

A Ten-Year Review of Aetiology and Bio-demographic characteristics of Hydrocephalus managed in a Regional Neurosurgical center

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Abstract

Background

Hydrocephalus is a common neurosurgical condition affecting people all ages. The aetiology and clinical profile may varies depending on the age and geographical location. Paucity of data in literature exists on causes and biodemographic characteristics of hydrocephalus in sub-Saharan Africa.

Objectives

To determine the aetiology and bio-demographic characteristics of hydrocephalus seen in our centre

Methods

A retrospective review of all cases of hydrocephalus managed between January 2008 to December 2017 in our centre. Relevant information including aetiological factors and bio-demographics were obtained from hospital records and analysed.

RESULTS

We found a total of 568 patients with hydrocephalus managed over the study period with an average of 56.8 patients per year. There was a male: female ratio of 1.4:1, males making up 58.5% of the total. Age ranged from 5-day old to 78 years. Acquired post-infective causes accounted for the majority of cases (32.2%). While, aqueductal stenosis represents the commonest congenital aetiology (17.9%).

Conclusion

Hydrocephalus remains a common neurosurgical presentation in our environment. It's mostly seen in infant and affects males majorly. Generally, acquired aetiological factors were more common than the congenital.

Key words: Childhood Hydrocephalus, Management, Outcomes

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I. Introduction

Hydrocephalus is an abnormal accumulation of cerebrospinal fluid (CSF) within the ventricles of the brain and /or subarachnoid spaces.^{1,2,3} It result from disturbance of formation, flow or absorption of CSF with myriad of causes which can be congenital or acquired.^{1,4,5} Congenital hydrocephalus tend to be more common than acquired as documented in the literature,^{1,6} even though the incidence of acquired hydrocephalus from neonatal or childhood infection is quite alarming in the sub-Saharan Africa.^{7,8} Despite great strides in diagnosis and treatment, hydrocephalus remains a challenge for the Neurosurgeons.⁹ Treatment include both nonsurgical and surgical, even though surgical is more definitive. Endoscopic third ventriculostomy (ETV) and cerebrospinal fluid (CSF) shunting are the most popular treatment options. The objectives of this study were to review the aetiology and bio-demographic characteristics of hydrocephalus seen in our center.

II. Methods

Retrospective analysis of all cases of hydrocephalus managed between January 2008 to December 2017. Relevant data on aetiology and bio-demographic profile were obtained from patient's medical records. Descriptive analysis was done and results presented in frequency and percentages using charts and tables where appropriate.

III. Results

A total of 568 patients with hydrocephalus were operated on in the period under review giving an average of 56.8 patients per year.

