

Fungal Granuloma following Endoscopic Third Ventriculostomy for Infantile Hydrocephalus

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الورم الفطري الحبيبي بعد عملية التجويف الثالث بالمنظار لاستسقاء الرأس في الرضع

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الملخص: استخدام المناظير لعلاج استسقاء الرأس في سن الطفولة في تزايد مستمر. المضاعفات المعدية نادرا ما تحدث، ولكن العدوى الفطرية أو الأورام الحبيبية لم يتم ذكرها حتى الآن. المؤلفون يعرضون حالة حدوث الورم الحبيبي الفطري بالمصادفة بعد إعادة الكشف بالمنظار بعد فشل عملية التجويف الثالث الأولي وطرق التعامل معها.

مفتاح الكلمات: منظار الأعصاب، المضاعفات، العدوى الفطرية، فطور، الهند.

ABSTRACT: Endoscopic third ventriculostomy (ETV) is increasingly being used in the treatment of hydrocephalus in infancy. Infective complications rarely occur following ETV and fungal infections or granulomas have not been reported so far. The authors report the occurrence and management of a fungal granuloma incidentally detected during a repeat ventriculoscopy for a non-functioning ETV.

Keywords: Neuroendoscopy; Complication; Fungal infection; Candida; Case report; India.

ENDOSCOPIC THIRD VENTRICULOSTOMY (ETV) has been associated with a higher failure rate during infancy.¹⁻³ However, more recent reports have shown encouraging results and it is increasingly being considered an effective alternative to a ventriculoperitoneal shunt or even the procedure of choice.⁴⁻⁶ Although it is a safe procedure, ETV has several known complications including infection.^{7,8} Fungal granulomas have not been reported so far to the best of our knowledge.

Case Report

A 3-month-old child was born at 32 weeks' gestation, as one of triplets, with a birth weight of 1.75 kg and was treated at another hospital for neonatal sepsis and respiratory distress syndrome. There was no documented evidence of meningitis or intraventricular bleeding during this period. The child was referred to Amrita Institute of Medical Sciences, Cochin, India, with a history of increasing head size, vomiting, and downward eye gaze over

the previous month.

At admission, the child was active and alert with a head circumference above the 96th percentile for age, tense fontanelles, sutural diastasis, and a positive "sunset" sign. A computed tomography (CT) scan of the brain which accompanied the child's referral, showed triventriculomegaly [Figure 1]. A magnetic resonance imaging (MRI) scan had not been done due to financial constraints. After discussing the various surgical options, it was decided to perform an ETV. The procedure was uneventful with the intraoperative findings of clear cerebrospinal fluid (CSF) under pressure and a thin floor which was pulsating well after the procedure [Figure 2]. The CSF studies, including cell count, biochemistry, and cultures were normal. The child did well over the following 6 months with resolution of the symptoms of raised pressure and the head circumference in the normal range.

Seven months after the procedure, the child presented again with vomiting, irritability, and a downward gaze which had lasted two weeks.

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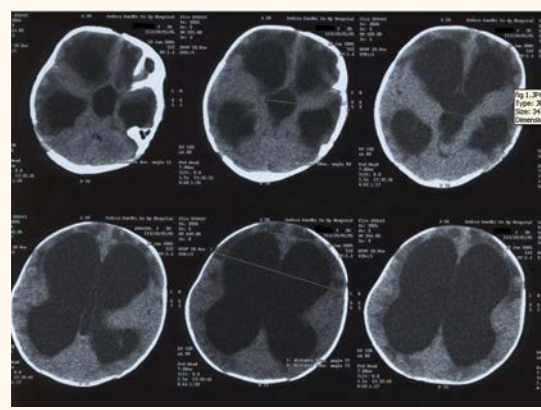


Figure 1: Initial computed tomography scan showing triventriculomegaly.

A repeat CT brain scan showed significant triventriculomegaly but lesser in size than in the previous scan.

As the child had done well with the previous ETV, it was decided to do a repeat ventriculostomy. During surgery, it was found that the third ventricular floor was opaque and the stoma was not visualised. A small white nodule was seen loosely adherent to the floor just posterior to the mamillary bodies [Figure 3]. It was presumed to be a foreign body granuloma and was easily removed. A fresh stoma was made in the floor but since the floor pulsations were unsatisfactory, it was decided to go ahead with a ventriculoperitoneal shunt insertion.

The child improved immediately. A biopsy of the nodule revealed a fungal granuloma, most probably *candida*. The CSF sent for testing during the procedure was normal and did not grow any organism. Although there was no evidence of fungal infection clinically or from the CSF laboratory values, it was decided, in view of a shunt hardware being present, and with the concurrence of the paediatricians, to give a course of intravenous amphotericin, which the child tolerated well.

The child was doing well at a 24-month follow-up visit, with normal ventricles on a CT brain scan.

