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The fact that the spinal fluid became clear postoperatively and remained so would appear to be strongly indicative that the tumor was responsible for the hemorrhage.

**SUMMARY**

A case is presented of subarachnoid hemorrhage with grossly bloody spinal fluid provoked by a verified glioblastoma multiforme, simulating ruptured aneurysm with hematoma. It is believed to be the fourth to be reported in the American medical literature.

**REFERENCES**


**ARNOLD-CHIARI MALFORMATION**

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(Received for publication October 10, 1949)

It has repeatedly been mentioned that Arnold-Chiari malformation without abnormality of the cervical spine is unusual,1,2 and the difficulties in diagnosing the lesion under such circumstances have been indicated. The following case is thus presented for its statistical value and may contribute something of diagnostic and therapeutic value as well.

**CASE REPORT**

A 23-year-old white female was admitted to the hospital on Feb. 22, 1948 complaining of headache which began about 1 year previously. This symptom had been progressive and accompanied by vomiting during the last month. Falling to the left when walking, dysphagia and dysarthria had been noted for the last 3 months. Tinnitus, progressive impairment of hearing on the left and progressive impairment of vision had been present for 1 month.

*Examination* revealed an apprehensive and emaciated patient complaining bitterly of headache. Her weight was only 76 pounds. Vision was impaired to such an extent that she retained only ability to count fingers. There were 3 D. of choked disc with retinal hemorrhages and exudates. Signs of 5th cranial nerve involvement on the left were evident, with impaired corneal sensation and hypoalgesia over the distribution of the 1st and 2nd divisions. There was subjective diplopia on looking to the left without objective strabismus, and minimal impairment of ability to wrinkle the left side of the forehead. Air conduction and bone conduction were diminished on the left but vestibular tests reportedly showed hyperirritabil-

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ity of the left labyrinth. Dysarthria and dysphagia of mild degree were present without diminution of gag reflex. Cerebellar signs were confined to the left side and consisted of intention tremor, inaccuracy of the finger-to-nose test, positive Holmes rebound sign, and diminished deep reflexes in the upper and lower extremities.

Spinal puncture showed a pressure of 240 mm. of water, 2 cells and a total protein of 14 mg. per cent.

X-rays of the cervical spine were normal. X-rays of the skull showed some flattening of the squama of the occipital bone and a resultant shallow posterior fossa (Fig. 1). There was no evi-

dence of platybasia. Ventriculography on Feb. 27, 1948 (Fig. 2) showed no hydrocephalus. In retrospect, it was noted that the 4th ventricle was nearer the foramen magnum than usual.

A suboccipital craniotomy was performed on Mar. 2, 1948, using the inverted U type of incision with the patient in the sitting position. Careful exploration of the cerebellopontine angles and 4th ventricle revealed no neoplasm. There was, however, a very striking Arnold-Chiari malformation. The tips of the cerebellar tonsils were near the level of the upper margin of the 3rd cervical arch and attached to the brain stem and upper cervical cord by adhesions. The caudal six cranial nerves followed an unusually oblique rostral course from their point of emergence from the brain stem to enter their foramina at an increased angle.

The cerebellum was carefully freed and CSF was observed to flow into the wound from the 4th ventricle. The dura was left widely open over the suboccipital and upper cervical regions. At the completion of these procedures there was a distance of about 5 mm. between the lower margin of the dural opening and the caudal margin of the cerebellar tonsils.

Course. She was discharged from the hospital on Mar. 25, 1948. At this time she was free of headache, her papilledema was receding and visual acuity was approaching normal.

On Apr. 19, 1948 she again experienced headache, and examination revealed bulging and tenseness of the suboccipital wound. During the ensuing 7 months there were remissions and exacerbations of signs and symptoms of increased intracranial pressure. The ataxia and cranial nerve palsies did not recur. Aspiration of CSF from the suboccipital wound repeatedly relieved her headache temporarily.

A third ventriculostomy was done on Nov. 27, 1948. The right transtemporal route was used and an opening was made in the lateral wall of the 3rd ventricle, just anterior to the 3rd cranial nerve. Indigo carmine injected into the right lateral ventricle promptly escaped from the ventriculostomy opening. Following this procedure headache and bulging of the suboccipital wound improved for 5 days, then recurred.

On Dec. 8, 1948 indigo carmine injected through the suboccipital scalp into the pseudomeningocele appeared in the lumbar subarachnoid space only after 21 minutes, and even then...
only in very small amounts. CSF withdrawn prior to these injections contained 173 mg. per cent of protein.

Re-exploration of the suboccipital area was performed on Dec. 11, 1948, this time through a midline incision and with the patient in a prone position. The cerebellar hemispheres were found to be firmly attached to the margin of the dural opening. As a result the CSF upon leaving the 4th ventricle was prevented from entering the basal cisterns. The lamina of the 3rd and 4th cervical vertebrae were removed and the dura was opened as far caudally as possible, thus creating a considerable space between the tip of the cerebellar tonsils and the margin of the dura. This accomplished a good communication between the spinal canal, the 4th ventricle and the basal cisterns. Indigo carmine injected into the lateral ventricle promptly appeared in the wound. Phenolsulphonphthalein, injected into the lumbar theca, also appeared promptly. The dura was left widely open and the remainder of the wound carefully closed.

Course. The patient made an uneventful recovery. When last seen on Sept. 30, 1949 she had gained 38 pounds. The suboccipital wound was soft. She had experienced no recurrence of headache. Her optic discs were normal. Other cranial nerves showed no sign of involvement. There was no subjective or objective evidence of ataxia.

DISCUSSION

There were several unusual features in this case. Loss of convexity of the occipital bone has not, to the author's knowledge, heretofore been reported in conjunction with Arnold-Chiari deformity. This may be a coincidental finding, but seems worthy of mention. Papilledema was quite marked and was not accompanied by the hydrocephalus one would anticipate with a block in the posterior fossa. The failure of the first operation was undoubtedly due to an inadequate laminectomy. This mistake was a result of the effect of extreme flexion of the head on the relative position of the 3rd cervical arch and the lower margin of the cerebellum. With the head in this position there were several mm. between the lower margin of the dural opening and the cerebellum, and the illusion of an adequate laminectomy was thus created. After the wound was closed, however, and the head brought back to the neutral position, the tips of the cerebellar tonsils presumably were brought into contact with the dural edge. During the course of wound repair adhesions between these surfaces ensued and resulted in recurrence of the CSF block. Third ventriculostomy failed, probably due to closure of the stoma. The second and more complete laminectomy has, it is hoped, permanently re-established communication of the CSF pathways.

SUMMARY

A case of Arnold-Chiari malformation without malformation of the cervical spine is presented. Several unique findings, including a malformation of the basis-occiput are mentioned. The danger of failure of operation due to inadequate laminectomy is discussed.

REFERENCES