



Brief Communication

Endoscopic Third Ventriculostomy at Laquintinie Hospital (Douala) : A Report of 23 Cases

La Ventriculocisternostomie à l'Hôpital Laquintinie de Douala : À Propos de 23 Cas

HB Mfouapon Ewane^{1,2}, B Djoubairou³, OH Nassourou¹, B Figuim¹, T Ndome³, ERA Bikono¹, JP Engbang^{2,3}, NE Essomba^{2,3}, VDP Djientcheu¹

Affiliations

1 Faculty of Medicine and Biomedical Sciences of the University of Yaounde 1
2 Laquintinie Hospital
3 Faculty of Medicine and Pharmacy of University of Douala

Corresponding author: Mfouapon Ewane
Herve Blaise
Email: Mfouaponewaneherve@gmail.com
Tel: +237 651599576

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ABSTRACT

Endoscopic Third Ventriculostomy (ETV) is a minimally invasive procedure that allows for fenestration of the third ventricle into the prepontine cistern. It is generally indicated for all forms of obstructive hydrocephalus. This technique has only recently been introduced at Laquintinie Hospital, and our study aimed to evaluate its use. From 2022 to 2023, we conducted a retrospective study of 23 ETV patients. CT scans were obtained for all patients, while MRI was performed only for those with tumors. In our study, out of the 23 enrolled patients, 22 were children. Regarding etiology, 73% of patients had congenital malformative obstructive hydrocephalus. The remaining 27% had brain tumors obstructing cerebrospinal fluid flow. The clinical presentation varied with respect to the age population. The failure rate of ETV was 17%. All patients with failures underwent reoperation via ventriculoperitoneal shunt. There were no major complications.

RÉSUMÉ

La ventriculocisternostomie est une procédure minimalement invasive permettant la fenestration du troisième ventricule dans la citerne prépointine. Elle est généralement indiquée pour toutes les formes d'hydrocéphalie obstructive. Cette technique a été récemment introduite à l'Hôpital Laquintinie, et notre étude visait à évaluer son utilisation. De 2022 à 2023, nous avons mené une étude rétrospective portant sur 23 patients ayant subi une ventriculocisternostomie. Des scanners cérébraux ont été réalisés pour l'ensemble des patients, tandis que des IRM n'ont été effectuées que pour les patients présentant des tumeurs cérébrales. Dans notre étude, sur les 23 patients inclus, 22 étaient des enfants. En ce qui concerne l'étiologie, 73 % des patients présentaient une hydrocéphalie obstructive d'origine malformative congénitale. Les 27 % restants avaient des tumeurs cérébrales obstruant la circulation du liquide céphalorachidien. La présentation clinique variait en fonction de la tranche d'âge de la population. Le taux d'échec de la ventriculocisternostomie était de 17 %. Tous les patients en échec ont été réopérés par une dérivation ventriculo-péritonéale. Aucune complication majeure n'a été relevée.

INTRODUCTION

Endoscopic Third Ventriculostomy (ETV) is a minimally invasive procedure that permits the fenestration of the third ventricle into the prepontine cistern. ETV is a well accepted procedure in the treatment of hydrocephalus especially for the non-communicating forms^{1,2}. This pathology, which is frequent in the pediatric environment,

recognizes a multitude of etiologies, most often malformative and hemorrhagic in the neonatal period, post-meningitis in infants and tumors in older children^{4,5,6}. However controversy exists in the appropriate patients⁷, as this affects the success rate of ETV⁸. The aim of the study was to evaluate the epidemiological profile, indications, surgical technique and outcomes.

HIGHLIGHTS**What is already known on this topic**

Endoscopic Third Ventriculostomy (ETV) is a minimally invasive procedure that permits the fenestration of the third ventricle into the prepontine cistern. It is being practiced at the Laquintinie Hospital for only two years.

What question this study addressed

Evaluation of indications, surgical technique and outcome of ETV in Laquintinie Hospital (Douala).

What this study adds to our knowledge

- 22 patients (out of 23) were children and 73% of patients had malformative obstructive hydrocephalus.
- The success rate of ETV was 83%. There were no major complications.
- All patients with failures underwent reoperation via ventriculoperitoneal shunt.

How this is relevant to practice, policy or further research.

Further studies should embark on the clinical criteria that can predict failure of ETV

MATERIALS AND METHODS.**Study Design**

We carried out a retrospective study from January 2022 to June 2023. The study was carried out at the Neurosurgical department of the Laquintinie Hospital in Douala. The Laquintinie hospital is of the referral university teaching hospital located in the economic capital of Cameroon. It has a capacity of about 1000 hospital beds. The neurosurgical department counts 30 beds in total. The Laquintinie hospital is one of the referral university teaching hospitals located in the economic capital of Cameroon. It has a capacity of about 1000 hospital beds. The neurosurgical department counts 30 beds in total.

