JOURNAL OF CLINICAL MICROBIOLOGY, Dec. 1981, p. 684-685
0095-1137/81/120684-02$02.00/0

Vol. 14, No. 6

Selenomonas sputigena Septicemia

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Received 23 January 1981/Accepted 24 June 1981

Selenomonas sputigena is a curved motile anaerobic gram-negative rod that is a part of the normal upper respiratory tract of man. We present a case of speticemia associated with this organism and believe it to be the first such report describing systemic disease.

Selenomonas sputigena is a crescent-shaped anaerobic gram-negative rod that is motile by means of flagella that occur as tufts extending from its concave cell surface (2-4). This organism is a component of the normal upper respiratory tract flora and has only rarely been implicated as an agent of disease (1). We describe a septicemic patient whose blood cultures twice yielded *S. sputigena*. This is believed to be the first report describing septicemia associated with this organism.

CASE REPORT

A 53-year-old black man with a history of alcohol abuse was admitted to our hospital after being found unconscious at home. At admission, the patient was hypothermic with a temperature of 30.4°C. He immediately underwent warm peritoneal dialysis and received warm intravenous fluids until his temperature reached 36°C. Physical examination revealed an emaciated, dehydrated, and malnourished man who only responded to deep pain. There were no signs or symptoms of pulmonary, genitourinary, or central nervous system disease. Examination of the oral cavity revealed dry mucous membranes and poor dental hygiene. Rectal examination showed decreased muscle tone and a moderately enlarged prostate. Occult blood was detected by the guaiac test. The patient's hematocrit was 30%, and his leukocyte count was 15,500/mm^3 with 89% polymorphonuclear leukocytes and 5% band forms.

Two blood cultures were obtained because of the patient's elevated leukocyte count and compromised condition. Gentamicin and cefazolin therapy was instituted. Both blood cultures (obtained within 45 min of each other) yielded *S. sputigena*. One of the two yielded a viridans streptococcus, *Veillonella parvula*, and *S. sputigena*, whereas the other yielded only *S. sputigena*.

The patient responded to antibiotic therapy with resolution of the infection and was subsequently discharged.

MATERIALS AND METHODS

Blood specimens (16.6 ml) were collected and processed by using methods previously described (5). Each blood specimen was thoroughly mixed and divided equally between two blood culture bottles. Each bottle contained 100 ml of Columbia broth modified by the addition of L-cysteine to a final concentration of 0.05%. One bottle was vented to admit air, and both culture bottles were incubated at 35°C.

Biochemical tests employed to characterize our strain of *S. sputigena* were those offered by the Minitek System (BBL Microbiology Systems, Cockeysville, Md.). Minitek tests were inoculated in accordance with the manufacturer's recommendations for anaerobic bacteria and were incubated at 35°C in a glove box (Coy Manufacturing, Ann Arbor, Mich.) with an atmosphere of 85% N_2-10% CO_2-5% H_2. Gas chromatographic analysis of fermentation by-products produced by the organism grown in peptone yeast glucose broth were conducted by using methods previously described (3). The bacterium's susceptibility to antimicrobial agents was determined by the microtiter broth dilution method described by Thornsberry and Swenson (6). Flagella stains were performed by using the method of West and co-workers (7).

RESULTS AND DISCUSSION

Both positive blood cultures were detected after 4 days of incubation in the unvented broth bottles by macroscopic observation. Gram stains of the vented and unvented culture bottles revealed that a small curved gram-negative rod was present in only the unvented bottles. Samples (0.1 ml) of each bottle of the positive cultures were used to inoculate one MacConkey plate, two chocolate agar plates, and one brain heart infusion agar (BHIA) plate supplemented with 5% sheep blood, hemin, and menadione (3). The MacConkey plate and one of the chocolate agar plates were incubated at 35°C in 5% CO_2, whereas the remaining chocolate agar and BHIA plates were incubated anaerobically at 35°C. No growth was observed on any of the subculture plates after 48 h of incubation. All subculture plates were reincubated for an additional 48 h. After 96 h of incubation, small (<0.5 mm) grey-white opaque colonies with entire borders were observed on the BHIA subculture plates inocu-

lated from only the unvented blood culture bottles. Gram stains of the colonies revealed the same curved gram-negative rods seen in the blood culture. Close inspection of the BHIA subculture plates prepared from one of the two positive blood cultures also revealed rare colonies of a gram-negative coccus and a gram-positive coccus. These were respectively identified as *Veillonella parvula* and a viridans group streptococcus.

The gram-negative rod exhibited motility in wet mounts prepared from the positive blood culture bottles. The isolate was catalase negative, neither hydrolyzed esculin nor produced indole, and did not ferment glycerol, lactose, mannitol, rhamnose, salicin, or trehalose. The organism reduced nitrate to nitrite and fermented arabinose, glucose, maltose, and sucrose. Gas-liquid chromatographic analysis of fermentation by-products after growth in peptone-yeast-glucose broth revealed the presence of acetic, propionic, and lactic acids. The chromatographic and biochemical test results obtained were characteristic of *S. sputigena*. This identification was confirmed by a flagella stain that revealed the presence of a lateral tuft of flagella extending from the organism's concave surface.

Broth dilution susceptibility testing revealed the following minimal inhibitory concentrations: 0.12 μg of penicillin per ml, 0.25 μg of cephalothin per ml, 2.0 μg of carbenicillin per ml, 0.12 μg of erythromycin per ml, 0.12 μg of clindamycin per ml, 0.025 μg of chloramphenicol per ml, and 0.25 μg of tetracycline per ml.

Motile anaerobic gram-negative rods are rarely recovered from clinical specimens. Those species of motile anaerobes that have been reported to be recovered from humans are: *Fusobacterium plauti*, *F. symbiosum*, *F. bullosum*, *Butyrivibrio fibrisolvens*, *Bacteroides praeacutus*, *Anaerovibrio lipolytica*, *Vibrio succinogenes*, *Succinomonas amylolytica*, and *S. sputigena*. Glucose fermentation and the absence of butyric and succinic acids as by-products of glucose fermentation uniquely distinguish *S. sputigena* from the other motile anaerobic gram-negative rods.

In addition to *S. sputigena*, there is a second species in the genus *Selenomonas*, *S. ruminantium*. *S. ruminantium* is associated with the rumen of herbivores, whereas *S. sputigena* is associated with the human buccal cavity. *S. ruminantium* ferments cellobiose, salicin, and dulcitol, whereas *S. sputigena* does not. Our isolate was identified as *S. sputigena* because of its inability to ferment salicin and its cultivation from a human.

Our patient was compromised by a history of alcohol abuse, malnutrition, and anemia. Together with his poor oral hygiene, he was likely predisposed to septicemia associated with *S. sputigena* and the other two species of normal mouth flora bacteria that were isolated. The isolation of *S. sputigena* from this patient represents a rare circumstance; however, it again demonstrates that clinical microbiologists should recognize the possibility for the recovery of unusual bacteria from compromised hosts.

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