Case Report

Streptococcus bovis complex isolated from pleural fluid in a case of liver cirrhosis: An interesting case report

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ABSTRACT

Organisms belonging to *Streptococcus bovis complex* have been under-rated as pathogens. This report focuses on an organism belonging to this complex isolated from the pleural fluid of an adult patient with liver cirrhosis. Various organisms from this group have been associated with bacteremia, infective endocarditis, peritonitis, and meningitis. These are well-known to be associated with hepatobiliary disease and grown from various body samples but their growth from the pleural fluid is thought-provoking and confirms their pathogenic potential in such patients. Furthermore, reporting it from the pleural fluid is unique in literature.

Key words: Cirrhosis, Pleural fluid, *Streptococcus bovis complex*

Organisms belonging to the *Streptococcus bovis* group constitute non-enterococcal Group D Streptococci. In the past, they have been reclassified many times. Recently, the *S. bovis group* is divided into biotypes I and II based on mannitol fermentation ability. *S. bovis* biotype I was named *Streptococcus gallolyticus* subspecies *gallolyticus* (SGSG). *S. bovis* biotype II is further categorized as *S. bovis* biotypes II/1 and II/2 based on initial phenotyping tests, including bile esculin reaction, trehalose acidification, starch hydrolysis, and subsequent sodA gene sequencing. *S. bovis* biotype II/1 consists of *Streptococcus infantarius* subspecies *coli* and *S. infantarius* subspecies *infantarius*, whereas *S. bovis* biotype II/2 is referred to as *S. gallolyticus* subspecies *pasteurianus* (SGSP) [1]. These are opportunistic pathogens. In adults, pathogens belonging to the *S. bovis* group are reportedly associated with hepatobiliary disease, colonic lesions, infective endocarditis, bacteremia, and peritonitis. Among the pediatric age group, they are known to cause bacteremia and meningitis in neonates and infants [1,2].

We report the case of a 48-year-old male in whom the growth of *S. bovis complex* organism was found in the pleural fluid of the liver cirrhosis patient presenting with breathlessness. He was given antibiotics along with other management after which his condition improved. This case of *S. bovis* is distinctive as it grew from pleural fluid but not blood which is exceptionally different. It highlights the significance and probability of identifying such un-common organisms from an unusual site and awareness of the laboratory that it should be reported based on clinical correlation and not always be neglected as contaminant.

CASE REPORT

A 48-year-old male patient presented with complaint of breathlessness for 5 days. He is a known case of Non-alcoholic steatohepatitis (NASH) with cirrhosis with portal hypertension and membranoproliferative glomerulonephritis for 5 years and diabetes mellitus for 6 years. He was operated on for inguinal hernia repair a year back and a paraumbilical hernia repair 1 month back. He has a history of refractory hydrothorax for which tapping was done a few times in the past. He is on tacrolimus 1 mg, frusemide, spironolactone, and oral hypoglycemic agents.

On examination, he was having breathlessness. His vitals were normal. There were no other significant findings.

Ultrasonography of the chest showed right-sided moderate pleural effusion. A computerized tomography scan showed right-sided moderate pleural effusion with passive collapse of the lung. Blood investigations were normal.

Aerobic blood culture did not show growth. Routine microscopy report of the pleural fluid showed proteins 1.0 g/dl, sugar 146 mg/dl, total white blood cell count 550 cells/cumm, 98% lymphocytes, and 2% polymorphs. Gram stain from the pleural fluid showed a moderate number of pus cells and few Gram-positive cocci in pairs. Z-N stain and GeneXpert were negative. Aerobic culture of the pleural fluid showed pinpoint grey non-hemolytic

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colonies on chocolate and 5% of sheep blood agar (Fig. 1a). Gram stain from the growth showed Gram-positive cocci in pairs and short chains (Fig. 1b). It was identified as *S. gallolyticus* subsp. *gallolyticus* or *S. infantarius* subsp. *coli* by Vitek 2 Compact. It was reported as *S. bovis complex*. It was sensitive to penicillin, ampicillin, cefotaxime, ceftriaxone, vancomycin linezolid, tetracycline, tigecycline, and chloramphenicol and resistant to levofloxacin, moxifloxacin, erythromycin, and clindamycin.

The patient was given amoxicillin-clavulanic acid 625 mg twice a day for 10 days along with other supportive therapy and his condition improved.

