INTRAVENTRICULAR TORULA GRANULOMA

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(Received for publication January 14, 1955)

Torula granuloma of the brain seems to be an infrequent occurrence. Carton and Mount reported 8 cases. Liu in reviewing the literature added 5 more, and reported 1 of his own. Balakrishna and Lilauwala reported 1 more, thus making a total of 15 cases in the literature so far.

However, in none of these 15 cases was the granuloma found within the ventricular cavities. The involvement of the central nervous system by Torula histolytica (Cryptococcus neoformans) may be classified as (1) the meningitic type, (2) the meningoencephalitic and (3) the embolic type. The last is responsible for the majority of granulomas found. There is another type, apparently not mentioned before in the literature, which involves the choroid plexus and produces granulomas. This can be called a choroid plexitis. The following case illustrates this.

CASE REPORT

A 61-year-old white male was first seen in the office on Jan. 16, 1954 having been referred by Dr. Wallace McNair of Aiken, S. C. His chief complaint was headache, which had become progressively worse, of 2 weeks' duration. He had had one black-out spell and two episodes of blurring of vision. He had noticed general progressive weakness and malaise for several months.

Past history was not contributory except for the fact that he had had a transurethral resection for prostatic difficulty 3 years before. Family history was not contributory. He was a carpenter by trade.

He was a listless, apathetic white male who complained bitterly of headache. He had a minimal left facial weakness of central type. There was a questionable Babinski sign on the left and some weakness of the left arm. Fundi were normal except for some arteriosclerotic changes.

He was advised to enter the hospital for further study and was admitted on Jan. 17, 1954.

Examination and Course. Complete blood count was within normal limits. Urine was normal. Serological tests for syphilis was negative. Roentgenograms of the skull revealed multiple defects in the parietal and occipital bones. Roentgenograms of the chest showed considerable pulmonary congestion bilaterally with evidence of infiltration of the right base. Lumbar puncture done shortly after admission revealed a CSF pressure of 140 mm. of water. The fluid contained 14 white cells, 100 per cent of which were polymorphonuclear. Pandy was slightly positive; total protein was 115.

In view of the suspicious lesions in his skull and the possibility of metastatic malignancy, a medical consultation was obtained. In the meantime a right cerebral arteriogram was done which showed no abnormalities (Figs. 1 and 2).

Nonprotein nitrogen was 34, total protein 6.9, albumin 5.04, globulin 1.86, calcium 9.9, phosphorus 4.1, acid and alkaline phosphatase 2.2 and 2.9 respectively. Bence-Jones protein test was negative. Sternal bone marrow was normal.

At lumbar puncture on Jan. 21, 1954 pressure was 160 mm. of water. Cell count was 147 with 33 per cent polymorphonuclear cells and 67 per cent lymphocytes. Pandy was positive. This fluid was submitted for routine culture and for examination for tubercle bacilli and fungus.

306
Another lumbar puncture was done on Jan. 26, 1954. Pressure was 120 mm. of water. Cell count was 104, with 27 per cent polymorphonuclear cells and 73 per cent lymphocytes. Total protein was 75; sugar was 52.

Gastro-intestinal series showed no abnormalities. Febrile agglutination tests, including heterophile, were negative. Temperature during this time ranged from 90° to 101°.

At lumbar puncture on Feb. 1, 1954 pressure was 180 mm. of water. Cell count was 125, with 12 per cent polymorphonuclear cells and 88 per cent lymphocytes. Smears of spinal fluid and cultures were repeatedly negative. Spinal fluid serology was negative.

First Operation. On Feb. 4, 1954 exploratory trephinations were done to rule out a subdural hematoma and also to see if one of the skull lesions could be biopsied. There was no evidence of hematoma and nothing was seen grossly at the areas of defects in the skull that were indicated by the roentgenograms.

