A long-term complication of burying a shunt valve in the skull

Ahmed Ammar and Munir Nasser

Department of Neurosurgery, King Faisal University, King Fahd Hospital, Al Khobar, Saudi Arabia

Abstract

One of the most common causes of shunt malfunction is infection; a major contributing factor to this infection in neonates is scalp necrosis over the valve site. One of the methods recommended to avoid this requires the burying of the valve in the skull bone. We present a case of a long-term complication from this procedure: the shunt slowly disconnected, over a prolonged period, leading to the formation of the fibrous tunnel which enabled the shunt to function intermittently. We recommend that the practice of burying the shunt into the skull bone is be reconsidered.

Keywords: Dysfunction, hydrocephalus, infection, neonate, shunt.

1 Introduction

There are several complications of shunts in neonates and premature babies, the most common being infection [2–8]. When faced with the problem of neonatal hydrocephalus, it is not uncommon for the neurosurgeon to bury the shunt valve in the bone [2, 6], in order to avoid scalp necrosis and sloughing over the valve area. This practice, however, can lead to complications which include shunt dysfunction.

2 Case report

In January 1985, a 7-month-old child suffering from obstructive hydrocephalus received a V-A shunt. The shunt worked well for three years. In November, 1988, the patient was admitted to our hospital, suffering from vomiting and headache. A preliminary diagnosis of shunt obstruction was made. However, CT scan revealed a functioning shunt, and the patient improved clinically and was discharged home. Two years later, the patient was readmitted with similar symptoms. A valvogram revealed a patent shunt; a CT scan showed the system to be functioning. Again after signs of clinical improvement the patient was discharged home. In August, 1991, the patient, aged 7 years, was admitted with a three day history of headache and vomiting. Revision of the distal end of the shunt, diverting it to the peritoneal cavity, was undertaken and the shunt appeared to be functioning, but the headache persisted.

Skull X-ray (Figure 1) revealed separation of the proximal catheter from the valve.

Revision of the proximal end of the system revealed shunt disconnection, but with a fibrosed tunnel maintaining continuity. Both the valve and proximal end of the shunt were revised.

Following surgery the patient recovered well and is well to date.

3 Discussion

The scalp of neonate is extremely fragile, and with the establishment of modern diagnostic techniques, early detection of hydrocephalus in utero is common. It is now a widespread policy to deliver these neonates pre-term, in order to deal with the hydrocephalus as early as possible, and thus, to reduce the risk of irreversible brain dam-
age as a result of the increased ICP. This approach however holds other inherent complications such as scalp necrosis over the valve site, due to the excessive thinness of the under-developed scalp in premature babies, particularly in those suffering from hydrocephalus, ultimately leading to shunt infection and malfunction [2, 5, 6, 8]. Because the neonate cannot adjust his head position himself, responsibility for positioning lies entirely with the nurses and/or mother. Even relatively short periods of inattention, exacerbated by the increased size and weight of the head, can lead to sloughing over the valve site.

It is, therefore, imperative that the surgeon carefully consider the position of the valve before undertaking surgery. Alternatives include a frontal burr hole with Pudenz valve or placing the valve in the neck. The frequently advocated practice of nibbling the skull bone in order to create a space to accommodate the valve should not be undertaken, because it can lead to eventual disconnection, as in the case presented.

This case went undetected through three admissions, although the valve was trapped in the skull bone, because the valve functioned intermittently as a result of the fibrous tunnel between the valve and the disconnected proximal end of the catheter. The separation occurred because the proximal end was anchored at the burr hole and the valve embedded in the skull, leading to slow separation with growth. The very slow rate of separation, along with the tendency for formation of fibrous tissue around shunt systems accounts for the formation of the fibrous tunnel [1]. The burying of the valve in skull has been considered to be a safe method of avoiding scalp necrosis. This case highlights a previously undocumented case of a long-term complication of this method. Further study of complications arising from this practice should be undertaken. Although the valve functioned well for 3 years, the inevitable separation with growth indicates that this should not be the first method of choice when inserting a shunt system in a neonate, and while scalp necrosis is a serious complication of shunts in neonates, an alternative method for dealing with the problem must be sought.

References


