Article *NIMHANS Journal*

The Outcome of Shunt Surgery in Cogenital Hydrocephalic children

Volume: 03 Issue: 01 January 1985 Page: 69-71

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Abstract

One hundred and eight congenital hydrocephalic children were evaluated by psychometric examination before and after operation. At the end of 2 years of operation 65 per cent of children had an I.Q. of over 70. Even though our results of surgery are not as encouraging as those from western countries, they are getting better with more children being operated early in recent years.

Key words -
Psychometric evaluation,
Congenital hydrocephalus

The reports of results of surgical treatment of hydrocephalic children from developing countries have not been encouraging due to delay in referral, poor follow up, ignorance and general reluctance to permit repeated operations if they become necessary to these children. So, a study was undertaken by us to verify this aspect.

Material and Methods

One hundred and ninety three cases of hydrocephalus of diverse etiology were operated upon by us during the 1972-75, one hundred and eight of these were congenital hydrocephalus cases and 30 of this group had associated myelomeningocoele or encephalocele.

The follow up was possible in 82 per cent of cases of congenital hydrocephalus. The total mortality in this series of 108 cases till early 1976 was 9. One died in the immediate post-operative period due to seizures and rest succumbed to infection or malfunctioning of the shunt later. Twenty four cases needed revision of the shunt.

All congenital hydrocephalic children were evaluated by psychometric examination before operation. 1-2 weeks after operation and at 3-monthly intervals after operation. An attempt was made to study various developmental parameters such as motor co-ordination, speech, perceptual ability and comprehension. Some of these children with large head and weakness of the lower limbs showed delayed motor development although there was improvement in other areas. Hence, while considering the intellectual development, motor aspects is not given importance. For this purpose following tests were used :

(1) Gesell developmental schedule - a test which measures motor, language, adaptation and social development from birth till 3 years of age.

(2) Canadian intelligence examination which measures six faculties, such as motor development, language, reasoning, memory, arithmetic and general information from the age of 2 years.
(3) Motor tests, such as two form-board, Seguin form-board and colour bits and dolls to test the colour and body concepts.

The difficulty in testing few infants in post-operative period was compensated by parent's co-operation.

Results

As for the results, out of 99 living hydrocephalic children 82 could be followed up. The results of 43 cases which were followed up for more than 2 years are now presented. The age of these children at the time of operation ranged from 2 months to 1 ½ year and their mean age at the time of operation which was 8 ½ months in the beginning came down to about 3 ½ months in later cases.

The average I.Q. was 63 before surgery and 72.3 after surgery. The lowest I.Q. in operated cases was 38 and highest was 117. The analysis of results reveal that 60 per cent of cases showed remarkable improvement.

Table I - Quantitative evaluation of improvement

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Their I.Q. improved by 10-15 points. In 28 per cent of cases the improvement was between 5-9 points and 12 per cent did not show any significant gain in terms of I.Q. They showed only qualitative improvement, such as speaking monosyllables, recognising parents, etc. If the initial I.Q. is lower, the range of improvement was observed whereas in the cases with high initial I.Q. the range of improvement was lower. Moreover, the children operated earlier showed better improvement after surgery.

The results were further analysed. I.Q. of children before surgery and 2 years after surgery and these are grouped into four.

Table II - Comparison of I.Q. of children before and at the end of 2 years after operation

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(1) First group has an I.Q. of 91-110 and are considered as average or normal. Some in this group had I.Q. of over 110.
(2) Second group has I.Q. of 71-90 and these are educable but are slightly retarded children. They can attain secondary education level by intensive coaching.
(3) Third group has I.Q. of 51-70 and these are trainable for an occupation in special schools.
(4) The last group has less than 50 I.Q. and are institutional type. These are grossly retarded children and need help even for their personal needs. The results of immediate postoperative period are not much different from the pre-operative level except for one child who jumped from 3rd to the 2nd group. At the end of 2 years 10 out of the 43 children, i.e., 23 per cent had normal I.Q.s and other 18 children had an I.Q. of over 70.

Discussion

In our series, 65 per cent of children have an I.Q. of over 70 at the end of 2 years after surgery.

Even though our results of shunt surgery in cases of congenital hydrocephalus are not as favourable as those reported from western countries, [1], [2] they are not as discouraging as made out by authors from developing countries like Seligson and Levy from Rhodesia [3]. These authors reported that there was no statistically significant benefit from surgery in hydrocephalic children. Even though our series are small and follow up is not long enough, the results are getting better with more children being operated upon early and prompt revision of shunts undertaken whenever they malfunction.

We have continued the study of psychometric evaluation of these children who were operated upon by me in the early 1970s. Long term follow up of those children has not been encouraging. Some of these children have not turned up for regular follow up either because they have been well or because some of them died due to shunt malfunction before they could go to the nearest neurosurgical centre. Periodic non-availability of shunts also has aggravated the situation. We were forced to do adhoc operations which only have increased the morbidity and mortality in some cases. However, there has been further marginal improvement in I.Q's of the children who have survived for many years. But there is no reason why results of shunt surgery should not be as good in our country as in the West.

Some authors have expressed doubts about validity of psychometric tests performed in infancy and early childhood, since there is no tangible correlation between Pre-school test scores and later I.Q. tests because of wide standard deviation and variability in the case of I.Q.'s measured by different tests. But recent studies by many authors including Fishman and Palkes [4], have proved the validity and usefulness of these tests in children with congenital malformation of the nervous system. Their serial psychometric testing like our own from infancy to the age of five years or more has shown that the score of these children at 18 months has high coefficient correlation with later intellectual attainments. Hence psychometric testing performed in infancy appears to have predictive value for later intelligence evaluation and should be used in planning surgery, especially in infants who are referred late to us. The psychometric testing partially answers whether a particular child should be operated upon or not.

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