Course. Cultures for fungus and tubercle bacilli up to this date were reported as negative. That night the patient's condition was much worse; he became stuporous, and a left-sided paralysis developed. An emergency ventriculogram was done (Figs. 3 and 4). This showed an intraventricular mass in the posterior horn on the right side.

Second Operation. A right parieto-occipital cranioplastie flap was turned. The dura mater was opened; it appeared slightly milky. A tunnel was made in the posterior part of the parietal

Figs. 1 and 2. Right carotid arteriograms, anteroposterior and lateral views.

Figs. 3 and 4. Ventriculograms showing mass in posterior horn of lateral ventricle.
lobe, exposing the posterior part of the right lateral ventricle. A gelatinous mass, measuring 4 × 5 × 6 cm., was found, which was attached to the choroid plexus. This was removed.

**Course.** The next day the spinal fluid cultures which had been started at the time of his first lumbar puncture revealed a growth which was identified as Torula histolytica. Pathological report on the tumor removed confirmed this diagnosis (Figs. 5 and 6). Following craniotomy he did very poorly; his temperature rose to 103°F and death occurred on Feb. 14, 1954.

**Autopsy.** The findings, except for the brain, were noncontributory. The brain weighed 1675 gm. The gyri were flattened and sulci were narrowed. The cerebral cortex and overlying pia-arachnoid had a granular opaque appearance, more pronounced in the sulci. There were 20–30 cc. of serosanguineous fluid subtentorially. There was no evidence of gross encephalomalacia. There was pronounced cerebral edema, especially on the right side, with adherent, thickened, opaque, yellow-white pia-arachnoid.

Multiple coronal sections through the cerebral hemispheres revealed a dilated left ventricle with the right ventricle markedly encroached upon by surrounding edematous brain, especially the anterior portion of the caudate nucleus. The choroid plexus in the posterior horn of the left ventricle was not too well preserved and appeared slightly cystic. Little remained of the choroid plexus in the posterior horn of the right ventricle, except for several large vessels. Pons, cerebellum and medulla were not unusual.

**Microscopic examination** of the brain revealed the remains of Torula granuloma of the right choroid plexus, and Torula granuloma of the left choroid plexus with meningo-encephalitis. Slight hemorrhage was noted about the site of operation; no microscopic evidence of choroid plexus in the right posterior ventricle was found. The choroid plexus in the left posterior ventricle was infiltrated by round cells and giant cells, with a moderate number of organisms. Generalized meningeal reaction was present with a small to moderate number of organisms.

![Fig. 5. Photomicrograph of choroid plexus granuloma (arrows) showing infiltration of round and giant cells and a moderate number of organisms.](image-url)
Fig. 6. High-power magnification of part of section shown in Fig. 5. Arrows point to organisms.

Fig. 7. Photomicrograph showing reaction in the meninges.
organisms. In sections of the pons there was perivascular round-cell infiltration with organisms. Cerebral edema was most pronounced throughout the right hemisphere. A chronic inflammatory cell infiltration with some organisms was noted along the stalk of pituitary.

**Pathological Diagnosis.** Torulosis: (i) granuloma, choroid plexus, right; (ii) granuloma, choroid plexus, left; (iii) meningo-encephalitis (Fig. 7).

**DISCUSSION**

The diagnosis of Torula was suspected early after the first lumbar puncture, but the cultures were repeatedly reported as negative. It took 18 days before the spinal fluid culture showed the organism. This stresses the importance of maintaining cultures at least 20 to 30 days when fungous infection of the central nervous system is suspected. The findings at ventriculography were compatible with the diagnosis of a ventricular tumor. This case is unusual in that the granuloma was located intraventricularly and involved the choroid plexus with very little meningeal involvement.

We have had experience in studying 8 cases of Torula and interest has arisen concerning the type of occupation these people were engaged in to see if there was a possible correlation between occupation and disease. In 5 of our 8 cases the patients had occupations that were connected with paper, pulp, or wood industry. Whether or not the organism is more prevalent in this type of occupation is purely speculation but it raises a question.

**REFERENCES**