The Role of Microorganism in Gallstones Formation

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ABSTRACT

The aim of this research was to assess the prevalence of gallstones and antimicrobial susceptibility in patients with gallstones. It was carried out at the University of Fallujah, College of Medicine. Patients varied in age from 22 to 86 years old, and there were 47 male and female patients in total, The average age (54), the number of male patients, and the numbers of female patients were all diagnosed with gallstones and required treatment. Differential antimicrobials, obesity, and diabetes all have different levels of risk and details we collected from patients by filling out a special questionnaire. In all, there were 47 patients. By evaluating the susceptibility of bacteria that cause gallstones to antibiotics such as penicillin, the questionnaire indicated that the age group (30 - 40) years is the group that has suffered the most from other gallstones. (Ciprofloxacin, ampicillin, erythromycin, critrexone, tetracycline, and Cefixime), as well as samples of different chemicals Catalase production, Oxidase production, Coagulase production, Hemolysis, etc.

KEYWORDS
Gallstones, Microorganism, Biochemical tests, Patients

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INTRODUCTION

Brown dye contains a lot of bacteria, but cholesterol gallstones have a lot less. Gallstones are usually made up of many different types of stones. Gallstones have no documented natural past. Gallstones are created as bacterial and nonbacterial processes combine. The gallstone that is extracted during cholecystectomy is the culmination of a long pathologic phase.[1] Gallstones is solid deposits in your gallbladder that form as a result of digestive fluid. The gallbladder is a small pear - shaped organ that is situated below the liver on the right side of the abdomen.[2] Gallbladder stones normally necessitate surgical removal of the gallbladder.[3] Gallstones that don't cause any symptoms or signs usually don't need to be treated. Gallstones can take a variety of forms in the gallbladder, including Stones made up of bile cholesterol Gallstones of the cholesterol yellow variety are the most common.[4] Gallstones are made up mostly of cholesterol that hasn't been dissolved, but they can also include other additives and pigment gallstones. If the yellow liquid contains a lot of bilirubin, these stones may be dark brown or black in colour. When a gallstone blocks the gallbladder directly, cholecystitis is the most frequent cause.[5,6] This causes bile to condense and stagnate, providing a perfect atmosphere for the growth of various germs and secondary infection from an intestinal organism, especially E. coli bacteria. The gallbladder wall gets inflamed after that (and in some rare cases the condition may accompany the death of some of the tissues that form the wall and may end up with an explosion of the gallbladder. As inflammation happens, it extends to surrounding tissues including the diaphragm, intestine, and liver.[7] the aim of the study role of microorganism in gallstones formation.

MATERIALS AND METHODS

This was a culture media - blood agar used to cultivate picky species and distinguish bacteria based on their hemolytic properties - Mueller Hinton agar most microorganisms may thrive in a rich medium. Antibiotic susceptibility monitoring is a popular application for it. MacConkey agar since Lactose and neutral red are present, it is differential media. Lactose fermenting bacteria grow in red colonies, whereas non - lactose fermenting bacteria grow in clear colonies. Mannitol salt agar is a staphylococci pathogenic staphylococci separation medium that is selective and differential. Identification of bacteria and fungi - morphological identification of bacteria observations of colony morphology are a key fungus and bacteria recognition criteria.[8] Biochemical identification of bacteria the biochemical reactions used to identify bacteria are described below. Bacitracin test bacitracin is an antibiotic that prevents bacteria from synthesizing peptidoglycan, which is a key component of their cell walls. Blood agar is widely used to cultivate the bacterial lawn. Optochin test Optochin distinguishes alpha - hemolytic streptococci from *Viridans Streptococci*. *S pneumoniae* are Optochin - sensitive bacteria. Catalase test, Oxidase test The oxidase test is used to determine which bacteria develop cytochrome c oxidase, Coagulase Test, Voges - Proskauer reaction, vIndole reaction *Shigella sp, Edwardsiella tarda, Klebsiella oxytoca* and *Proteus vulgaris*, Methyl red test used to identify bacteria producing acids by mechanisms of mixed acid fermentation of glucose. Citrate Urease, Hydrogen sulfide (H_2S) H_2S - producing microbes are *Salmonella, Edwardsiella, Citrobacter* and *Proteus sp*, mannitol salt fermentation.[9,10] A pure culture from nutrient agar was sub - cultured on a freshly prepared plate of mannitol salt agar.[11] It was then incubated at a temperature of 37°C for 24 h. Growth of white colonies surrounded by yellow zones indicated presence of *Staphylococcus aureus* and then confirmed by gram staining and urease Test Some bacteria can utilize urea as a non - carbohydrate carbon source using urease enzyme.[12]

Figure 1. Microbial Identification Using the Bio - Merieux VITEK.

