ORIGINAL ARTICLE

Hydrocephalus

by

HADI SOEKMA SIREGAR, H. RIDWAN M. DAULAY, LILY EMSYAH and BISTOK SAING

(From the Pediatric Neurology Sub Division of the Child Health Department Medical Faculty University of North Sumatera, Pirngadi Hospital Medan)

Abstract

A retrospective study had been done, to find out the incidence of hydrocephalus during 1984-1985 in the Pediatric Neurology Sub Division of the Child Health Department Medical Faculty University of North Sumatera/Pirngadi Hospital Medan.

The number, age groups, causes and treatment were reviewed. The cases consist of 17 children, 9 males (52,09%) and 8 females (47,01%). Most of the patients 12 (70,58%) were found in the age group of 1 year or less, and the others 5 (29,42%) in the age group of more than 1 year. The youngest was 1 year of age and the oldest 3½ years. Six cases were caused by congenital abnormalities, 1 case by meningitis and in 10 cases the probable cause was unknown. Conservative treatment had been given to all cases.

Introduction

Hydrocephalus is a condition in which enlargement of the ventricular system occurs as a result of an imbalance between production and absorption of cerebrospinal fluid (Cook, 1971). The obstruction of cerebrospinal fluid flow from the foramen Monro up to the villiarachnoid in the subarachnoidal space will increase the volume of cerebrospinal fluid and elevate intra cranial pressure, causing an enlargement of the ventricular system and subarachnoidal space (Edward, 1972).

Received November 7, 1987

Hydrocephalus is almost always caused by some obstruction in the circulation and absorption of cerebrospinal fluid, and rarely caused by the overproduction of cerebrospinal fluid (Cook, 1971). The objective of this study is to find out the incidence, affected age groups, causes and treatment of hydrocephalus in the Pediatric Neurology Sub Division of the Child Health Department, Medical Faculty University of North Sumatera/Pirngadi Hospital, Medan.

Materials and Methods

The study was conducted retrospectively, the period of to the Pediatric Neurology Sub Division of the Child Health Department, Medical Faculty University of North Sumatera, Medan during January 1984 until August 1985. All children admitted with hydrocephalus were included in this study.

The diagnosis was based on the clinical symptoms such as the increase of head circumference more than 2 SD above the P50 (98% tile) according to the standard of Nellhaous, suture widening, cracked pot sign, widely open fontanel, accompanied by the dilatation of the scalp vessels and the presence of the sunset sign.

Cranial X-rays, lumbar puncture, and transillumination were also performed. All patients were handled with medical treatment.

Results

During that period there were 17 cases of hydrocephalus, consisting of 9 males and 8 females, all admitted with the complaint of macrocephaly.

Table 1 : *Number of cases according to the age groups*

Age (month)	Male	Female	Number
0 -	1	1	2
3 -	2	2	4
6 -	3	1	4
9 -	—	2	2
12	3	2	5
Total	9 (52,90%)	8 (47,10%)	17

Table 1 shows that 12 cases (70,58%) were below 1 year, and 5 cases (29,42%) were in the age group of more than 1 year. The youngest cases were 1 day old, consisting of 1 male and 1 female. The oldest cases were 3½ years of age.

Table 2 : *Causes of hydrocephalus*

Age (month)	Congenital		Aquired		Unknown	
	Male	Female	Male	Female	Male	Female
0 -	1	1	—	—	—	—
3 -	1	2	—	—	2	—
6 -	—	—	—	—	3	1
9 -	—	—	—	—	—	2
12	1	—	—	1	2	—
Total	3	3	—	1	7	3
	(35,29%)		(5,88%)		(58,82%)	

Congenital hydrocephalus occurred in 6 cases (35,29%), one of these had also by meningomyelocele. Acquired hydrocephalus was found in 1 case only caused by serous meningitis. Most of the cases (58,82%) were of unknown origin (table 2).

