AQUEDUCT STENOSIS

CLINICAL ASPECTS, AND RESULTS OF TREATMENT BY VENTRICULO-CISTERNOSTOMY (TORKILDSEN'S OPERATION)

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Partial or complete occlusion of the sylvian aqueduct may be caused by congenital malformation, post-inflammatory ependymitis, or may result from pressure of an intracranial tumour, aneurysm or angioma. In order to overcome such an obstruction some new pathway must be made that will enable the cerebrospinal fluid to gain access to the subarachnoid space covering the cerebral hemisphere or be directed to some other absorptive space.

The obvious method would be to dilate the aqueduct or to insert a tube connecting the third and fourth ventricles. Dandy, in 1920, reported 2 cases in which he passed a tube from the fourth ventricle through the aqueduct. In both cases the tube was later removed. One patient died and the other was reported as being well 1 year after operation. Fraser and Dott reported 5 cases of aqueduct stenosis, in 4 of which the operative procedure was a cerebellar decompression and insertion of a probe through the aqueduct. One patient was stated to be cured, 1 improved, and the other 2 died. The follow-up period was not given. Leksell, more recently, used a tantalum wire coil to pass through the stenosed aqueduct. He had 2 operative deaths, and 1 death a year after operation, in a group of 10 patients. Three infants under the age of 1 year did not survive the operation.

Shelden, Parker and Kernohan described the treatment of 6 patients with aqueduct stenosis, 1 with an associated meningocele. All 6 died: 1 after lumbar puncture, 3 after cerebellar decompression, 1 after subtemporal decompression and 1 after third ventriculostomy.

Stookey and Scarf summarising the results of treatment in reported cases of the condition, found that there were 10 deaths among patients not submitted to operation, 1 death after subtemporal decompression and puncture of the corpus callosum, 2 deaths following ventriculography, 2 deaths after suboccipital decompression, and 1 death 5 weeks after this procedure. No survivals were recorded. These authors then reported the results of their operation of third ventriculostomy. Four patients were submitted to this procedure. One died after 1 month, but the other 3 were stated to be well 6 months, 14 months and 3 years later. Here at last seems to be a method of treatment that yields successful results.

Pennybacker in 1940 reported to the Royal Society of Medicine 18 cases of aqueduct stenosis. A variety of operations had been practised on
these patients. Cerebellar decompression had been performed in 7, 1 of whom died postoperatively from a wax embolus. Another patient had a recurrence of symptoms 3 months later. Three patients were well 3 years after operation and one was well 4 years after operation. Two of these patients had been subjected to a course of irradiation. The final patient, who had had a pineal exploration in addition to the decompression, was well 4 years later. Third ventriculostomy was performed in 5 patients, 2 of whom died postoperatively whilst the other 3 were reported as being well 4 months, 1 year and 2 years later. In 2 patients the corpus callosum was split but 1 died postoperatively and the other 10 months later. The only patient subjected to a pineal exploration and irradiation was well 7 years later. One patient who had had a subtemporal decompression and a course of X-ray therapy was still symptom-free after 6 years. One patient died from an intracranial infection after ventriculography and the remaining patient died 3 years after diagnosis, having received no operation.

Drainage of the cerebrospinal fluid into the body tissues or cavities has been advocated by many, tubes of varying construction having been passed between the ventricular system above the stricture to the mastoid, jugular vein, the soft tissues of the neck or scalp, peritoneum and pleura, to mention but a few. No one of these methods has proved satisfactory and the death rate has been high. The tendency of cerebrospinal fluid to produce a dural membrane around itself prevents success by many of these methods whilst drainage into such cavities as the middle ear opens a potential road for infection of the subarachnoid spaces.

Avulsion of the choroid plexus to provide a pathway from the lateral ventricle into the cisterns around the brain stem was advocated by Hildebrand in 1904. Hyndman described 1 case of stenosis of the aqueduct treated by his operation of disruption of the choroid plexus but the patient died 2 months later.

Third ventriculostomy, as mentioned above, was one of the early methods of treatment that gave some hope of success in the management of patients with aqueduct stenosis. Stookey and Scarff first reported 4 operations with 3 survivals. Their original procedure required the making of an opening in the lamina terminalis above the optic chiasm, the exposure being through a transfrontal craniotomy. Scarff later reported on 10 cases, in which 7 operations were performed for the relief of aqueduct stenosis. There were no operative deaths but 1 patient died a month after surgery. Another survivor died 5 years later. Three other patients were living 1, 3 1/2 and 5 years after operation. The follow up was incomplete for the remaining patient. White gave his results of this operation on 3 patients with occlusion of the aqueduct. Two survived but 1 died 2 months after operation from pneumonia. Krayenbühl, Werner and Martin performed this operation on 17 patients, 4 of whom had stenosis of the aqueduct. Of this latter group 3 were relieved of symptoms, for 3 years in 2 cases and 4 years in 1. The fourth patient was well for 3 years but then suffered a recurrence of symptoms.