THE VENTRICULO—CAVAL SHUNT FOR HYDROCEPALUS

Preliminary Report

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In Beirut during a two and a half year period, we had the opportunity to operate on 12 patients suffering from hydrocephalus. Five of them underwent a ventriculo-caval derivation. For the remaining seven, different procedures were used: excision of the choroid plexuses of one patient; ventriculocisternostomy (Torkildsen) in two cases; third ventriculostomy (Stookey and Scarff) in three cases; and, decompressive exploration of the posterior fossa of one patient.

Among the five patients who underwent ventriculo-atrial shunt, there was one adult, whom we have omitted from this study.

Materials and Methods

The subjects of this paper are four patients with infantile hydrocephalus, a girl of two months, a boy of eleven months, a girl of one year and the last a boy of two and a half years, on whom five derivations were performed.

Etiologically, there were two patients with congenital communicating hydrocephalus, one patient with Arnold Chiari anomaly and one with post meningeal hydrocephalus. The following are summaries of the case histories of our patients.

Case 1: Simon L., a two and a half year old male was known to have slow progressive hydrocephalus since early infancy. The patient was unable to sit erect. He had psychomotor retardation, and his eyes were in setting sun position. His skull perimeter was 56 centimeters. Encephalography revealed a huge ventricular dilation. The thickness of the brain surpassed 2 cm.

Surgical intervention was performed on August 23, 1962, in the Hôtel-Dieu de France, Beirut, and a Spitz-Holter one-way valve was installed. The patient was discharged on the ninth hospital day.

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Since then there has been definite improvement in his psychomotor condition. He is able to sit and walk. According to his parents there has been improvement in his psychic condition.

Figure 1.

Figure 2.

Case 2: Nemr S., an eleven month old male, suffered from a purulent meningitis of the salmonella para B type. He recovered after intensive antibiotic therapy, but developed a hydrocephalus secondary to arachnoiditis, with a left facial palsy.

Physical examination showed that the perimeter of the skull was 49 cm, eyes were in "soleil couchant", and the fontanelles were bulging.

The first operation was a third ventriculostomy on November 11, 1963 at the Clinique Rizk, Beirut. This internal derivation of the cerebrospinal fluid resulted in a transitory remission of two months duration.

The second operation was a ventriculo-atrial shunt performed with a Pudenz-Heyer one-way valve. This functioned well for nearly one month and then was blocked. The hydrocephalus increased, resulting in a skull perimeter of 54 cm. The silicone capsule was constantly pulled inwards indicating either a negative pressure or vacuum inside the apparatus.

The third operation on May 30, 1964 was a revision and placement of a Spitz-Holter valve on the left side. The malfunction of the Pudenz-Heyer valve must have been due either to a bending or an obstruction of the tube. Three and a half months after the operation, the perimeter of the skull was reduced from 54 to 53 cm. The psychosomatic development of the child has been satisfactory.

Figure 3.

Case 3: Rita D, eleven months, underwent a surgical intervention at the age of 25 days for a lumbar myelomeningocele. Two months later, she developed a progressive hydrocephalus. On March 6, 1964, the patient underwent surgery. Following an occipital craniectomy and a laminectomy of the atlas, we discovered as expected, an anomaly of the Arnold-Chiari type. The tonsillar cerebri were one and a half cm below the foramen magnum and were strongly adhering to both the medulla oblongata and to each other. The decompression stabilized the hydrocephalus for five months. After this period it again progressed until the perimeter of the skull enlarged from 48 to 54 cm.

November 28, 1964, eight months after the latest intervention, a ventriculocaval shunt of the Pundenz-Heyer type was performed. Since this period, ten months after the derivation, the progression of the hydrocephalus has been arrested, and the actual skull perimeter is 52. The psychomotor development is improving.

Figure 4.

Case 4: Caroline H, a two month old child from Aleppo, Syria had hydrocephalus of the congenital communicating type. Her skull perimeter was 46 cm. On January 23, 1964 she underwent surgery at the Hotel-Dieu de France, Beirut. A Spitz-Holter one-way valve was installed. The decrease in the size of the skull was rapid and impressive. On discharge, twelve days after surgery, the skull perimeter was reduced from 46 to 41 cm. On follow up, eight months later, her condition was satisfactory. At this time the skull perimeter was 42 cm.

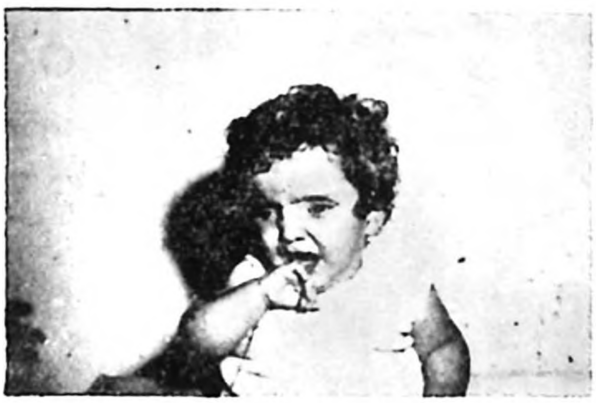

Figure 5.

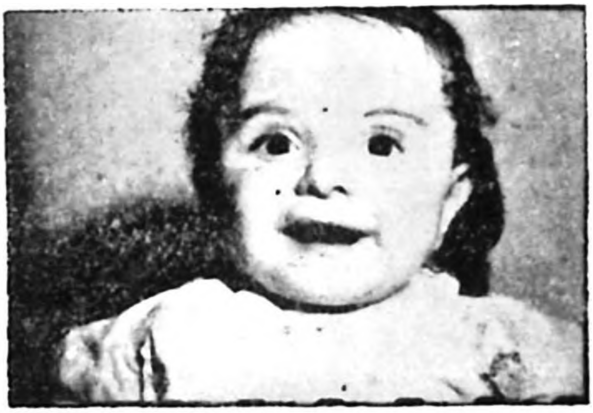

Figure 6.

Discussion

Five ventriculocaval shunts were performed on four patients with infantile hydrocephalus. This is certainly a modest figure which does not permit any statistical deductions. All four patients are alive in follow up periods ranging from eight months to two years.

A review of the literature shows that successful results have been obtained in 70 per cent of the operations.

We did not encounter any postoperative infectious complications. This is probably due to the meticulous aseptic care that we took. The suturing of the operative fields to the skin, enveloping the whole operative area; is a detail that is worth emphasizing.

The success of the operation depends on the precision and timing of the surgical intervention. We obtained the best result in the fourth case, the patient who was operated on at the age of two months. We consider that the earlier the derivation is performed the greater its chances of success.

In the immediate postoperative period an increased diuresis is noticed as well as rapid respiration and tachycardia. This is due to an excess of fluid in the venous system. We find it useful to prescribe for these patients mild cardiac analeptic, thus avoiding an excessive load on the heart.

We also know that a weak myocardium is an additional risk in the placement of the ventriculocaval shunt.