Bacteriological profile for patient with viral hepatitis

Done by:

Abdul-Hassan Ali Hussien

Supervised by:

Dr. Luma Taha Ahmed

Abstract

Background: Three types of bacterial liver infections may be distinguished: granulomatous liver disease caused by bacteria, bacterial liver abscesses, and acute bacterial hepatitis. Numerous types of hepatic infections have been linked to a wide range of bacteria, and the liver is impacted by the infection process of numerous systemic bacterial diseases. Clinical manifestations, etiological agents, and treatment modalities substantially intersect. The majority of liver-damaging bacterial infections only manifest clinically and laboratory as secondary hepatitis.

Aims of the study: To show the bacterial profile in viral hepatitis patients as a preliminary investigation at Diyala province.

Methodology: Study conducted cross-sectionally Included were forty individuals who had been clinically diagnosed with viral hepatitis between November 1, 2023, and March 30, 2024. The patients in question were

inmates of the province of Diyala's Baqubah Teaching Hospital. Samples of blood and urine were taken from every participant.

Results: When treated to bacterial culture, all blood and urine samples taken from those who had viral hepatitis had positive results at percentage 26 (65%).Nineteen blood cultures showed positive results for bacteria. Pseudomonas aeroginosa was the major Gram-negative bacteria, whereas Staphylococcus haemolyticus was the leading Gram-positive bacterium. In 26 instances, urine cultures revealed the presence of bacterial cultures. Additionally, the most common Gram positive bacterial species found in urine samples from individuals with viral hepatitis was Staphylococcus haemolyticus, while the most common Gram negative bacterial type found in these samples was E. coli.

Conclusion: Patients with viral hepatitis were found to have bacterial infections. In 26 urine culture instances, bacterial cultures were found. Additionally, in urine samples from individuals with viral hepatitis, the most common Gram positive bacterial type was Staphylococcus haemolyticus, whereas the most common Gram negative bacterial type was E. coli.

Introduction

The inflammation of the liver is known as hepatitis.. The condition could go better on its own or become worse and cause cirrhosis, fibrosis, or liver cancer (scarring). Hepatitis can also be caused by autoimmune diseases, alcohol, drugs, and other harmful substances, even though hepatitis viruses are the most common cause of hepatitis globally. Hepatitis viruses come in five main forms: A, B, C, D, and E.(1)

The pathophysiology of hepatitis B virus (HBV) infection and the individual clinical history of each patient are greatly influenced by the host's immunological response to the virus. Most people with hepatitis B appear to recover from their viral infection, in contrast to those infected with the hepatitis C virus (HCV).(2)

Recent research has demonstrated that in people with self-limited acute hepatitis B, T cells reactive with hepatitis B core protein (HBc) mostly include the Th1 fraction and release interferon-gamma (IFN-γ).(3) Infections with the hepatitis B and C viruses are still widespread in Iraq, a developing country where the frequency of HBV carriers is between 2% and 5%. Despite the fact that HBV vaccination is included in Iraq's Expanded Program on Immunization, fewer than 80% of the population is getting the doses.(4)

Infections with HBV and HCV acquired in hospitals still happen, even though medical professionals are becoming more aware of the issue.(5)

The three most prevalent infections among people with liver disease are urinary tract infections, bacteremia, and pneumonia.(6)

The hepatitis B virus does not have a cytopathic impact by itself. Some of the early symptoms of chronic hepatitis, such as arthralgias, arthritis, and urticaria, as well as some of its consequences, such as glomerulonephritis, cryoglobulinemia, and vasculitis, are brought on by antigen-antibody complexes.(7)

The primary target of the hepatitis C virus infection is hepatocytes; nevertheless, there is no proof that the virus has cytopathic effects on liver cells. Rather, the immunological onslaught by cytotoxic T cells is most likely what killed the hepatocytes.(8)

A potentially fatal disease known as liver failure arises when there is significant damage to the hepatocytes. Increasing host vulnerability to bacterial infections is one of the most common effects of liver failure.(9)

Aims of the study

The aims of the study was show the bacterial profile in viral hepatitis patients as a preliminary investigation at Diyala province.

Methodology

Subjective and patients

Study conducted cross-sectionally Included were forty patients with clinically confirmed viral hepatitis between the ages of one and sixty-one and from both genders (17 females and 23 males) throughout the time frame of November 1, 2023, to March 30, 2024. These individuals were

inpatients at the Baqubah Teaching Hospital in the province of Diyala. Each patient had blood and urine samples taken.

Bacterial Identification

Vitek equipment was used to identify the isolates, as stated by the manufacturer, Biomerieux/France.