Inclusion criteria in our study included patients

- Presenting with an obstructive hydrocephalus irrespective of the etiology.
- That had not undergone a prior Endoscopic Third Ventriculostomy
- Where all treated at the Laquintinie Hospital.

Study Population, data collection and processing

Twenty-six patients were recruited in a retrospective study from 2021 and 2022. These patients were either seen in our outpatient consultation or could be seen at the emergency unit. Initial evaluation included a thorough medical history, neurological, ophthalmologic and imaging studies. After thorough assessment, an indication for an ETV was made and the patients were planned for surgery.

1. Endoscopic third ventriculostomy was performed in a standardized fashion⁸. The patient was placed under general anesthesia and positioned supine, brow up. After thorough asepsis, a two centimeters skin incision was done along the axis of the mid pupillary line and immediately in front of the coronal suture (Figure1). Hemostasis attained on the hypodermal layer. A burr hole was done while using enough bon

wax to avoid bleeding from the skull. Using a size 15 surgical blade the dura is incised in a longitudinal manner. A protective endoscope camera cover is used and later on adapted to a 30-degree endoscope. This endoscope will be connected to a light source. The right lateral ventricle was cannulated with a rigid endoscope. Under visual guidance, the endoscope was advanced through the foramen of Monro into the third ventricle. Fenestration of the third ventricle floor was made in front of the mammillary bodies as anteriorly as possible, most commonly using the tip of our endoscope (Figure 2). Duration of surgery lasted at most 30 minutes. The skin was closed with 2-0 silk. At the end of the surgery the patient is placed on lateral position for cerebrospinal fluid tap in order to favor drainage (Figure 3).



Figure 1: skin marking of 3 cm corresponding to skin incision



Figure 2: fenestration of the cistern.



Figure 3 : patient placed an lateral decubitus for lumbar tap to ease flow of cerebrospinal fluid

RESULTS

Twenty-six patients were recruited in our study among which 16 females and 10 males (Figure 4). We noted an

exponential increase in the number of patients recruited from 2021 (6) to 2022 (17)(Figure 5).

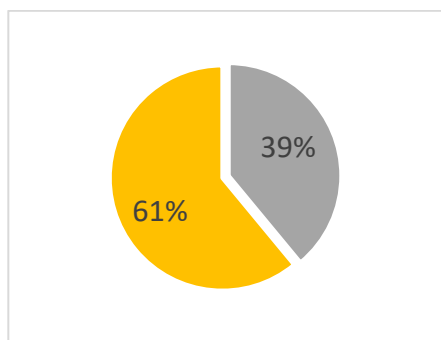


Figure 1: distribution par sexe

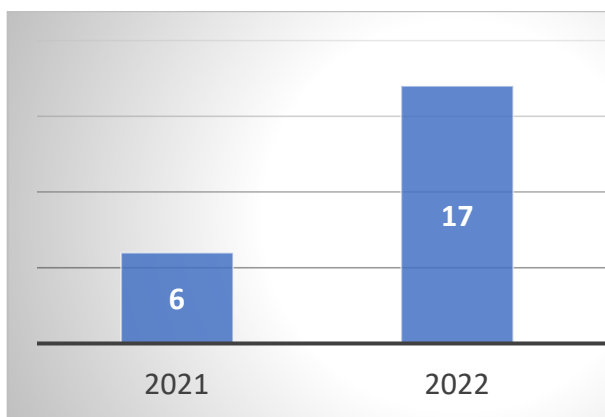


Table 2 : Showing the number of patients by period

The pediatric population was the most representative. The age groups below 11 years contributed over 70 percent in our study population.