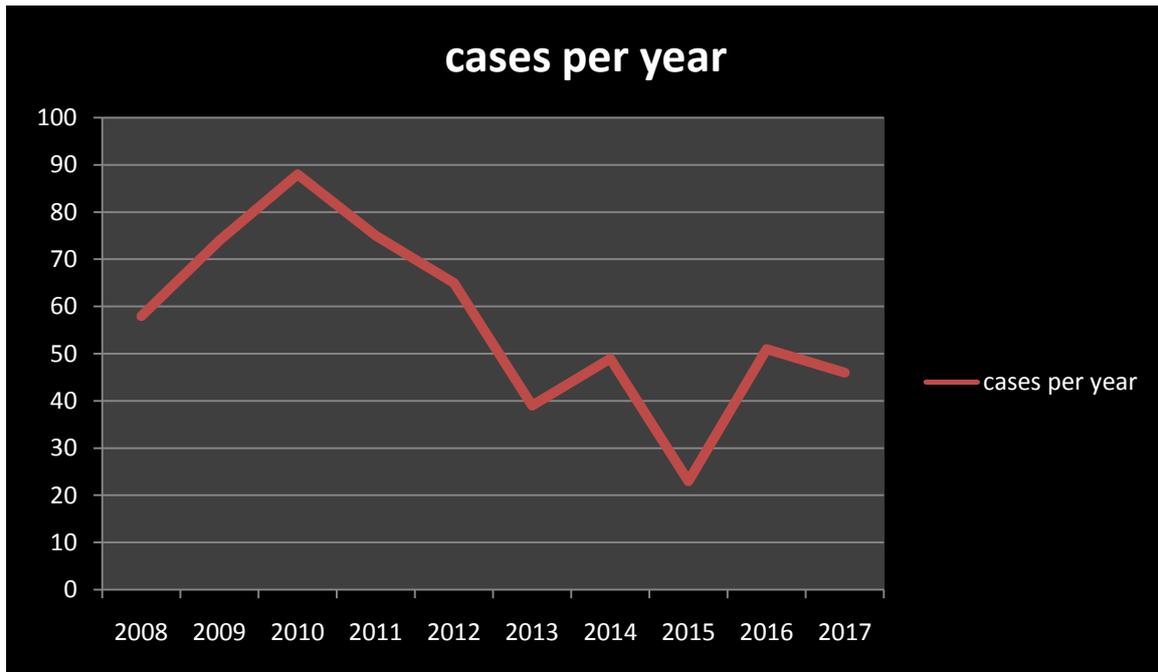


Figure 1: Case per year distribution

There was a male: female ratio of 332: 236, males making up 58.5% of the total.

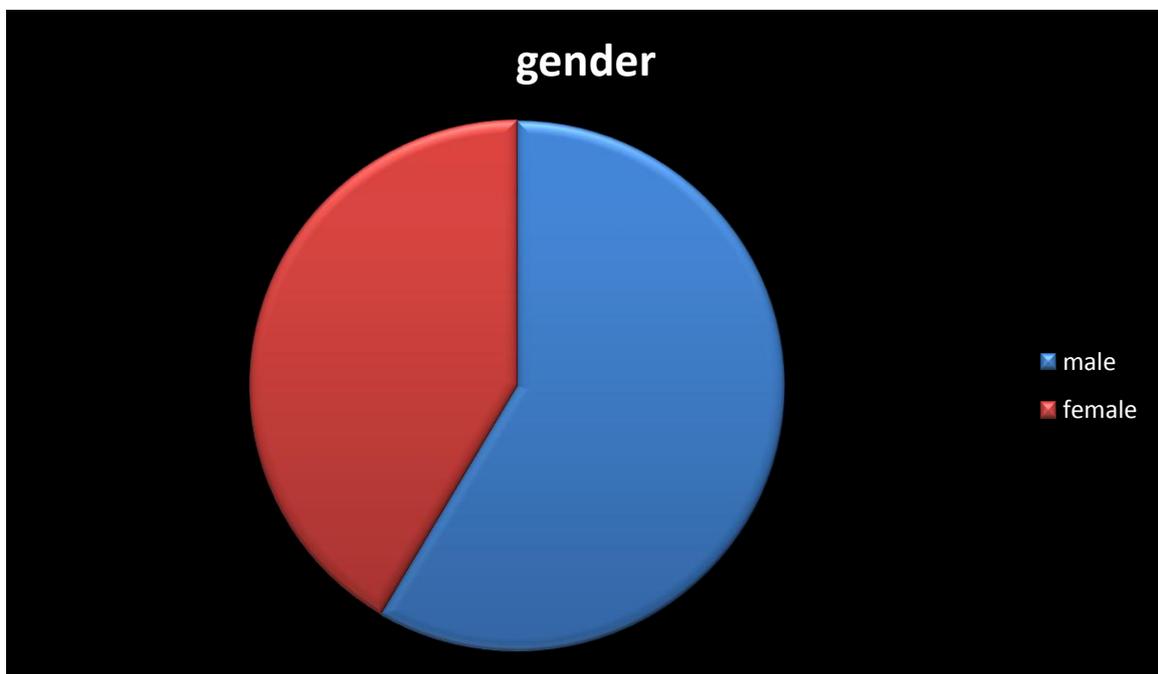


Figure 2: Distribution based on gender

Age ranged from 5-day old to 78 years.