DISCUSSION

S. bovis/equinus complex (SBEC) is a large group of phenotypically heterogeneous bacteria, constituting the non-enterococcal Group D Streptococci, present as commensals in the human gut and capable of causing opportunistic human infections [3]. Over recent decades, this group has undergone significant taxonomical changes [4]. Depending on biochemical tests, SBSEC species were grouped into biotype I (mannitol-fermenting) and biotype II (mannitol-nonfermenting). Biotype II was subdivided into II/1 and II/2, based on trehalose fermentation, β-galactosidase and β-glucuronidase activities, and starch degradation. After reclassification, *S. bovis* biotype I was named *Streptococcus gallolyticus subspecies gallolyticus* (SGSG). *S. bovis* biotype II/1 consists of *S. infantarius* subspecies *coli* and *S. infantarius* subspecies *infantarius,* whereas *S. bovis* biotype II/2 is *Streptococcus gallolyticus subspecies pasturianus* (SGSP) [1,5]. *S. gallolyticus* subsp. *gallolyticus* has been found to be affiliated with bacteremia in patients with infective endocarditis and underlying colonic malignancy. This organism is also commonly associated with hepatobiliary disease [6,7]. *S. gallolyticus* is an uncommon cause of sepsis and meningitis among infants and has a well-documented association with colonic cancer [2,4,8].

In addition, organisms of *S. bovis* group are reportedly associated with hepatobiliary disease [1,5]. Kale *et al.* have documented the isolation of *S. gallolyticus* subsp. *pasteurianus* simultaneously from blood and ascitic fluid in patients with hepatocellular carcinoma [2]. Yu *et al*. have reported meningitis with empyema by *Streptococcus lutetiensis* in a neonate [9]. *S. gallolyticus* meningoencephalitis in adults has been reported in China [10]. In our case, the isolate was identified as *S. gallolyticus* subsp. *gallolyticus* or *S. infantarius* subsp. *coli* by Vitek. It could not differentiate between the two probably because both isolates are genetically identical. However, as mentioned in the classification above, both these organisms belong to *S. bovis complex*. Our patient was a known case of cirrhosis and hence considered to have a strong association with this group of organisms. He also had long-standing membranous glomerulonephritis and diabetes mellitus which made him immune-compromised. Hence, this isolate was reported. The peculiar fact, in this case, is that this isolate grew from pleural fluid and not blood. One reason could be that the volume of blood collected in the blood culture bottle may be insufficient to maintain the blood broth ratio. Another reason may be that our patient may not have been infected by blood but through the gastrointestinal tract by disruption of gut mucosa as these organisms are known colonizers of the gut [9,10]. Human-to-human transmission is another probability as *S. bovis* also colonizes ear and throat [10]. A similar case of *S. gallolyticus* has been reported from China where the organism was isolated from the cerebrospinal fluid of a patient but not blood [10].

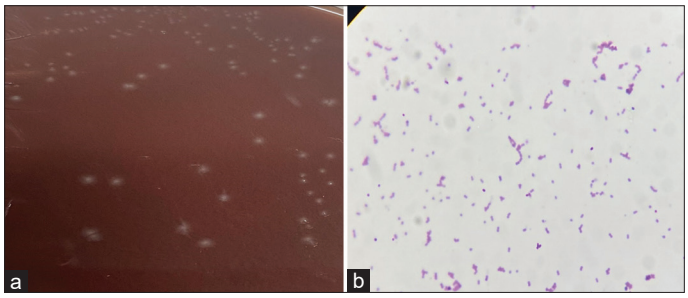

Figure 1: (a) Colonies on 5% sheep blood agar; (b) Growth showing Gram-positive cocci in pairs and short chains

To the best of knowledge, SBEC has not been reported from pleural fluid previously in the literature. Our patient was given amoxicillin-clavulanic acid to which he responded. *S. gallolyticus* is resistant to erythromycin and clindamycin and the drug of choice is penicillin or ceftriaxone and gentamicin. *S. bovis* group organisms are susceptible to beta-lactam antibiotics, third-generation cephalosporins, vancomycin, and carbapenem [6]. This was also seen in our case.

CONCLUSION

This report highlights the facts regarding organisms belonging to *S. bovis complex*. They sustain their importance as opportunistic pathogens in patient with long-standing liver ailments and should not be dismissed as contaminants in such a scenario. These can be isolated from samples like pleural fluid, which is a deviation from the usual samples. Keeping these facts and the clinical picture of the patient in mind, it was reported which contributed to patient improvement.

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