Vibrio Fetus Human Infection
—Isolation from a Subacute Bacterial Endocarditis Case—

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ABSTRACT

*Vibrio fetus* was isolated from blood specimens of a subacute bacterial endocarditis patient. The 38 year old male patient was admitted to Severance Hospital in January 1970 for 11 days and again in July 1970 for 13 days. Subacute bacterial endocarditis was the major condition. Aortic insufficiency and cholestatic hepatitis were the accessory diagnosis. The organism was isolated during the second admission. *V. fetus* human infection is known to be very rare, and the present case appears to be the first case in Korea.

*V. fetus* grows very slowly with increased carbon dioxide tension which favours the growth. It is a slightly curved, S-shaped and spiral gram-negative organism. Many antibiotics, effective to gram negative organisms, inhibit the growth of the organism.

*V. fetus* is an animal pathogen causing disease in ruminants. The patient enjoyed raw beef dishes. He could be infected with the organism by eating raw beef.

FIRST ADMISSION

A 38 year old male was admitted to Severance Hospital in January 1970, with chief complaints of occipitalgia, occasional palpitation and dyspnea on exertion. Myalgia on the right great toe and intermittent pain of left calf were also noticed. He had poor appetite and lost 4kg during the preceding 3 months. At the time of admission his body weight was 52kg. Diastolic and systolic murmurs were heard and liver was palpable two finger breadth. During hospitalization he had fever as high as 40°C followed by chills. He was diagnosed as a subacute bacterial endocarditis.

Laboratory findings

Hematologic findings were; WBC count 5,050 per cu.mm with 65% neutrophil, hemoglobin 11.9gm, hematocrit 3%, ESR 10mm per hour (Wintrobe, corrected). Urine protein was positive, and the microscopic examination revealed a few WBCs, occasional RBCs and a few finely granular casts. Blood chemistries were normal with the exception of 12 units of thymol turbidity test. BUN, creatinin, protein, electrolytes, SGOT, SGPT, alkaline phosphatase and prothrombin time were all normal. VDRL was negative. Blood cultures were taken 5 times for a period of 4 days and were all negative.

The patient was given 20,000,000 units of
crystalline penicillin per day for 4 days. The patient was discharged after 11 days without any improvement.

SECOND ADMISSION

He was treated at other clinics. His state became worse and on July 5, 1970, he was readmitted to this hospital. He complained of dyspnea, occasional cough, nausia and vomiting. He showed drowsy mental state, icteric sclera, coarse and decreased breathing sound, and pansystolic murmurs. Liver was palpable 4 finger breadth below the left costal margin. Diagnosis were aortic insufficiency and cholestatic hepatitis based on clinical and laboratory data including ECG.

Laboratory findings

Hemoglobin was 17gm, hematocrit 58% and WBC 9,750 with 76% neutrophil. Urine was cloudy, protein +++ and WBC 2-5 per HPF. During hospitalization, one of the urine specimens showed positive urobiligen up to 1:20 dilutions. Bile was positive. Blood chemistry values were; BUN 33.7–55.5mg/dl, creatinine 1.1–2.5mg/dl, SGOT 108–870 units, SGPT 93–440 units (Sigma), alkaline phosphatase 2.9–4.0 units (Sigma), bilirubin 2.7–8.2mg/dl and prothrombin time 25–75% of normal. Four blood cultures were taken for a period of 2 days with three positive cultures of V. fetus. During the second admission his body temperature was generally below 37°C and no antibacterial treatment was given.

He stayed for 13 days and was again discharged despite his poor condition. Later it was learned that he died one week after the discharge.

Yunsoo Chung and Samuel Y. Lee

![Graph showing body temperature and blood cultures](image)

**Fig. 1.** Body temperature, antibiotic treatment and blood culture during the 1st and 2nd admission (−: no growth, +: growth on blood cultures)

**BACTERIOLOGY**

For blood culture, brain heart infusion and thioglycollate broth (Difco) were used. Cultures were incubated at 37°C aerobically. During the first admission five blood cultures were taken and the results were all negative. During the second admission four cultures were taken and three of which were positive with *V. fetus*.

The growth was very slow. It was not until the 6th, 8th and 12th day of incubation that slight turbidity was recognized. When the incubation was prolonged, brain heart infusion broth showed a viscid ring along the wall at the surface. Some viscid sediment was also noticed at the bottom, although the turbidity did not increase much.

