

Case Report

Stomatococcus mucilaginosus meningitis in a healthy 2-month-old childMeher Rizvi,¹ Nazish Fatima,¹ Indu Shukla¹ and Kamran Afzal²

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Stomatococcus mucilaginosus is a Gram-positive, catalase-variable organism considered part of the normal human oral and upper respiratory tract flora. Although traditionally believed to be an organism of low virulence, *Stomatococcus mucilaginosus* has been reported to be an opportunistic pathogen in immunocompromised patients. We describe what we believe is the first reported case of *Stomatococcus mucilaginosus* meningitis in a healthy child. The isolate was multidrug-resistant, susceptible only to vancomycin. The patient was treated successfully with vancomycin after initial trials with amikacin and cefotaxime.

Case report

A 2-month-old female child presented at the paediatric emergency ward of Jawaharlal Nehru Medical College, Aligarh, with high grade fever of 5 days duration and general tonic spasm of all four limbs with unconsciousness, neck retraction and uprolling of eyes for the previous 2 days. The child was born at term by normal vaginal delivery in the same hospital with a birth weight of 2.8 kg. She was on exclusive breast feeding.

On physical examination, her pulse rate was 130 min⁻¹, respiratory rate was 50 min⁻¹ and temperature was 39.3 °C. On head to toe examination, the anterior fontanelle was full and pulsatile (size 1.5 × 1.5 cm). Physical examination was otherwise normal. On central nervous system examination, the child was not alert, the tone of all the four limbs was increased and the plantar response was bilaterally extensor (upgoing). Her current weight was 5 kg. Her anthropometric measurements were within normal limits.

Peripheral blood was taken for a full blood count and the report showed a total leukocyte count of 12 000 cells mm⁻³ with 65% polymorphonuclear leukocytes, 31% lymphocytes, 2% monocytes and 1% eosinophils. The general blood picture showed mild to moderate hypochromia with microcytosis. Hepatic and renal profiles were within normal limits. Chest X-ray (postero-anterior view) was normal. Urine culture was sterile. Cytological analysis of cerebrospinal fluid (CSF) showed a white cell count of 1000 cells mm⁻³ with a preponderance of neutrophils (72%). CSF biochemistry revealed that proteins were raised (200 mg dl⁻¹) (normal CSF proteins: 20–45 mg dl⁻¹) and glucose was reduced (35 mg dl⁻¹) (normal CSF glucose level:

>50 mg dl⁻¹ or 75% of serum glucose). Her plasma glucose was 75 mg dl⁻¹ (normal plasma glucose: 50–120 mg dl⁻¹). On direct microscopy, Gram staining of the CSF showed Gram-positive cocci in clusters. CSF culture showed growth of large greyish white, non-haemolytic colonies which were adherent to the blood agar surface. On Gram staining, Gram-positive cocci in clusters were again observed. A capsule was noticed on capsular staining. The organism was weakly catalase-positive, and coagulase- and oxidase-negative. It hydrolysed aesculin and liquefied gelatin, fermented glucose, trehalose, mannose and sucrose and did not ferment mannitol, rhamnose, raffinose, arabinose or xylose. It did not grow in 6.5% NaCl. On the basis of these characteristics, the organism was identified as *Stomatococcus mucilaginosus*. The blood culture also grew Gram-positive cocci which were subsequently identified as *Stomatococcus mucilaginosus*. Antimicrobial susceptibility testing was performed using NCCLS (2006) guidelines by the Kirby–Bauer disc diffusion method on Mueller–Hinton agar plates. The strain was multidrug-resistant. It was susceptible to only vancomycin (disc potency 30 µg) and cefotaxime (30 µg). It was resistant to gentamicin (10 µg), co-trimoxazole (trimethoprim/sulfamethoxazole 1.25/23.75 µg), erythromycin (15 µg), tetracycline (30 µg), ciprofloxacin (5 µg), amikacin (30 µg), ampicillin (10 µg), cefazolin (30 µg) and oxacillin (1 µg).

Empiric antibiotic treatment was started immediately with cefotaxime and amikacin prior to obtaining culture and an antibiotic susceptibility report. After obtaining the antibiotic susceptibility report, further treatment continued with cefotaxime alone. However, as the child continued to be febrile, it was decided to add vancomycin. The child recovered well subsequently with no neurological sequelae and was discharged after 12 days.

Abbreviation: CSF, cerebrospinal fluid.

Discussion

Although *Stomatococcus mucilaginosus* is a normal commensal of the human oral and upper respiratory tract flora (Gordon, 1967), it is increasingly being implicated in serious diseases such as endocarditis (Prag *et al.*, 1985), septicaemia and catheter-related sepsis (Poirier & Graudreau, 1989). The most common risk factors are indwelling venous catheter, cancer, cardiac valve disease, intravenous drug abuse and severe neutropenia (Prag *et al.*, 1985; Ascher *et al.*, 1991b; Relman *et al.*, 1987; Weinblatt *et al.*, 1990). Infections due to *Stomatococcus mucilaginosus* are probably under-reported because it can be misidentified as *Staphylococcus aureus*, *Micrococcus* or *Streptococcus* sp. because of the presence or absence of catalase activity and coagulase negativity (Ascher *et al.*, 1991a). The problem is compounded when a laboratory is using commercial identification kits such as API Staph-Ident or Microscan systems which have not incorporated the organism into their databases (Ascher *et al.*, 1991a). We identified our isolate based on its strong adherence to the agar surface, Gram-positive nature, weak catalase positivity, coagulase negativity, positive aesculin and gelatin hydrolysis and fermentation of glucose, sucrose, maltose, mannose and trehalose (Gordon, 1967; Ascher *et al.*, 1991a; Bergan *et al.*, 1970; Bergan & Kocur, 1982).