Statistical analysis

The Statistical Package for Social Science Software (SPSS, version 22) was used to conduct the statistical analysis. Standard deviation (SD) was used for continuous variables, while frequency distribution and percentage were used to characterize the participants based on their attributes and mean. T-test on independent samples was applied. At < 0.05, the p-value was statistically significant.

Ethical approval

The Baqubah Teaching Hospital's ethics committee granted the required ethical permission. Additionally, prior to the collection of samples, all

participants included in this investigation were informed and given the consent necessary to conduct the studies and publish the results.

\

Results

All blood and urine samples obtained from individuals with viral hepatitis yielded positive findings at percentage 26 (65%) when subjected to bacterial culture.

Nineteen blood cultures showed positive results for bacteria. According to table 1, the most common bacteria for Gram-positive bacteria were *Staphylococcus haemolyticus* and *Pseudomonas aeroginosa* for Gram-negative bacteria.

Table (1): Distribution of blood isolates' Gram-positive and Gram-negative bacteria.

Bacterial isolates from blood	**No. of isolates**	**Percentage**
Staph. haemolyticus	1	5.3%
Kocuria kristinae	1	5.3%
Pseudomonas aeruginosa	16	84.2%
Pseudomonas luteala	1	5.3%

According to Table 2, there were 26 cases of urine cultures where bacterial cultures were found. Additionally, the most common Gram positive bacterial species found in urine samples from individuals with viral hepatitis was *Staphylococcus haemolyticus*, while the most common Gram negative bacterial type found in these samples was *E. coli.*

Table (2) Gram-positive and Gram-negative bacterial distribution in urine isolates.

Bacterial isolates from urine	No. of isolates	Percentage
Staph. Haemolyticus	8	30.8%
Staph. Epidermidis	1	3.8%
Staph. Epidermidis	2	7.7%
Rothiadentocariosa	1	3.8%
Lactobacillus spp.	2	7.7%
Escherichia coli	6	23.1%
Klebsiella Pneumoniae	3	11.5%
Proteus mirabilis	1	3.8%
Citrobacterfarmeri	1	3.8%
Enterobacter cloacae	1	3.8%

Discussion

These findings corroborated those of byother *et al*. (10) who discovered that 64% of all samples from hospitalized patients were positive for bacterial growth, with half of those cases being dangerous.

In the rare instances where there is a prognosis of subacute hepatic necrosis or fullminant hepatic failure, bacterial infection may account for as much as 20% of mortality.(11)

Additionally, the findings of this investigation align with those reported by Campillo *et al.* (12), who reported that urinary tract infections, pneumonia, and blood stream infections were the causes of positive cultures for blood and urine samples in hepatitis patients.

Patients with liver illness are most commonly infected with urinary tract infections, bacteremia, and pneumonia. When fever, rigors, hypotension, and leukocytosis—the typical clinical features of infection—are absent, it can sometimes be more difficult to diagnose an infection.(13)

Even though broad spectrum antibiotics are used extensively, up to 25% of liver disease patients die from bacterial infections. It is challenging to

determine from published studies if individuals with various forms of liver disease have bacterial infections.(13)

Pseudomonas aeroginosa and *Staphylococcus haemolyticus* were the most common bacteria. The findings of this investigation corroborate those of Barros *et al*.(14), who noted that *S. haemolyticus* is a prominent Gram-positive bacterium that can be isolated from hospitalized patients and is linked to bacteremia in hepatitis patients.

The Kocuria kristinae case, which involved bacteremia in hepatitis patients. Micrococcus infections are rare but recognized, particularly in individuals with underlying diseases who are immunocompromised.(15)

Furthermore, the results of the present investigation were consistent with those reported by Kang et al. (16), who proposed that *P. aeroginosa* is the principal pathogen involved in the bloodstreams of hepatitis patients. These microbes are a serious infection that has been connected to a number of illnesses, especially in those with weakened immune systems.

Urinary tract infections are caused by a wide variety of bacteria (UTIs). While *E. coli* is the most frequent etiological agent of UTI in hospital and

community patients, coagulase-negative *staphylococci* are the most common organisms to colonize the urethra and periurethra in both men and women.(17)

Conclusion

Patients with viral hepatitis were found to have bacterial infections. In 26 urine culture instances, bacterial cultures were found. Additionally, the most common Gram positive bacterial species found in urine samples from individuals with viral hepatitis was Staphylococcus haemolyticus, while the most common Gram negative bacterial type found in these samples was E. coli.

Recommendations

• Further studies are needed to fully understand the complex role of gut microbiome in viral hepatitis and develop effective microbiome-based therapies.

• Individual variations in the microbiome exist, and treatment approaches should be personalized based on each patient's specific microbial profile and disease course.