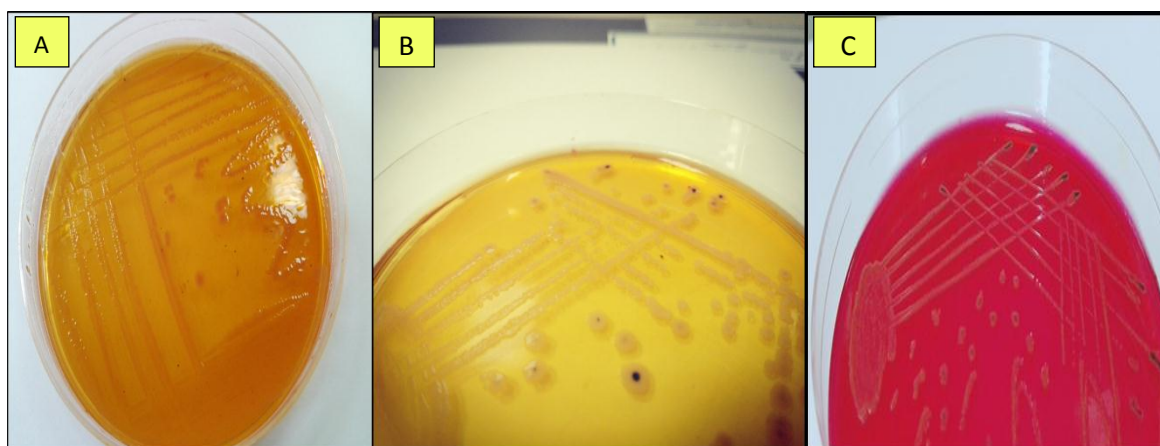


Fig. 1: Morphological characterize of *S.typhi* on:Macconkey agar (A), SS agar (B), XLD agar.



Table 1: Isolation of *S.typhi*

The ratio of our study was agreed with study [13] with a rate of 6.6%. And there was Studies recorded a higher rate of isolation than in our study, Study of Mansour and his colleagues recorded ratio of *S.typhi* isolates 7.2% [10]. In other study by Manan and his colleagues the isolation rate of *S.typhi* was 12.7% [14]. And study of Abd-Alkareem in Al-Anbar province recorded 16% [15]. There was Other studies have recorded a lower ratio of isolation *S.typhi* than our current study, Study Capoor and his colleagues reporting ratio of *S.typhi* isolation 3.8% [16]. In other study conducted in Sudan, the rate of isolation was 3% [17]. While study of Al-Zuharri in the province Al-Najaf in Iraq and study of Thapa and colleagues in Nepal didn't record any isolate of *S.typhi* from gallbladder [18,19]. *Salmonella typhi* isolates from patients with gallstone according to references amount to (1-34%) [20], which agreed with our current study. People with gallbladder disease are more likely to become carriers of salmonella bacteria. *Salmonella typhi* is associated with gallstone because it has the ability to produce beta-glucuronidase (B-glucuronidase) in bile salt, this factor with the inactivity of the bile plays an important role in the formation of brown pigment stones [21]. This enzyme works to break down the bilirubin diglucuronide in the bile into an free

unconjugated bilirubin, which in turn is associated with the calcium when the pH of bile been acidic, that it deposited in turn in the form of calcium bilirubinate. Deposition of these salts, on the other hand, is accompanied by the deposition of calcium bilirubinate deposition of calcium palmitate. This bacteria, which have the ability to secrete the beta-glucuronidase enzyme, also have the ability to secrete the phospholipase enzyme (phospholipase) Phospholipids in bile such as Lecithin and free palmitic acid, which in turn is associated with calcium when the pH of bile been acidic and the formation of calcium palmitate that precipitates in conjunction with calcium bilirubinate [21, 22, 23]. In addition, the ability of bacteria to adhere to the solid pigment of calcium bilirubinate through possession these bacteria capsule which contain Glycocalyx, this helps to collect solid particles of dye around these bacteria, so these bacteria in the nucleus of stones [24]. In our study, bacterial isolates from females were more than that of males, and this is Agreement with study of Mansour and colleagues [10]. In study [25] the isolates of *Salmonella typhi* in study belong all to females. Some researchers attributed the cause of this female dominance to exogenous female sex hormones, which can cause an increase in saturation bile with cholesterol, that they found Cholesterol stone increase three times in females than in males, As well as pregnancy that can cause the retention of bile salt in the gall bladder bag due to pressure on the bile ducts [26, 27].

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