CAVERNOUS SINUS THROMBOSIS COMPLICATING MENINGITIS. MICROSCOPIC STUDIES.

EUGENE M. BLAKE, M.D.,

From the Ophthalmological Department, School of Medicine, Yale University

NEW HAVEN, CONN.

This is the report of a case which takes added significance from the careful autopsy and microscopic examination by which it is supplemented.

The patient was an Italian child, aged $3\frac{1}{2}$ years, who was brought into the New Haven Hospital on May 12, 1920.

The family and past histories were negative.

The present illness began on May 10th, when the left eye became red and slightly swollen. The child complained of pain in the eye but played as usual. The following day the eye was worse, and he appeared ill, refusing to eat; and remained quiet all day. On the 12th of May the child's condition became alarming and a physician was called, who sent the child into the hospital.

The physical examination showed an irritable child with the left eyelids edematous and injected, the globe proptosed. The edema and redness extended up over the forehead and back to the ear. The conjunctiva was injected and there was a slight purulent discharge. The right eye was normal. The lobes of the ears showed some excoriation but no discharge from the middle ears. There was no nasal discharge. The neck was stiff and Kernig's sign was strongly positive on both sides. Otic examination showed no perforation of the membranae tympanorum. Ophthalmoscopic examination was unsatisfactory, but no gross changes were noted. Temperature was 101.5° .

A lumbar puncture was made, the pressure being much above normal. The fluid was cloudy, and smears showed many pus cells, but no organisms. Smears from the left eye showed many organisms, but no intracellular diplococci.

The day after admission to the hospital, the general condition was unchanged; but the right eyelids were red and edematous. Lumbar punctures were made at 9 a. m. and 9 p. m. and at each

operation, 40 cc. of antimeningococcus serum was injected.

Blood examination gave 4,200,000 reds, 72% hemoglobin, and 18,000 white blood cells.

On the 3rd day after admission to the hospital the general condition became worse, and the proptosis of the eyeballs and edema of lids increased. The patient died at 11 p. m. and a partial autopsy was secured.

AUTOPSY. The brain at autopsy showed the right cerebral cortex covered over with a large blood clot and the vessels intensely injected. A small amount of purulent exudate was present along the vessels of the base of the cerebral hemispheres, and a definite purulent exudate was found over the dura of the middle fossa. The left lateral sinus showed a small thrombus, which had extended back into the straight sinus and into the posterior part of the longitudinal sinus. Both cavernous sinuses were filled with a thrombus.

Bacteriologic specimens were obtained from the heart blood, right and left orbits and the brain. The heart blood was sterile. Both orbital cultures showed staphylococcus aureus; and the right, in addition, streptococcus hemolyticus. The brain culture gave staphylococcus aureus and streptococcus hemolyticus. The cultures showed grampositive diplococci in chains, and grampositive staphylococci in groups. The organisms in chains produced hemolysis on blood agar plates.

Section thru posterior part of left orbit showed a thrombus filling the ophthalmic vein. The center of the thrombus had disintegrated and showed large numbers of polymorphonuclear cells. At the periphery the thrombus was intact and the fibrin strands were seen forming a dense meshwork. There were large

numbers of mononuclear cells and a few polymorphonuclear cells surrounding the vessels and extending in all directions into the surrounding tissue. In some places there were areas of necrosis.

Section thru the posterior part of right orbit showed there were similar areas of cellular infiltration around the vessels, and extending into the surrounding tissue. There was marked disintegration of the nuclei and many places showed large numbers of nuclear fragments. The cells were largely mononuclear but polymorphonuclear cells were seen also. There were some blue staining masses suggesting clumps of bacteria.

Sections thru the clot in the left cavernous sinus showed an early thrombus. The typical structure with platelet columns, etc., was not seen. The thrombus was homogeneous in appearance, showing a meshwork of fibrin strands with many mononuclear and polymorphonuclear cells scattered thruout. The tissue around the right cavernous sinus showed an infiltration of polymorphonuclear and mononuclear cells.

The left lateral sinus showed a thrombus similar to that described for the

cavernous sinus. In some places, however, there were the typical fibrin strands with accumulation of white blood cells in columns. There was also a dense accumulation of polymorphonuclear and mononuclear cells, which was in part surrounded by the intact thrombus.

A section thru the clot in the posterior part of the longitudinal sinus showed a thrombus resembling that described in the cavernous sinus.

The occipital sinus and left sinus rectus showed a postmortem clot.

A section of the dura from the left anterior fossa showed a slight purulent exudate on the surface.

There was a slight meningeal exudate consisting of serum, red blood cells, mononuclear cells, and some polymorphonuclear cells.

The anatomic diagnosis was otitis media, causing infected thrombi in both cavernous sinuses and in the left lateral, straight and longitudinal sinuses, and acute cerebral meningitis.

I wish to express my thanks to Dr. M. C. Winternitz, Prof. of Pathology at Yale University, School of Medicine, for permission to report the work done in his laboratory.