Reagent Cards

Each slit on the detector cards conducts a particular test and adjusts the chemical support structure. The chemicals that are modified calculate different processes related to the handling and use of foodstuffs, such as acid conversion, aqueous hydrolysis in the enzyme, development in the presence of dilution, and stopping materials.

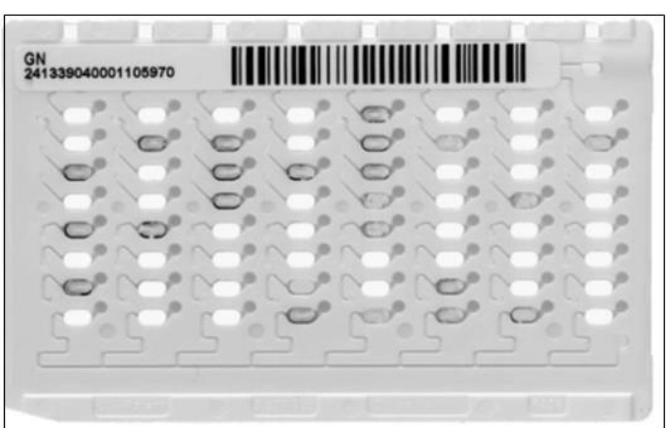

Figure 2. Vitek 2 GN Colorimetric Identification Card.

GN – Gram - negative (alcohol change and production) GN – Gram - positive (alcohol change and production) GN – Gram - positive (alcohol change and production) GN – Gram - positive (alcohol change and production) GN – Gram - positive (alcohol (chemical alcohol change and production) YST - GP – GP – GP – GP – GP – GP – GP – GP – GP – GP – GP - GP (living organisms). Table 1 shows the BCL - culture requirements and suspension preparation.

Product	McFarland Turbidity Range
GN	0.60 - 0.70
GP	0.60- 0.70
YST	1.90 - 2.30

BCL	1.90 - 2.30

Table 1. Card Inoculation of Suspension Turbidities

RESULTS

Patients with (47) gallstones, ages (22 - 86) years, average age (54), (5) male patients, (42) female patients, all of them were contained in Table 2. Gallstones, unequal antimicrobial toxicity, smoking, and asymmetric diabetes are just a few of them and knowledge gained by a patient - specific questionnaire. Between the ages of 20 and 30, there are (0) men and (8) women, with (1,7) of them having gathered them Earlier citation. Antibiotics and smoking, respectively, lead to diabetes (0,8). The group is (30 - 40) years old, with (2) men and (10) women, three of which are under the age of thirty. Previously stated. Antibiotics, asthma, and smokers (0,12) are also related to antibiotics. Class category (40 - 50) years, of (1) men and (6) women, of whom (0,7) are Previously. In the past, Antibiotics and diabetes were also smoked at the same time. The age range (50 - 60) is made up of (0) men and (9) women, with (3,6) of them being women. Earlier citation. Smokers (0.9), antibiotics, and diabetes, respectively. Class party (60 - 70 years), of 0 men and (7) women, 1,6 of which are pre - menopausal. There was a previous reference. Antibiotics, diabetes (2,5), smokers (0,7), and age group (70 - 80) years, including (1) men and (1) women, among them (0,2). In the past, Antibiotics, asthma, and cigarettes are all listed in the same sentence. (1) men and (1) women in the age group (80 - 90), of whom (0.2) are under the age of 80. In the past, Antibiotics and smokers, on the other hand, cause diabetes. There were 47 patients in all. The age range (30 - 40) years was found to be the most affected by other gallstones, according to the questionnaire.

Age	Sex		Pre - Op antibiotic		Diabetes mellitus		Smoking	
	Male	Female	Yes	No	Yes	No	Yes	No
20 -30	0	8	1	7	0	8	1	7
30 - 40	2	10	3	9	0	12	0	12
40 - 50	1	6	0	7	0	7	0	7
50 - 60	0	9	3	6	3	6	0	9
60 -70	0	7	1	6	2	5	0	7
70 - 80	1	1	0	2	0	2	0	2
80 - 90	1	1	0	2	2	0	0	2

Table 2. Gallstones Patients are Divided into Groups based on their Age, Gender, and Other Factors.

