Case Report

Globicatella sanguinis meningitis in a post head trauma patient: first case report from Asia

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Abstract
Globicatella sanguinis is a rare isolate in clinical samples. We present a case of meningitis in a 70-year-old male patient after a head injury operation. Three consecutive cerebrospinal fluid samples obtained from the patient identified *Globicatella sanguinis* based on morphology, biochemical profile, and Vitek-2 identification. The patient recovered after antibiotic treatment with vancomycin. This is the first case report of *Globicatella sanguinis* from Asia from a case of meningitis.

Key words: *Globicatella sanguinis,* meningitis, head injury

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Introduction

Globicatella sanguinis is Gram-positive catalase negative coccus. It has been isolated from various human clinical specimens such as the blood of bacteremic patients, the urine of patients with urinary tract infections, cerebrospinal fluid of patients with meningitis, and wounds [1]. It closely resembles streptococci on microscopic appearance and morphologically on blood agar. Therefore, previously identified *Streptococus viridans* strains may have included *G. sanguinis* strains. Since this agent shows some intermediate resistance to penicillin, it is important to accurately identify and monitor drug resistance. Here we present a case of meningitis from *Globicatella sanguinis* after a head injury operation.

Case report

A 70-year-old male patient presented to the emergency department with loss of consciousness 24 hours after a fall from a trivial height. The patient had three episodes of vomiting; there was no bleeding from the ears or nose and no history of seizures. He had no external injuries.

On evaluation, his past medical history was unremarkable. Vital signs revealed an oral temperature of 101.6°F, pulse rate 98/minute, blood pressure of 130/80 mm Hg and a respiratory rate of 22/minute. His Glasgow Coma Score (GCS) was 1 for eye opening response and 5 for motor response, but verbal response could not be measured because of endotracheal tubing. Non-contrast CT scan of skull revealed a large right temporo-parieto-ocipital hematoma with intra ventricular extension with mass effect. The patient was started prophylactically on amoxicillin plus clavulinic acid and kept for observation in the intensive care unit for two days. He then underwent a right fronto-tempero-parietal-occipital [FTPO] decompressive craniectomy with evacuation of the hematoma and contusectomy. The bone flaps were stored in a bone bank so that cranioplasty could be performed following improvement of clinical and neurologic status. A LAX duraplasty was performed with artificial dura.

The patient was kept on a ventilator for two days and a tracheostomy was performed during the hospital course. He was discharged fourteen days after admission, with left side hemiparesis, with a healing healthy wound at the surgical site on the scalp, and taking an oral diet. He was advised with routine treatment, chest and limb physiotherapy, with a daily diet schedule.

Nine days after discharge from hospital, the patient was readmitted with high-grade fever, heavy purulent discharge from the wound at the surgical site

Table 1. Differences in biochemical profiles of *G. sanguinis* and our strain

Test	*G. sanguinis*	Our strain
Gram stain from Thio Broth	cocci, chaining, pairs	cocci, chaining, pairs
Hemolysis	α, non	α, non
Catalase	Negative	Negative
Vancomycin (30 µg)	Sensitive	Sensitive
Leucine aminopeptidase	Negative	Negative
Pyrrolidonyl arylamidase	Variable reactions	Positive
Motility	Negative	Negative
Growth on Bile esculin	Positive	Positive
Growth in 6.5%NaCl Broth	Positive	Positive
Growth at 10^0C	Positive	Positive
Growth at 45^0C	Variable reactions	Positive

on the scalp and unconsciousness. The provisional diagnosis of acute pyogenic meningitis was made and the patient was started empirically on IV antibiotics (levofloxacin, cefoperazone plus sulbactam and amikacin). A lumbar puncture was performed, which yielded cloudy cerebrospinal fluid (CSF) containing 300 leukocytes/mm^3 (polymorphonuclear cells 98%), protein of 254.2 mg/dl and glucose of 20.2 mg/dl. The culture of the first CSF sample on Columbia blood agar supplemented with 5% sheep blood and incubated at 37^0C with 5% CO_2 resulted in faint growth of rough, alpha hemolytic colonies after 24 hours, which was more pronounced after 48 hours. Gram staining of the growth showed a Gram-positive coccus (short chains). The organism was catalase negative and resistant to optochin (5µg disc, Oxoid, Basingstoke, United Kingdom).

Biochemical tests were performed to identify the isolate. Results are summarized in Table 1. Biochemical profile of the isolate resembled *Globicatella.* spp. Vitek 2 ID (Biomeriux Ltd, Marcy l'Etoile, France) confirmed the biochemical profile result and identified the bacterium as *Globicatella sanguinis*. Further two consecutive CSF samples received in the laboratory also demonstrated a similar kind of growth. Gram staining, optochin test and Vitek 2 system also gave the same identification of *Globicatella sanguinis*. Swabs were also taken from the groin and rectum to rule out any carriage and the cultures from these sites did not show growth of *Globicatella sanguinis.*

A literature review revealed that *G. sanguinis* closely resembles catalase negative Gram-positive cocci both microscopically and on gross appearance on blood agar. However, some differentiating characters do exist, such as cellular arrangement of the cells in the Gram stain, as *Globicatella* forms chains while the aerococci form tetrads and clusters [2]. Our isolate had cellular arrangement in chains. Biochemical tests that can help in identification of this pathogen include negative leucine aminopeptidase reaction (LAP) and growth in the presence of 6.5% NaCl. The viridans streptococci are pyrridonylarylamidase (PYR) negative and LAPpositive and do not grow in the presence of 6.5% NaCl. Therefore, our isolate resembled *G. sanguini*s based on its biochemical profile [1,2].