Table 1: Age distribution of cases

AGE	FREQUENCY	CUMMULATIVE FREQUENCY	PERCENTAGE	CUMMULATIVE PERCENTAGE
≤1 month	23	23	4.0	4.0
>1 month – 1 year	356	379	62.7	66.7
>1 year – 5 years	76	455	13.4	80.1
>5 years – 10 years	30	485	5.3	85.4
>10 years – 20 years	19	504	3.3	88.7
>20 years – 40 years	27	531	4.8	93.5
>40 years – 60 years	16	547	2.8	96.3
>60 years	13	560	2.3	98.6

Not specified	8	568	1.4	100
TOTAL	568		100	

A peak is noted in infancy: about 66.7% being managed in the first year of life (figure 3).



Figure 3: An infant with hydrocephalus



Figure 4: CT scan showing Ventriculomegaly with shunt insitu.

Table 2: Distribution based on aetiological factors

AETIOLOGY	FREQUENCY	PERCENTAGE
CONGENITAL:	203	35.7%
Aqueductal stenosis	102	17.9%
Hydrocephalus + myelomeningocele	89	15.7%
Hydrocephalus + encephalocele	6	1.1%
Dandy walker malformation	4	0.7%
Vein of Galen malformation	2	0.4%
ACQUIRED:	282	49.6%
Post-infective	183	32.2%
Tumours	71	12.5%
Normal pressure hydrocephalus	14	2.4%
Post-traumatic	13	2.3%
Post birth trauma	1	0.2%
POST-SURGICAL	18	3.2%
ARRESTED	4	0.7%
NOT SPECIFIED	61	10.7%
TOTAL	568	100%

The post-surgical cases were following excision and repair of myelomeningocele (n=13) and encephalocele (n=5). The question arises if these were congenital ab-initio, but were only revealed after dural closure. Of the 568 patients, 474 had ventriculoperitoneal shunt only (figure 4), while 94 had ventriculoperitoneal shunt plus excision and repair of myelomeningocele (n=88) or encephalocele (n=6). Also, fifty-eight patients had complications requiring operation. These complications include shunt malfunction (n=44), shunt migration (n=8), shunt infection (n=3). The shunt was mispositioned in initial surgery in 3 patients.

IV. Discussion

From our study, a decline in number of cases operated per year was observed from 2013-2017. This could be attributed to reduced number of referral cases as the centre had trained some Neurosurgeons from neighboring state during the study period. Of the 586 patients reviewed, 332(58.5%) were males with a male to ration of (1.4:1). This agrees with male preponderance reported in the literature.^{6,10} However, a study by

Murshid et al in Saudi Arabia reported no statistically significant sex predominance in infantile hydrocephalus.¹¹ Another study by Nakashima et al reported no gender preponderance in infantile hydrocephalus.¹² As reported by previous study majority of cases (66.7%) of hydrocephalus were diagnosed in infants.¹³

Acquired causes (49.6%) were more common than the congenital cases (35.7%) from our study. Among the congenital causes, aneurysm of vein of Galen was the rarest seen in only 2 patients (0.4%). This conforms with the findings of d'Avella and Causin and Feletti et al.^{14,15} Post-infective hydrocephalus was the commonest acquired cause (32.2%) in our study which was equivalent to data reported by other workers.^{7,8} All our patients had ventriculoperitoneal shunt. Four hundred and seventy-four patients (83.5%) had shunt alone, while the remaining (16.5%) had excision and repair of either myelomeningocele or encephalocele along with VP shunt. Other shunting options reported in the literature include ventriculoatrial, ventriculopleural and ventriculocisternal, even though ventriculoperitoneal shunt is the most popular with less complications.^{1,9} Patients with non-communicating hydrocephalus can also benefit from endoscopic third ventriculostomy (ETV) especially in children greater than one month with aqueductal stenosis who have not had shunt previously with less complications compared to ventriculoperitoneal shunt.^{9,17} Out of the 568 patients reviewed, 58 (10.2%) had complications that required surgery. Eight patients had shunt migration while 3 patients had shunt infection. The remaining (44 patients) were actually reported as having shunt malfunction which was not specified. However, our overall complication rate (10.2%) was lower than the rate of 22.6% reported by Merkler et al¹⁷ and 33% reported by other authors.^{18,19}

V. Conclusion

Hydrocephalus is a common neurosurgical condition seen in infants in our environment. There was male predominance and on the overall acquired aetiological factors were more common in comparison with the congenital.

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