

Conjunctivitis Caused by a Nutritionally Variant Streptococcus

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We report on a case of conjunctivitis caused by a nutritionally variant streptococcus in a newborn infant.

Nutritionally variant streptococci (NVS) have been known to cause endocarditis since the report of Frenkel and Hirsch in 1961 (1). They have also caused otitis media, postpartum sepsis, cirrhosis, and other conditions (4, 9, 11). However, to our knowledge this is the first report of conjunctivitis produced by NVS in humans.

Case report. An 8-day-old male baby with purulent discharge from the left eye was brought into our emergency room. He had been delivered by normal vaginal means without complications and had been given erythromycin ophthalmic ointment as required. The mother had received 2 g of intravenous ampicillin before delivery. A swab of the left eye drainage was obtained and submitted for routine bacterial culture and susceptibility testing. No other cultures were obtained. A Gram stain was reported to have moderate numbers of leukocytes with few intracellular gram-positive cocci. After overnight incubation of the culture at 35°C in 5% CO₂, two colonies of alpha-hemolytic streptococci were observed on the sheep blood agar plate. No growth appeared on a chocolate agar plate. Surrounding the colonies on the blood agar plate were many pinpoint colonies reported to be "gram-variable coccobacilli." The initial interpretation was that the organism could be a *Haemophilus* species. Tests for X and V requirements were negative. A second possibility, that the organism could be an NVS, was tested by adding 0.002% pyridoxal to liquid medium and inoculating. Growth appeared in the supplemented medium but not the deficient base. A Gram stain of this growth clearly showed it to be gram-positive cocci in pairs to short chains. Inoculation of an API 20S strip (Analytab Products, Plainview, N. Y.) with either a 0.002% pyridoxal-supplemented suspension or a brain heart infusion broth culture failed to give an acceptable profile number (no. 2523350). The organism did appear to be alpha-hemolytic and failed to grow on bile esculin, 6.5% NaCl, or routine sugar broths, all with 0.002% pyridoxal added. The culture was submitted to the Michigan Department of Public Health Laboratories for further identification; they confirmed it as "nutritionally deficient streptococci" with "no further identification available."

The baby was treated successfully with neosporin ophthalmic ointment.

Studies have shown these streptococci require pyridoxal in most cases, although L-cysteine may be required (1, 5). Pyridoxine is not effective (6, 10). The organisms grow on blood agar made with the blood of some animals but not others (7). The recommendation was made to use staphylococcal streaks on sheep blood agar rather than pyridoxal-supplemented plates, the main reason being that some strains of *Streptococcus pyogenes* are inhibited by pyridoxal. Also, the use of cat blood, the most effective

animal blood, is not practical (6). Rabbit, human, and guinea pig blood were slightly less effective.

In a review of the problem concerning NVS, Carey (R. B. Carey, Clin. Microbiol. Newsl. 6:313-314, 1985) suggests subculturing blood cultures that show gram-positive cocci on smear but no growth in 24 h on the original subculture to blood or chocolate agar plates with a staphylococcal streak. An alternative method was also given, in which sterile disks with pyridoxal added are put onto the streaked areas. This approach is also given in *Cumitech 1A* (8). A method for susceptibility testing was also provided.

This case demonstrates the need also to include a staphylococcal streak on blood agar plates when specimens show gram-positive cocci on direct Gram stain. The NVS would not have been discovered if not for an alert technologist, as the two colonies of alpha-hemolytic streptococci could have been interpreted as being representative of those seen in the direct Gram stain. The fact that these organisms were almost exclusively in the leukocytes is of interest, although this has not been reported previously. Additional observations are needed before this could be determined to be a characteristic of NVS.

It has been suggested by previous studies that the natural habitat of NVS may include the oral cavity and the urogenital and gastrointestinal tracts (2, 4, 9, 11). This was supported by the finding of NVS in vaginal discharges, blood cultures of postpartum patients, and the trachea of a stillborn baby (2). It is probable that our patient was inoculated during birth and that the erythromycin was either ineffective, although NVS are reported to be susceptible, or not in proper contact when given to be effective. NVS have also been isolated from corneal ulcers in horses (3).

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LITERATURE CITED

1. Frenkel, A., and W. Hirsch. 1961. Spontaneous development of L-forms of streptococci requiring secretions of other bacteria or sulfhydryl compounds for normal growth. *Nature* (London) 191:728-730.
2. George, R. H. 1974. The isolation of symbiotic streptococci. *J. Med. Microbiol.* 7:77-83.
3. Higgins, R., E. L. Biberstein, and S. S. Jang. 1984. Nutritionally variant streptococci from corneal ulcers in horses. *J. Clin. Microbiol.* 20:1130-1134.
4. McCarthy, L. R., and E. J. Bottone. 1974. Bacteremia and endocarditis caused by satelliting streptococci. *Am. J. Clin. Pathol.* 61:585-591.
5. Peterson, C. E., J. L. Cook, and J. P. Burke. 1981. Media-dependent subculture of nutritionally variant streptococci. *Am. J. Clin. Pathol.* 75:634-636.
6. Reimer, L. G., and L. B. Reller. 1982. Growth of nutritionally variant streptococci on laboratory media supplemented with

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- blood of eight animal species. *Med. Lab. Sci.* **39**:79-81.
7. **Reimer, L. G., and L. B. Reller.** 1983. Effect of pyridoxal on growth of nutritionally variant streptococci and other bacteria on sheep blood agar. *Diagn. Microbiol. Infect. Dis.* **1**:273-275.
 8. **Reller, L. B., P. R. Murray, and J. D. MacLowry.** 1982. Cumitech IA, Blood cultures II. Coordinating ed., J. A. Washington II. American Society for Microbiology, Washington, D.C.
 9. **Roberts, R. B., A. G. Krieger, N. L. Schiller, and K. C. Gross.** 1979. Viridans streptococcal endocarditis: the role of various species, including pyridoxal-dependent streptococci. *Rev. Infect. Dis.* **1**:955-965.
 10. **Schiller, N. L., and R. B. Roberts.** 1982. Vitamin B₆ requirements of nutritionally variant *Streptococcus mitior*. *J. Clin. Microbiol.* **15**:740-743.
 11. **Verhagen, J., and J. Vandepitte.** 1983. Endocarditis caused by nutritionally deficient streptococci. *Acta Clin. Belg.* **38**:12-18.