Clostridium sordellii as a cause of constrictive pericarditis with pyopericardium and tamponade

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Abstract

Systemic infections caused by \textit{Clostridium sordellii} is a rare entity. They are usually reported in skin, soft tissue infections and sometimes toxic shock syndrome involving exotoxins. We report here, the first case of \textit{Clostridium sordellii} infection associated with acute constrictive pericarditis with pyopericardium and tamponade.

Case Report

The patient, an eight months old infant, was admitted in a local hospital with history of fever of about 2 months and an abscess in right thigh which had developed following hepatitis-B vaccination. The abscess was drained and the pus culture revealed \textit{Staphylococcus aureus} for which the patient was given vancomycin intravenously as per the antimicrobial susceptibility report. The abscess subsequently healed, however, the patient continued to remain sick with development of dry cough and swelling of legs. Echocardiography and chest x-ray showed pericardial effusion with increased cardio-thoracic ratio and the patient was referred to our institute. On admission, the patient was afebrile with mild pedal edema, tender hepatomegaly, and liver palpable till 4 cm below costal margin. Routine investigations showed...
haemoglobin-12.8 g/dL; total leukocyte count-14,100/µL; differential leukocyte count of Neutrophils 50, Lymphocytes 46, Eosinophils 3, Monocytes 1; erythrocyte sedimentation rate-5 mm in first hour; blood urea-35 mg/dL; serum creatinine-0.4 mg/dL; serum sodium-128 mEq/L; serum potassium-4.3 mEq/L; SGOT-115 U/L; SGPT-235 U/L; total bilirubin-1.8 mg/dL; total protein-5.1 g/dL; serum albumin-2.8 g/dL. The urine output was within normal limits. Central nervous system and respiratory system examination showed no abnormalities. Heart rate was 128 beats per minute. Electrocardiogram showed low voltage complexes and echocardiography revealed organized pericardial effusion with features of tamponade. The x-ray of chest showed a cardio-thoracic ratio of 0.65. Computerized tomography (CT) scan of chest showed features suggestive of effusive constrictive pericarditis and a diagnosis of constrictive pericarditis with pyopericardium and tamponade was made. Pigtail drainage of pericardial pus was performed and patient was administered empirically with intravenous piperacillin-tazobactam and linezolid. On examination, pericardial fluid was turbid with protein-40 mg/dL; sugar-45 mg/dL; total leukocyte count of 2600/µL; differential leukocyte count of Neutrophils 90 and Lymphocytes 10. Gram staining on direct smear showed no organisms and Ziehl-Neelsen staining showed no acid fast bacilli. Aerobic cultures of pericardial fluid and blood were sterile, however, pericardial fluid was not sent for anaerobic culture. Meanwhile the patient had stabilized. Follow-up Computerized tomography-angiogram showed a localized constriction at atrio-ventricular groove and pericardiectomy was performed. Post-operative period was uneventful and the patient was discharged with oral amoxycillin-clavulanic acid.

The excised pericardial tissue was sent for both aerobic and anaerobic culture. Aerobic culture showed no growth. On anaerobic culture, odourless, flat, greyish, non-hemolytic colonies were seen with irregular margin. They were metronidazole sensitive. Gram staining
showed gram-positive bacilli with sub terminal non-bulging spores. The isolate was further identified biochemically, and tested positive for lecithinase, urease, gelatin liquefaction, indole production, glucose fermentation, and esculin hydrolysis. The isolate was identified as *C. sordellii*. The isolate was also tested using API 20A (Biomeurix, France) and was identified as *C. sordellii*.