Discussion

This child was born prematurely with related problems including sepsis, but there was no documented evidence of fungal meningitis which has been reported previously in this setting.⁹ There was no other evidence of hydrocephalus being present antenatally or during the immediate post-natal period. The child had presented with a

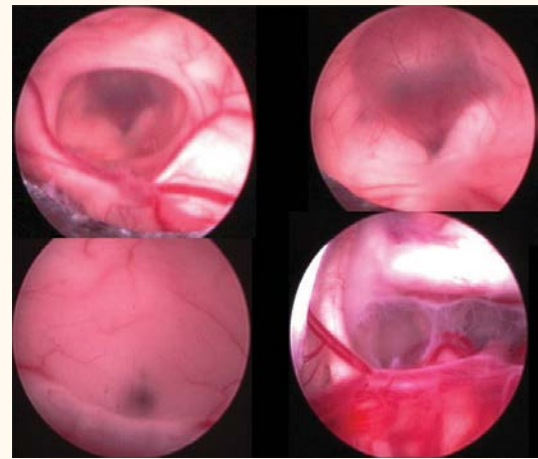


Figure 2: Endoscopic view during the first surgery showing the stenosed aqueduct, the third ventricle floor, and the interpeduncular cistern after endoscopic third ventriculostomy.

triventriculomegaly at a corrected age of one month and it was decided to perform an ETV based on the CT scan findings. Recent reports have shown good outcomes with ETV in early infancy.^{5,6} The child was clinically well over the following 6 months. No imaging was done in the follow-up period due to financial constraints. When there was a recurrence of hydrocephalus, it was decided to have a repeat ventriculostomy as the procedure had been effective for more than 6 months. Failure of ETV commonly presents during the first 2 to 4 months.^{1,3}

The conversion to a ventriculoperitoneal shunt during the second surgery was based on the unsatisfactory stoma achieved. The white nodule was presumed to be a foreign body granuloma during the surgery. No infective process was suspected and hence no specimen was taken for culture, and a shunt hardware was inserted. Although there was no evidence of active infection

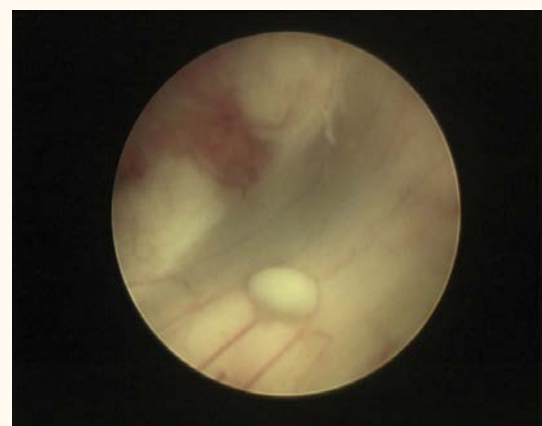


Figure 3: Endoscopic view at second surgery showing white nodule.

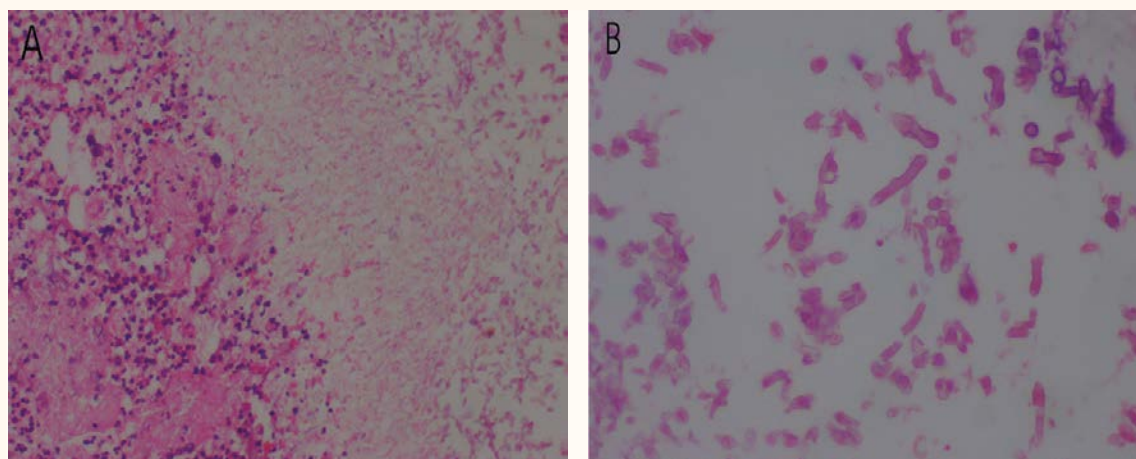


Figure 4: Photomicrograph (haematoxylin and eosin stain) (A) x 100 and (B) x 400 showing fungal hyphae.

clinically or in the CSF, it was decided to give anti-fungal treatment due to the presence of shunt hardware. Candidal infections have been reported to be more commonly associated with the presence of a foreign body like a shunt or an external CSF drain.^{10,11} However, conservative management without anti-fungal therapy has also been successful in the absence of clinical features or CSF findings, but require close monitoring of the lumbar CSF.¹¹

The fungal granuloma in this patient could possibly be attributed to contamination during the earlier ETV. Irrigation fluid is a possible source, especially when multiple bottles are changed or when air-vents are inserted. Aggressive treatment is warranted in such a situation due to the possibility of colonisation of the shunt hardware or even a catastrophic fungal meningitis.¹¹

Conclusion

Fungal granuloma, even an asymptomatic one, is a hitherto unreported complication of an ETV procedure. The maintenance of sterile precautions cannot be over-emphasised. The detection of fungus in the ventricular system, even in asymptomatic situations, needs to be aggressively treated, especially in the presence of shunt hardware.

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