The results in Table 3 of six types of bacteria in biochemical tests demonstrated that *Streptococcus pyogenes*. This type of bacteria displayed Bacitracin sensitivity, *Streptococcus viridans* this type of bacteria showed a Bacitracin sensitivity.[13] Optochin resistance was found in this type of bacteria, *Staphylococcus aureus, Klebsiella pneumoniae* was shown to be uniformly negative in tests. It revealed that five samples were negative and five others were positive, including *E. coli Streptococcus Spp*. A negative result revealed six samples and a positive test revealed four more. Just four samples returned a positive result.[14]

	Streptococcus pyogenes	*Streptococcus viridans*	*Staphylococcus aureus*	*Klebsiella pneumoniae*	*E. coli*	*Streptococcus Spp*
Catalase production	_	_	+	+	+	_
Oxidase production	_	_	_	+	_	_
Coagulase production	*	*	+	*	*	*
Haemolysis	+	+	+	-	-	+
Motility	-	-	-	-	+	_
Optochin	*	R	*	*	*	
Bacitracin	S	*	*	*	*	
Indole production	*	*	*	_	+	*
Voges proskauer	-	v	*	+	_	
Methyl red				_	+	*
Simmon citrate	*	*	*	+	_	*
Urease	-	-	+	+	_	_
H2S production	*	*	*	-	-	*
Mannitol Salt Fermentation			+		*	*

Table 3. According to the Biochemical Examination, Bacteria are Distributed Differently.

The findings in Table 4 showed that all of the antibacterials examined (Ciprofloxacin, Ampicillin, Erythromycin, Ceftriaxone, and Tetracycline) were effective against the

majority of the isolates (*Streptococcus spp*) (*Cefixime*). Antibiotics are unable to reach the outer membrane, reducing the drug's permeability. Resistance to (Cefixime) in *Streptococcus spp* may be due to the widespread use of these antibiotics in the treatment of most clinical infections.[15] and that the majority of the isolates (*Staphylococcus aureus*) were resistant to the majority of the antibacterials examined (Ciprofloxacin, Erythromycin, Ceftriaxone, Tetracycline), with the exception (Ampicillin, Cefixime). Antibiotics are unable to reach the outer membrane, reducing the drug's permeability. Resistance to (Ampicillin, Cefixime) in *Staphylococcus aureus* may be attributed to their widespread use in the treatment of most clinical infections.[16,17] Most isolates were vulnerable to half of the studied antibiotics (Ciprofloxacin, Ceftriaxone, Tetracycline), except for the other half (Ampicillin, Erythromycin, Cefixime), and antibiotics could not reach the membrane's outer coating, which could minimize drug permeability. Resistance to antibiotics (Ampicillin, Erythromycin, Cefixime) may be a result of their widespread use in the treatment of clinical infections. As seen in Table 4, which summarized all of the details gathered from the antibiotic susceptibility test, the majority of isolates were susceptible to most antibiotics used in the sample, although some were moderate.[18]

	Streptococcus spp	***Staphylococcus aureus***	***E. coli***
Ciprofloxacin	S	S	S
Ampicillin	S	R	R
Erythromycin	S	S	R
Ceftriaxone	S	S	S
Tetracycline	S	S	S
Cefixime	R	R	R

Table 4. Antibacterial Research Results Show a Distribution of Bacteria Species.

The effectiveness of the urease and the viscous layer they create was shown by dye - negative microbes within stone components. The gram - positive sympathetic *streptococcus Streptococcus viridans* is a wide group of *streptococcus*.[19,20] The most popular bacillus that causes inflammatory stones is Volatility, For these types of stones, the type mirabilis P is the most common bacterial species capable of producing urea, accounting for more than 70 % of the germs isolated from these stones, yet even because of its toughness.[21] Resistance to antibiotics administered by doctors is more common, according to this report. Without a question, constant surveillance of pathogen exposure to widely used antimicrobial agents in various population groups is important.[22,23] The findings of this analysis can be used to identify patterns in antimicrobial resistance, to develop local antibiotic strategies, and to help clinicians make sound antibiotic therapy decisions to avoid antibiotic abuse or overuse .[24,25]

CONCLUSION

Gallstones are caused by a pathogen that causes many gallstones (bacteria). Humans are the original cause of infection, as well as the organism's dissemination in culture, among other influences. Antibiotics are antibiotics that are used to prevent and cure diseases caused by bacteria, Antibiotic tolerance develops as bacteria adapt as a result of antibiotic treatment. Antibiotic -resistant bacteria are more likely to cause a complicated human infection than their non - resistant counterparts.

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