A polymerase chain reaction (PCR) using published primers for 16S ribosomal RNA was also done. Briefly, DNA was extracted from the culture by QIAmp kit (QIAGEN, Germany) and was amplified using broad range PCR primers i.e., forward primer (F8) 5’-AGTTTGATCCTGGCTCAG-3’ and reverse primer (357R) 5’-CTGCTGCCTCCCGTA-3’ (6, 14) and *C. sordellii* specific forward primer (C1SOR-F) 5’-TCGAGCGACCTTCGG-3’ and reverse primer (C1SOR-R) 5’-CACCACCTGTCACCAT-3’ respectively, targeting the 16S ribosomal RNA (rRNA) gene (10). Amplified products i.e., 330 bp (Fig. 1) for broad range and 944 bp (Fig. 2) for *Clostridium sordellii* specific PCR, were purified by using QIAGEN Gel extraction kit. The purified products were commercially sequenced and compared with sequences available in the Gene Bank database by Basic Local Alignment Search Tool (BLAST). The 16S rRNA gene sequences amplified from isolate showed 99% identity with *C. sordellii* (Accession no. dbj|AB448946.1) sequence available in the database. Thus, *C. sordellii* was identified as the cause of constrictive pericarditis with pyopericardium and tamponade. Patient responded favourably to the therapy.

Anaerobes are now being recognized as etiological agents for infections of almost any body site including pericardium (4). Pericarditis refers to inflammation of the pericardium and the proximal part of great blood vessels. It may either be asymptomatic or may present as a fulminating, life threatening condition. Brahan et al (3), Francois et al (8), and Pigrau et al
(12) have reported the association of \textit{C. septicum} infection with pericarditis in patients with underlying carcinoma. Skiest et al (13) have given a brief review of anaerobic pericarditis occurring in children in which \textit{Bacteroides} species was highlighted as the predominant cause. Pericarditis was also associated with \textit{C. perfringens} (9). \textit{C. difficile} pericarditis complicating pseudomembranous colitis in patient hospitalized after multiple trauma was first reported by Koehler et al (11). It is to be noted that \textit{C. difficile} resembles \textit{C. sordellii} phenotypically and since more virulent strains of \textit{C. difficile} such as NAP1 are being reported worldwide, there is a need to carefully differentiate between them genotypically (7). Although few other cases of pericarditis caused by genus clostridia have been reported, to our knowledge, this is the first case where \textit{Clostridium sordellii} infection is associated with pericarditis. \textit{C. sordellii} is a gram-positive anaerobe; an infrequent human pathogen associated with skin and soft tissue infections. The exotoxins produced by the bacteria are associated with toxic shock syndrome with high mortality rate following childbirth, medically induced abortion, and routine gynaecological procedures (1, 2). Recently, \textit{C. sordellii} has been reported as a cause of brain abscess (15).

In the case reported here, there was no clinical suspicion of anaerobic infection initially. Since all other reasons were ruled out systematically the clinicians finally decided to send the excised pericardial tissue for anaerobic culture. The sample was transported in anaerobic transport medium with sterile precautions. A pure culture of \textit{C. sordellii} was confirmed phenotypically and genotypically.

Prevailing local conditions, host factors, and rapid administration of appropriate antimicrobial treatment could have decreased the clinical severity of the infection which led to good prognosis in the case reported here. The possibility of low virulence of the pathogen could not be ruled out (5).
Present case demonstrates that *C. sordellii* can cause acute constrictive pericarditis. Moreover, expanding clinical spectrum of *C. sordellii* necessitates application of rapid identification methods such as PCR and gene sequencing and increased clinical awareness of this unrecognized human pathogen.

References


Figure 1:
Broad range PCR assay showing 330 bp sequence of 16S rRNA gene of genus clostridia.
Lane 1: 100 bp ladder
Lane 2: Pericardial isolate
Lane 3: C. sordellii lab isolate
Lane 4: C. difficile ATCC 9689
Lane 5: C. perfringens lab isolate
Lane 6: Negative control
FIGURE 2:

Clostridium sordellii specific PCR showing 944 bp sequence of 16S rRNA gene.
Lane 1: 100 bp ladder
Lane 2: Negative control
Lane 3: *C. sordellii* pericardial isolate
Lane 4 and 5: *C. sordellii* lab isolate
Lane 6: 100 bp ladder
FIG. 2

944 bp