Actinomycosis of the Central Nervous System:
Report of a Successfully Treated Case

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In 1882 Ponfick reported the first case of actinomycosis of the central nervous system. Although more than 100 articles have described actinomycosis of the brain and spinal cord, most cases are insufficiently documented to substantiate the diagnosis. The number of instances in which the diagnosis of central nervous system disease has been established by culture is at least 20. This report describes the successful management of a patient with actinomycosis of the central nervous system, and reviews the related literature in Japan.

Report of a Case

A 54-year-old woman was admitted to the Juntendo University Hospital on September 6, 1965, with a chief complaint of “remittent fever since tooth extraction two months ago.” She also had persistent headache and nausea. She had been referred to another hospital, and had received symptomatic therapy under the diagnosis of rheumatic fever or brain tumor or septicemia.

On admission to the University Hospital revealed a thin, emaciated, drowse woman with a temperature of 101.4°F (38.5°C), a blood pressure of 122/74 mmHg, a pulse rate of 80 beats per minute, and a respiratory rate of 35 per minute. The remaining findings of the general physical examination were within normal limits. Neurological examination showed stiffness of the neck and Kernig’s sign. Pupils were of equal size, with normal fundi. Results of routine laboratory studies were limits of normal except for anemia with a white blood cell count of 11,000 cumm (68% segmented cells, 21% band cells). Films of the chest, skull, mastoids, and paranasal sinuses revealed no abnormalities. Electroencephalogram also was within normal limits.

A lumbar puncture was performed on September 8, 1965, revealing malodorous, and purulent cerebrospinal fluid under 630 mm pressure, numerous polymorphonuclear leucocytes, and protein concentration of 2,570 mg/100 ml; smear showed questionable gram-positive rods; a cerebrospinal fluid culture subsequently yielded a heavy growth of Actinomyces sp. and Bacteroides melaninogenicus. The Actinomyces sp. was sensitive to penicillin, tetracycline, erythromycin, streptomycin, and kanamycin, as tested by sensitivity discs. The Bacteroides melaninogenicus also was sensitive to these antibiotics except streptomycin.

Shortly after admission she was treated with penicillin, 500,000 units three times a day (intramuscularly), chloramphenicol, 500 mg twice a day (intramuscularly), tetracycline, 500 mg once a day (intravenously), and prednisolone, 4 mg once a day (intramuscularly). Cerebrospinal fluid aspirated September 19, 1965, continued to yield Actinomyces sp. All cerebrospinal fluid specimens subsequent to the first two were culturally negative for the microorganism. However, cerebrospinal fluid subsequent to the first two was not aspirated by the lumbar puncture, and then ten occipital punctures were per-
formed during the first 3 months' admission. The latest occipital puncture was performed on December 7, 1965, revealing clear cerebrospinal fluid under 140 mm pressure, 2 lymphocytes/cu mm, and protein concentration of 9 mg/100 ml.

Following frequent removal of cerebrospinal fluid, and the treatment with antibiotics, symptomatic improvement continued, and fever subsided on the 20th hospital day. However, paralysis of the legs appeared on about the 20th hospital day, which was suspected to be caused by meningeal blockage at the lumbar region. On June 12, 1966, the patient was discharged from the University Hospital, and was transferred to a rehabilitation center. She is walking pretty well at present.

Comment

In the present case, the diagnosis of actinomycosis of the central nervous system was established by cerebrospinal fluid cultures. Although the location of the lesion was not recognized clinically, it was suggested that actinomycotic brain abscess ruptured into the subarachnoid space. The origin of this abscess was obscure. The only likely focus of infection was a dental abscess. Seligman and co-authors reported that bacteremia due to anaerobes had been found in approximately 12 per cent of cases following tooth extraction. In the present case, both *Actinomyces* sp. and *Bacteroides melaninogenicus* were cultured from the purulent cerebrospinal fluid. Heineman and Braude also reported two cases of brain abscess in which *Actinomyces* sp. and other microorganisms were cultured simultaneously from the abscess collected at the time of operation. It is generally considered that lesions of actinomycosis almost invariably contain other microorganisms besides *Actinomyces*, and that even the granules themselves often have a mixed bacterial population. Holm called these bacteria “associates” and attributed to them a synergic activity in the pathogenesis of actinomycosis. However, Conant and co-authors described that the role of “associated” bacteria in the pathogenesis could be permanently established only after further investigation.

Although treatment with antibiotics exerted a suppressive effect in the case presented here, final cure seemed to be dependent on frequent removal of purulent cerebrospinal fluid.

Sixteen patients with actinomycosis of the central nervous system have been described in the Japanese literature. In 1958 Mikamo and Fukushima also reviewed 682 cases of actinomycosis from Japan and found 15 with brain or meningeal lesion. Eleven of the patients were males and 2 were females. Their ages ranged from 17 to 54 years. Three papers described neither sex nor age of the patient. The number of instances in which the diagnosis of the disease has been established by culture is only 4; cultures from cerebrospinal fluid in 39-10, and from brain abscess at autopsy in one11. No patient survived before the advent of penicillin. However, only one survival has been seen since the “antibiotic area.” This only one study of successful treatment was reported by Tsuneba and Yoshiya10 in 1950 when a 17-year-old man with a fulminant clinical picture of brain abscess and several positive cerebrospinal fluid cultures for the *Actinomyces* responded to 8800,000 units of penicillin in total amount. The patient presented here is the second survival in Japan. Recovery from actinomycotic cerebral abscess is generally considered to require complete aspiration or excision with or without supplementary antibiotics. It is interesting that these two patients were recovered without surgical treatment.

Summary

A case of actinomycosis of central nervous system successfully treated with antibiotics and frequent...
removal of cerebrospinal fluid is reported. A review of the Japanese literature of the disease is briefly presented.

References
(Received for publication, November 24, 1967)