Cranial X-rays were made in 5 cases, showing wide sutures and thin cranium. Ventriculography was not performed as it was unavailable yet in the Dr. Pirngadi Hospital, Medan. Lumbar puncture revealed an increased intracranial pressures, ranging from 215 to 650 mmH20, in 7 cases the pressures was not measured. Abnormal cerebrospinal fluid was found in 1 case with meningitis. The result of transillumination was positive in 8 cases, whereas in 9 cases they were negative. The treatment with acetazolamide (Diamox) were administered in the dose of 75 mg/kg, and furosemide 1 mg/kg. They seemed to be successful in some cases although in most of the cases there was no benefit of the medical treatment. No cases underwent surgical treatment.

Discussion

This study included 17 cases of hydrocephalus, 9 males and 8 females. None of these cases revealed a family history of the same disease. Edward et al. in 1972, reported sex-linked hydrocephalus in 4 families among 15 male sufferers. Predominantly twelve case (70,58%) were found in the age group of under 1 year. Five cases (29,42%) were in the age group of more than 1 year. Table 2 shows that 6 cases (35,29%) had congenital hydrocephalus out of which 1 case was accompanied by meningomyelocele.

Suryono, 1983 in Gajah Mada University Hospital found 16 out of 76 (21%) cases of congenital anomalies to be hydrocephalus. Lubis (1983) from Medan during 1978 - 1980, found 1 case of hydrocephalus

in 48 congenital abnormalities. Vaughan (1981); Simatupang (1977) from Medan found the incidence to be 0.8/1000 birth. Most of the patients (10 cases or 58,82%), appeared with unknown causes. According to Gabriel (1975) hydrocephalus in neonates up to 2 years of age is primarily caused by embryogenic disorders. Eighty percent of all types of hydrocephalus are usually caused by Arnold Chiari malformations with or without spina bifida, and the remaining are caused by intrauterine infections, neonatal hemorrhage and neonatal meningoencephalitis. It could be that in this study the case with unknown cause was congenital hydrocephalus. Nevertheless, further investigations should be done to find out the specific cause.

Medical treatment had been administered, but operation should also be considered especially in progressive hydrocephalus and in cases showing no improvement with medical treatment.

Conclusions

(1) Most of the patients with hydrocephalus (70,58%) were found in the age group of under 1 year. (2) Congenital hydrocephalus was found in 6 cases (35,29%) and one of these was accompanied by meningomyelocele. (3) Hydrocephalus with unknown cause was found in 10 cases (58,82%), and should therefore further be reviewed. (4) Operative treatment should be considered in cases with unsuccessful medical treatment.

REFERENCES

1. COOK, R.C.M.: Spina bifida and hydrocephalus; Br. med. J. 25 Dec. 796–799 (1971).
2. EDWARD, J.H.: The syndrome of sex linked hydrocephalus, Archs Dis Childh 36, 486 cited from Wong, H.: Hydrocephalus, in Bulletin from Department of Pediatrics, Faculty on Medicine University of Singapore Nov. 25, (1972).
3. GABRIEL, R.S.: Malformation of the central nervous system ; in Menkes John H, Textbook of Child Neurology; ed., p. 146–168 (Lea and Febiger, Philadelphia 1975).
4. IRWAN; SURYONO, A.; IMAN, S.; ISMANGOEN: The incidence of congenital malformation in the Gajah Mada University Hospital Yogyakarta during 1974 - 1979 Paediatr. Indones. 23 : 25–31 (1983).
5. LUBIS, A.; SARAGIH, M.; PURBA, M.D.; NOERSIDA RAID; SIREGAR, H.: The incidence of congenital malformation in Dr. Pirngadi Hospital Medan Paediatr. Indones. 23 : 138–144 (1983).
6. SIMATUPANG, J.; NOERSIDA RAID; BISTOK SAING; SIREGAR, H.: The incidence of congenital malformation in the General Hospital (RSUPP) Medan 1970 – 1975 Paediatr. Indones. 17 : 223–228 (1977).
7. VAUGHAN, V.C.; MC. KAY, R.J.; BEHRMAN, R.E.: Hydrocephalus; in Nelson Textbook of Pediatrics; 11th Ed., p. 1754–1757 (Asian Edition third printing 1981).