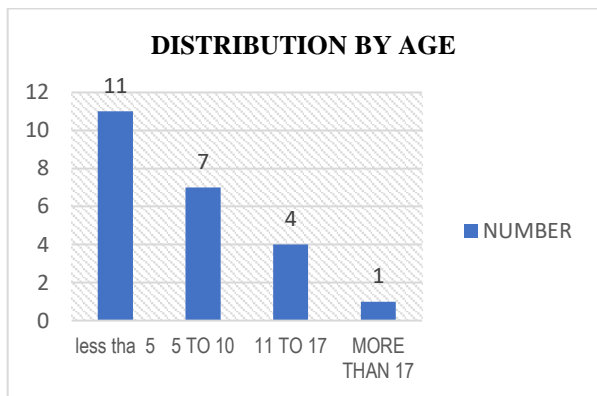


Table 3 : Distribution by age group

The clinical symptoms and signs were distributed with respect to the age of patients. The signs and symptoms are summarized in the table below.

| Between 0 and 2 years | More than 2 years |
|------------------------------|-----------------------|
| Irritability | Headache |
| Increased head circumference | Blurred vision |
| Non depressible fontanel | Nerve IV and VI palsy |
| Dilated collateral vessels | Altered consciousness |

All 2 patients recruited had a head computed tomography (CT) scan. We proceeded in doing eight (8) Magnetic Resonance Imaging (MRI) among the 23 patients recruited. This permitted us to better characterize the radiological images. Some of the CT and MRI images can be seen (Figure 4 and Figure 5).

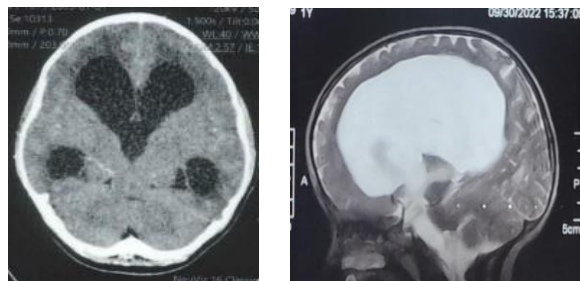


Figure 4: obstructive hydrocephalus with absent density in 4th ventricle. MRI image on T2 weighted image showed a congenital lesion of aqueductal stenosis



Figure 5: hypodense lesion with hydrocephalus. The lesion happened to be a medulloblastoma in the 4th ventricle.

All patients recruited presented with obstructive hydrocephalus. Among the 23 cases we noted 20 congenital forms of obstructive hydrocephalus and the other three were due to cerebral tumors. The forms of tumors are summarized table 2.

| Etiologies | Number |
|-----------------------|--------|
| Congenital | 20 |
| Tumoral | 3 |
| Pineal gland tumor | 1 |
| Medulloblastoma | 1 |
| Pilocytic astrocytoma | 1 |

Among the 23 patients who were operated, we had three ETV failure rendering a percentage of 13 %. All cases of ETV failure were converted into ventriculoperitoneal shunting

The three patients included:

- A 6 months and 8 months year old toddler who presented with a congenital obstructive hydrocephalus. The cause of obstructive hydrocephalus was aqueduct stenosis. Two months after ETV we noted an increase in 3cm of the head circumference as well as psychomotor retardation. The two patients were reoperated after about 3 months through a ventriculoperitoneal shunt.
- A 5 years old boy who presented with a pineal gland tumor resulting in an obstructive hydrocephalus. This patient had an ETV with mild improvement. He was

later on operated through a ventriculoperitoneal shunt.

DISCUSSION

ETV is a recent alternative technique that is practiced in Sub Saharan Africa. A study conducted in 2011 on hydrocephalus⁹ had initiated ETV practice in Cameroon. Our study is a supplementary article and the first to show an experience on ETV in Cameroon. Our study shows a female preponderance. This finding is different from other studies in Sub Saharan Africa in which males were more affected¹⁰. The pediatric population was the most affected this is similar to other Sub-Saharan studies^{11,12}. Our age predilection was found among children of less than 5 years old. Seventy-seven percent (77%) of our study population presented with congenital and malformative etiologies of hydrocephalus. All of the cases were present in the pediatric population. This is also a similar finding found in similar studies^{10,13}. All patients had a computed tomography (CT) scan as standard pre operative imaging. This permitted us to efficiently evaluate ventricular dilation and mesencephalic patency as found in other studies¹³. However, for all tumoral etiologies, a Magnetic Resonance Imaging (MRI) was performed to better plan surgery. It is in this light that the patients who presented tumors had a tumoral resection in addition to ETV. MRI is the preferred imaging in cases of cerebral tumors². Our study had no major complications related to the surgical procedure. We noted failure rate of 13% among 3 patients. Failure in the ETV procedure has been reported in recent studies¹⁴. For all failures we directly switched in ventriculoperitoneal shunts. We believe that further studies should embark on the factors that can influence failures related to ETV:

CONCLUSION

ETV is a modern form in treating obstructive hydrocephalus. It is a less invasive technique and faster method of managing. The selection of patients is of utmost importance in order to avoid failures of ETV. But it should be noted the importance of ventriculoperitoneal shunt.

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