While the subcultures on blood agar plates, incubated in air yielded only a few colonies even after 72 hours, those incubated in candle jars yielded many colonies after 48 hours. Growth in GasPak (BBL) was as good as that in the candle jar. In thioglycollate broth, the growth first appeared at the upper oxidized portion, indicating that the organism was not an anaerobe.

Colonies on blood agar were buff in color, convex, mucoid and opaque. Concentric rings
and umbonate forms were seen when the colonies became aged.

The bacilli grown in broth were short, slender and slightly curved at first. As the culture becoming old, S-shaped and loosely coiled forms apperred. The organism was gram negative. Electron microscopy revealed that short bacillus would have one polar flagellum, while S or spiral forms have two flagella, one for each poles.

Based on the characteristics shown in table 1, the organism was tentatively identified as *V. fetus* (King, 1957; Breed, 1957). The identification was later confirmed serologically by National Communicable Disease Center, U.S. Public Health Service.

The isolated organism was sensitive to the following antibiotics, determined by disk method; ampicillin, chloramphenicol, kanamycin, neomycin, streptomycin, tetracycline and gentamycin. The organism was penicillin resistant.
Table 1. Cultural characters of the organism.

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**Discussion**

Until it was first isolated from human infection by Vinzent, 1947, *V. fetus* had been known to be animal pathogen causing abortion in cows and sheeps (McFayden, 1909). Although isolations of the organism have been reported from many countries, human infection is known to be very rare (King, 1957; Kahler, 1960; Darrel 1967; White, 1967). In Korea, no *V. fetus* infection has ever been reported, neither in human nor in animals.

It has been suggested that actual incidence of *V. fetus* human infection might not be so small as the number of reported isolations indicates. The rarity might have been due to the difficulty of isolation which requires a prolonged incubation and increased carbon dioxide tension for better growth (King, 1961; White, 1967; Reyman, 1969). *V. bubulus* and “related vibrio” are organisms similar to *V. fetus*. King (1957) differentiated these three organisms based on the characters shown in Table 2.

The mode of infection of *V. fetus* in human is still not clear. Among animals, sexual contact and contaminated food intake are the mode of infection (Hagan, 1961). It was postulated that a similar mode of transmission may infect human subjects (King, 1957). Reports have shown that some patients with *Vibrio fetus* infection had occupations related directly to animals, such as butchers, stickers and farmers (King, 1957; Spink, 1957). However, as there were many patients who did not have contact with animals, the source of infection and mode of transmission are not yet clear (King, 1957; Kahler, 1960; Mandel, 1963; White, 1967; Reyman, 1969).

The present patient was on active duty with the army until he retired 10 years ago. He then had a job at a market. Direct animal contact was denied. However, as he was pond of raw beef dishes very much this could have resulted in the vibrio infection. Although the organism has never been reported in Korean domestic animals, this does not exclude the possibilities. If Korean cattles carry the organism, then the habit of eating raw
Vibrio Fetus Human Infection

beef may well lead to human vibrios.

Reyman (1969) has stated that since the bacillus is low in virulence, that only debilitated male patients or pregnant women are infected. But the present patient was in good health until three months prior to admission. It was not clear when he was infected with the organism. During the first admission all blood cultures were negative. It was not until the second admission that the organism was found. It is all possible that the infection was with V. fetus from the beginning and negative blood cultures were due to the fastidious growth requirements. It is also possible that the infection was secondary after the patient's resistance was lowered. Although, in the first admission the blood cultures were negative, the facts that the patient had signs of a subacute bacterial endocarditis and that many of his symptoms were similar to those of other V. fetus patients (King, 1957; Khaier, 1960; Spink, 1957; Loeb, 1960), strongly suggest a vibrio infection.

V. fetus have been isolated from various clinical specimens such as blood, brain, uterus, synovial fluid, skin, pericardial fluid and bile indicating that this organism can infect many different tissues. Some of the reported symptoms include fever, chills, headache, weight loss, dyspnea, nausea, vomiting, icterus, hepatomegaly, aortic insufficiency, phlebitis and proteinuria.

V. fetus is reported to be sensitive to many antibiotics and therefore not difficult to cure. It was reported that even after recovery from serious infections such as endocarditis, meningitis, pericarditis and arthritis, patients do not show serious sequelae (King, 1957; Spink, 1957; White, 1967; Reyman, 1969).

Our strain was sensitive to ampicillin, chloramphenicol, kanamycin, neomycin, streptomycin, tetracycline and gentamycin, but was resistant to penicillin.

ACKNOWLEDGMENT

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REFERENCES