Since *Stomatococcus mucilaginosus* is part of the normal flora of the mouth, the most likely portal of entry appears to be the oral cavity following violation of the mucous membrane barrier (Ascher *et al.*, 1991a). We presume that breakdown of the oral mucous membrane subsequent to an underlying oral infection could lead to haematogenous seeding of the CSF. This is the first reported case of meningitis in a healthy 2-month-old child. Prior studies have reported meningitis in premature and immunocompromised children (Ascher *et al.*, 1991a).

The other unusual feature in this case was the absence of neutropenia; the haematological profile showed neutrophilia when meningitis was diagnosed. *Stomatococcus mucilaginosus* meningitis has been reported predominantly in neutropenic patients, patients with malignancies or patients who were otherwise immunocompromised.

Tracing the drug-resistance profile of *Stomatococcus mucilaginosus* over the last 20 years, penicillin was considered the drug of choice in the 1980s with a study in 1989 first reporting penicillin resistance (Pinsky *et al.*, 1989). Thereafter, incremental drug resistance was observed over the years and vancomycin is now emerging as the effective empiric treatment in invasive *Stomatococcus mucilaginosus* infections (Poirier & Graudreau, 1989; Pinsky *et al.*, 1989). In our study too, *Stomatococcus mucilaginosus* was multidrug-resistant and susceptible only to vancomycin and cefotaxime. However, the patient responded well only to vancomycin. We believe that cefotaxime may not have been effective despite good *in vitro* activity because of the presence of oxacillin resistance. In fact, it appears that oxacillin resistance should be

interpreted as resistance to all cephalosporins, as is the case with methicillin-resistant *Staphylococcus aureus* (MRSA), despite *in vitro* activity. It should be understood that cross-resistance with methicillin extends to all β -lactam antibiotics, including cephalosporins. The reason for *in vivo* failure of cefotaxime could be poor penetration of the drug in the bacteria or due to its increased efflux or a change may occur in the penicillin-binding protein, as is seen in MRSA (PPB2a, which is a low binding protein). However, this issue should be explored further.

We believe that Gram-positive cocci in clusters having weak/negative catalase activity and producing sticky colonies that adhere to the agar surface should be suspected of being *Stomatococcus mucilaginosus* and appropriate tests should be performed to confirm the identity of the bacteria.

Given the initial difficulty often encountered in differentiating *Stomatococcus mucilaginosus* from coagulase-negative staphylococci and occasionally from group D *Streptococcus*, vancomycin may be a reasonable component in an empiric antibiotic regimen (Weinblatt *et al.*, 1990; Pinsky *et al.*, 1989). Vancomycin can be begun empirically in such cases, as no report of vancomycin resistance has been reported yet, to be replaced with other drugs once an antibiotic susceptibility report is available.

References

- Ascher, D. P., Bash, M. C., Zbick, C. & Whit, C. (1991a). *Stomatococcus* catheter-related infection in an adolescent with osteosarcoma. *South Med J* **84**, 409–410.
- Ascher, D. P., Zbick, C., White, C. & Fisher, G. W. (1991b). Infection due to *Stomatococcus mucilaginosus*: 10 cases and review. *Rev Infect Dis* **13**, 1048–1052.
- Bergan, T. & Kocur, M. (1982). *Stomatococcus mucilaginosus* gen. nov., sp. nov., a member of the family Micrococcaceae. *Int J Syst Bacteriol* **32**, 374–377.
- Bergan, T., Bovre, K. & Hovig, B. (1970). Re-isolation of *Micrococcus mucilaginosus* Migula 1900. *Acta Pathol Microbiol Scand [B] Microbiol Immunol* **78**, 85–97.
- Gordon, D. F., Jr (1967). Re-isolation of *Staphylococcus salivarius* from the human oral cavity. *J Bacteriol* **94**, 1281–1286.
- NCCLS (2006). *Performance Standards for Antimicrobial Disk Susceptibility Tests*, vol. 26, no. 1. Wayne, PA: National Committee for Clinical Laboratory Standards.
- Pinsky, R. L., Pischitelli, V. & Patterson, J. E. (1989). Endocarditis caused by relatively penicillin resistant *Stomatococcus mucilaginosus*. *J Clin Microbiol* **27**, 215–216.
- Poirier, L. P. & Graudreau, C. L. (1989). *Stomatococcus mucilaginosus* catheter-associated infection with septicaemia. *J Clin Microbiol* **27**, 1125–1126.
- Prag, J., Joller, E. & Espersen, F. (1985). *Stomatococcus mucilaginosus* endocarditis. *Eur J Clin Microbiol* **4**, 422–424.
- Relman, D. A., Ruoff, K. & Ferraro, M. J. (1987). *Stomatococcus mucilaginosus* endocarditis in an intravenous drug abuser. *J Infect Dis* **155**, 1080.
- Weinblatt, M. E., Sahdev, I. & Berman, M. (1990). *Stomatococcus mucilaginosus* infections in children with leukemia. *Pediatr Infect Dis J* **9**, 678–679.