Failure of a Torkildsen shunt after functioning for 50 years

Case report

*Pascal O. Zinn, M.D.,1,2 Oliver Bozinov, M.D.,2 Jan-Karl Burkhardt, M.D.,2 Robert Reisch, M.D.,2 M. Gazi Yaşargil, M.D.,3 and Helmut Bertalanffy, M.D.2

1Department of Neurosurgery, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, Massachusetts; 2Department of Neurosurgery, University Hospital Zurich, Switzerland; 3Department of Neurosurgery, College of Medicine, University of Arkansas for Medical Sciences, Little Rock, Arkansas

Mechanical obstruction is a severe complication of ventricular catheter use. Its incidence was shown to be high in the 1960s and 1970s, with up to 41% of the catheters becoming obstructed within 10 years after surgery. The authors present what is to their knowledge the first reported case of a patient with failure of a Torkildsen shunt after 50 years of functioning. A 60-year-old woman presented with increasing gait ataxia, decline in cognitive functions (including short-term memory loss), and slight urinary incontinence. The diagnosis of hydrocephalus and thus malfunction of the Torkildsen shunt implanted 50 years previously was confirmed by MR images, which revealed a prominent triventricular hydrocephalus. The patient subsequently underwent endoscopic third ventriculostomy (ETV), the current surgical treatment of choice, resulting in total resolution of her neurological symptoms and amelioration of cerebral tissue distension. Decrease in ventricle dilation and success of the ETV were confirmed on postoperative follow-up MR images. (DOI: 10.3171/2009.7.JNS09729)

Key Words • Torkildsen drainage • congenital cerebral aqueductal stenosis • endoscopic third ventriculostomy • hydrocephalus

Between 1968 and 1979, ventricular catheter obstruction was found to occur in 26–41% of cases.4–6 Go et al.3 showed that 60–70% of these obstructions occurred during the first year after surgery. They reviewed 206 cases and demonstrated a total of 65 ventricular catheter obstructions (31.6% of the cases) after a documented follow-up of 10 years. Ventricular catheter obstruction was identified as the most common cause of shunt failure. The chance of a ventricular drainage failure due to obstruction is highest within the first year after surgery and significantly lower thereafter.3 However, in this case report, we present a case involving a Torkildsen shunt that failed 50 years after placement.

Historical Note

In 1938, Arne Torkildsen (1899–1968), a Norwegian neurosurgeon, first published his work on ventriculocisternostomy12 and introduced a successful treatment for noncommunicating hydrocephalus. The idea was to connect the lateral ventricles with the cisterna magna bridging the cerebral aqueduct. The therapy had proven itself sufficient and was used as the standard treatment for aqueductal stenosis until the mid-1960s.

Case Report

History. This patient suffered from congenital idiopathic aqueductal stenosis, which became symptomatic at age 9 and led to severe gait ataxia and hemiparesis, including a mild facial paresis, as well as headaches, vomiting, lethargy, and intermittent diplopia. In 1958, Dr. M. G. Yaşargil (at the time, staff surgeon of Prof. H. Kräyenbuehl at the University Hospital in Zurich) operatively treated the patient with a Torkildsen drainage procedure.13 The symptoms improved altogether, and the patient experienced no shunt-related disabilities for the following 50 years.

Presentation and Examination. In March 2008, the patient presented with gait ataxia, decline in cognitive functions, and urinary incontinence. The cranial MR imaging showed enlarged lateral and third ventricles, and distension of the cerebral tissue (Figs. 1 and 2); thus, malfunction of the Torkildsen shunt was diagnosed.

This article contains some figures that are displayed in color online but in black and white in the print edition.
Torkildsen shunt

Operation. The patient was surgically treated with ETV using an Aesculap MINOP ventriculoscope (Figs. 3 and 4). Ventriculostomy was performed with a 4 Fr Fogarty catheter; because the Torkildsen shunt had been in place for half a century, it was decided not to remove it during the procedure.

Postoperative Course. The perioperative course was uneventful, and the 3-month follow-up examination showed amelioration of all the major symptoms. The MR

Fig. 1. Preoperative axial T2-weighted MR image demonstrating hydrocephalus with marked enlargement of the lateral ventricles and distension of the cerebral tissue. Note the position of the Torkildsen catheter (A).

Fig. 2. Preoperative sagittal T2-weighted MR image showing findings typical of aqueductal stenosis with ballooning of the third and lateral ventricles and a normal-sized fourth ventricle.

Fig. 3. Intraoperative endoscopic view. Note the prominent proximal part of the Torkildsen catheter, placed in the third ventricle and having remained in place for 50 years.

Fig. 4. Intraoperative endoscopic view showing the basilar artery after successful ETV.
imaging study revealed slight improvement of the hydrocephalus and decrease in distension of the cerebral tissue (Fig. 5). The sagittal scan showed an adequate flow signal in the third ventricle with a regular configuration and anatomical position of the third ventricle and adjacent structures (Fig. 6).

Discussion

Idiopathic or true aqueductal stenosis, such as congenital narrowing of the aqueduct, occurs in only 4–8% of infants with obstruction of the aqueduct.9 Walter Dandy first introduced the idea of third ventriculostomy;2,8 later the technique was improved by Stookey and Scarff.10 Their method was to approach the lamina terminalis by means of a subfrontal or subtemporal route through the interpeduncular cistern into the floor of the third ventricle.7,13 It was Torkildsen12 who invented the ventriculocisternostomy. In general, the disorder was treated until the mid-1960s with a Torkildsen drainage procedure and afterward with ventriculoperitoneal shunt placement. Currently, ETV is the treatment of choice.1 Late ETV is successful in 67% of cases of mechanical shunt failure.11

To the best of our knowledge, this is the first reported case in which a Torkildsen shunt has failed after 50 years of adequate function and the patient has been successfully treated with ETV. The given case illustrates the treatment of congenital cerebral aqueductal stenosis at an early stage of the history of therapy and, in contrast, the current minimally invasive keyhole approach, the ETV.

Disclaimer

Dr. Zinn is the recipient of a scholarship from the Swiss National Science Foundation.

Acknowledgment

The authors thank Dr. Rivka R. Colen for the helpful discussion and proofreading of the manuscript.

References

Torkildsen shunt


Accepted July 31, 2009.

Please include this information when citing this paper: published online August 28, 2009; DOI: 10.3171/2009.7.JNS09729.
Address correspondence to: Pascal O. Zinn, M.D., Department of Neurosurgery, Beth Israel Deaconess Medical Center, Harvard Medical School, 110 Francis Street, Boston, Massachusetts, 02215. email: pzinn@bidmc.harvard.edu.