Antibiotic sensitivity was performed by both Vitek 2 advanced system (Biomerieux Ltd, Marcy l'Etoile, France) and disc diffusion method, according to CLSI guidelines for *Streptococcus species* [3]. This strain was sensitive to amoxicillin + clavulinic acid, vancomycin, levofloxacin, chloramphenicol, but resistant to penicillin, ampicillin, erythromycin, clindamycin and tetracycline. After the antibiogram profile was obtained, the antibiotic therapy was changed to IV vancomycin and levofloxacin. The patient's condition improved with subsidence of fever and consciousness was regained after two days of antibiotic therapy. A CSF sample was sent to the laboratory on the third day of antimicrobial treatment with IV vancomycin and levofloxacin, which was sterile. On further enquiry, the patient had indirect contact history with cattle animals but evidence of transmission from these animals could not be ascertained conclusively.

Discussion

In the past *Globicatella sanguinis* was known as *Streptococcus uberis* because of the identification of viridans streptococci isolated in 1977 [4]. It was recognized as a new genus and species only after

comparative 16S rRNA gene sequencing became available to gather new data for these strains [1]. However, the species of the genus was later renamed from *sanguis* to *sanguinis* according to the rules of Latin grammar [5].

The organism has been associated with both animal and human diseases. It has been isolated in humans from blood of bacteremic patients, urine of patients suffering from urinary tract infections, cerebrospinal fluid of patients with meningitis, and wounds [1,6,7]. Association of *G. sanguinis* with animal disease has been illustrated in an unusual outbreak of meningoencephalitis in lambs [8].

Recently human carriage of *Globicatella* by identifying cefotaxime-resistant strains in groin and rectal specimens nine months after meningitis has also been demonstrated [9]. But in our case there was no evidence of carriage of *Globicatella sanguinis.*

The first antimicrobial susceptibility testing results of 27 clinical *G. sanguinis* samples were published by Shewmaker and co-workers [2]. In this study all isolates were sensitive to vancomycin and amoxicillin, and only one isolate was resistant to levofloxacin. The other antimicrobials (chloramphenicol, erythromycin, tetracycline, clindamycin) had variable results. Apart from this study, the only available published literature regarding the antimicrobial susceptibility pattern of *G. sanguinis* is a single case report of meningitis. This isolate was sensitive to penicillin, cefotaxime, clindamycin, levofloxacin, vancomycin, tetracycline, linezolid and resistant to erythromycin and clindamycin [10]. But in our case the strain was resistant to pencillin; therefore, patient was prescribed IV vacomycin and levofloxacin.

Ours is the first case report of isolation of *Globicatella sanguinis* from Asia from a case of meningitis.

Drug-resistant microorganisms incidence is increasing day by day; therefore, accurate identification of drug-resistant strains has become very important [11]. Previous reports of antimicrobial susceptibilities of viridans streptococci might have included some *G. sanguinis* strains due to its close resemblance. This bacterium has shown some intermediate resistance to penicillin, so it is important to identify and monitor drug resistance of this organism. Vitek 2 ID (Biomerieux Ltd, Marcy L'Etoile, France) correctly identified the organism to the species level, illustrating the need for a rapid automated system for better management of patients.

References

1. Collins MD, Aguirre M, Facklam RR, Shallcross J, Williams AM (1992) *Globicatella sanguis* gen.nov., sp.nov., a new gram-positive catalase-negative bacterium from human sources. J Appl Bacteriol 73: 433-437.
2. Shewmaker PL, Steigerwalt AG, Shealey L, Weyant R, Facklam RR (2001) DNA relatedness, phenotypic characteristics, and antimicrobial susceptibilities of Globicatella sanguinis strains. J Clin Microbiol 39: 4052-4057.
3. Clinical and Laboratory standards institute CLSI (2009) Performance standards for antimicrobial susceptibility testing, 19th informational supplement.M02-A10. Wayne Pa: CLSI.
4. Facklam RR (1977) Physiological differentiation of viridans streptococci. J Clin Microbiol 5: 184-201.
5. Trüper HG and de'Clari L (1997) Taxonomic note: necessary correction of specific epithets formed as substantives (nouns) "in apposition." Int J Syst Bacteriol 47: 908-909.
6. Lau SK, Woo PC, Li NK, Teng JL, Leung KW, Ng KH, Que TL, Yuen KY (2006) *Globicatella* bacteraemia identified by 16S ribosomal RNA gene sequencing. J Clin Pathol 59: 303-307.
7. Abdul-Redha RJ, Balslew U, Christensen JJ, Kemp M (2007) *Globicatella sanguinis* bacteraemia identified by partial 16S rRNA gene sequencing. Scand J Infect Dis 39: 745-748.
8. Vela AI, Fernández E, las Heras A, Lawson PA, Domínguez L, Collins MD, Fernandez-Garayzabal JF (2000) Meningoencephalitis associated with *Globicatella sanguinis* infection in lambs. J Clin Microbiol 38: 4254-4255.
9. Héry-Arnaud G, Doloy A, Ansart S, Le Lay G, Le Flèche-Matéos A, Seizeur R, Garré M, Payan C, Bouvet A (2010) *Globicatella sanguinis* meningitis associated with human carriage. J Clin Microbiol 48: 1491-1493.
10. Seegmüller I, van der Linden M, Heeg C, Reinert RR (2007) *Globicatella sanguinis* is an etiological agent of ventriculoperitoneal shunt-associated meningitis. J Clin Microbiol 45: 666-667.
11. Doern GVM, Ferraro J, Brueggemann AB, and Ruoff KL (1996) Emergence of high rates of antimicrobial resistance among viridans group streptococci in the United States. Antimicrob. Agents Chemother 40: 891-894.

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