

Therapy and Prognosis of Subdural Collections

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Subdural collections have been a point of interest since the beginning of this century. Extensive investigations have been made on the pathogenesis and therapy in children. In 1954, Ingraham and Matson reviewed 95 children with subdural hematoma and concluded that early diagnosis and treatment are important factors for saving the patient's life and decreasing the cerebral sequelae⁸. Since then several authors have contributed more knowledge on the pathogenesis and treatment.^{1 2 3 4 5 6 7 8} There are still several unsolved problems about this matter to which neither pediatricians nor neurosurgeons can offer solutions:

1. What are the principal factors causing subdural collections in infancy and early childhood? 2. What is the most effective type of treatment? 3. How is the prognosis and which treatment is more effective on the prognosis? 4. Does the etiology alter the prognosis?

The purpose of this study is to investigate these problems in the Turkish population, bringing out some unknown facts and making correlations with the etiology, type of treatment and prognosis.

Materials and Methods

Probands were chosen among the inpatient and outpatient population of Hacettepe Children's Hospital. These patients were diagnosed as having subdural collections primarily by clinical examination and then this diagnosis was confirmed by subdural taps, cerebral angiography, pneumoencephalography and electroencephalography. Brain scanning was used in some cases. 65 cases were included in this study which was carried out between October 1st, 1967 and July 1st, 1972.

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Probands were classified as follows Furthermore, all the groups were divided into two subgroups according to prognosis:

1. Etiological classification:
 - a) Trauma.
 - b) Infection of CNS and elsewhere.
 - c) Other causes.
2. Classification according to the age group: Between 0-2 months, 3-6 months, 7-12 months, 13-18 months and over 18 months. The cases were then taken up as two larger groups; under and over one year of age.
3. Classifications according to the severity of symptoms at admission:
 - a) Mild cases: Patients with fever and vomiting.
 - b) Moderately severe cases: Patients with fever, vomiting and convulsions.
 - c) Severe cases: Patients with fever, vomiting, convulsions and other neurological signs.
4. Classifications according to the duration between the onset of symptoms and diagnosis:
 - a) Cases diagnosed before ten days.
 - b) Cases diagnosed after ten days.
5. Improved cases were classified according to the neurological deficits:
 - a) Cases without any neurological deficits.
 - b) Cases with neurological deficits of various degrees.
 - c) Recurrent cases.
 - d) Deaths.
6. All the cases underwent several subdural taps. All specimens were examined for pressure, protein level, cell count and glucose content. Subdural liquids which were xanthochromic and had a protein level of more than 60mg/100 were regarded as subdural collections and additional.

Since erythrocyte count was not made, it was impossible to identify these as hematomas or effusions. They were considered as collections.

When treatment was performed only by subdural taps, the case was considered to be treated medically. If burr-holes or craniectomy were included in the treatment, this was considered a surgical treatment; χ^2 method was used for statistical analysis.

Findings

1. When the cases were classified according to the etiology, it was seen that there were 15 post-traumatic and 50 post-infectious cases. (See Table I). Medically and surgically treated cases showed a fairly equal distribution in the post-infectious group. On the other hand, cases with the history of trauma were treated more often by surgical methods: 73 %. In the same group medically treated cases showed an improvement at a rate of 75 % whereas surgically treated cases had an improvement rate of about 81 %. In the post-infectious group the good prognosis was 83.3 % with the medically treated cases whereas only 57.6 % with the surgically treated ones. In the total group the rate of good prognosis was 72.3 %; 80 % in the cases with trauma and 70 % in the post-infectious cases.

TABLE I
ETIOLOGICAL CLASSIFICATION IN SUBDURAL COLLECTIONS

	Trauma		Post-infectious		Total
	Number of cases	Good prognosis	Number of cases	Good Prognosis	
Medical Treatment	4	3 (75 %)	24	20 (83.3 %)	28(79.10) /0
Surgical Treatment	11	9 (81 %)	26	15 (57.6 %)	37(69. %)
Total	15	12 (80 %)	50	35 (70 %)	65(72.3 %)

2. When the cases were classified according to the age group, there were 52 cases under one year of age and only 13 cases over one year. In the group under one year of age 26 cases were medically treated and 19 showed good prognosis (73 %). Of 26 surgically treated cases in the same age group, good prognosis was seen in 19 (73 %). Whereas in the group over one year of age, 2 medically treated cases were improved without deficit (100 %) and out of the surgically treated 11 cases, 6 showed good prognosis (54.5 %). None of these results were found statistically significant (Table II).

TABLE II
CLASSIFICATION OF SUBDURAL COLLECTIONS ACCORDING TO AGE

	0-2 mos.	3-6 m.	7-12 m	13-18 m.	18-30 m.
Medically treated	6	11	9	1	1
28	Good prognosis	19/26	(73 %)	Good prognosis	2/2 (100 %)
Surgically treated	3	8	15	4	7
37	Good prognosis	19/26	(73 %)	Good prognosis	6/11(54.5%)
Total	9	19	24	5	8
65	Good prognosis	38/52	(73 %)	Good prognosis	8/13(61 %)

3. When the cases were classified according to the severity of symptoms, medically and surgically treated cases showed a fairly equal rate of improvement. In the mild cases: 69.2 % and 66.6. % (See Table III). On the other hand, the rate of improvement was higher in moderately severe cases treated by surgical methods: 71.4 %. All the severe cases were treated by surgery but the improvement rate was 50 %. In the total group the rate of good prognosis was 67.8 %. In the moderately severe group it was 63.5 % and in the severe cases 50 %. The results were not found statistically significant.

TABLE III
CLASSIFICATION OF SUBDURAL COLLECTIONS ACCORDING TO THE SEVERITY OF LESIONS

	Mild			Moderately		Severe	Severe		
	Number of cases	Good Prognosis	%	No.	Good Prognosis	%	Number of cases	Good Prognosis	%
Medically Treated	13	9	69.2	15	9	60	0	0	0
Surgically Treated	15	10	66.6	14	10	71.4	8	4	50
Total	28	19	67.8	29	19	63.5	8	4	50

4. When the cases were classified according to the duration of symptoms, it was seen that cases diagnosed in the first ten days had good prognosis at a rate of 80 %. When they were treated medically and only 64.7 % when surgical methods were used. On the other hand, cases diagnosed 10 days after the onset of symptoms showed an equal rate of improvement when treated medically and surgically (See Table IV).

TABLE IV
CLASSIFICATION OF SUBDURAL COLLECTIONS ACCORDING TO EARLY DIAGNOSIS AND TREATMENT

	Before	10 days	%	Number of cases	After 10 days	%
	Number of cases	Good Prognosis			Good Prognosis	
Medically treated	15	12	80 %	13	9	69.7
Surgically treated	17	11	64.7	20	14	70
Total	32	23	71.8	33	23	69.6

5. Table V summarizes the above findings. Here we see only 28 cases treated medically, 75 % of which improved with no neurological deficits and 25 % with some kind of deficit, recurrence or death. Generally no difference was found statistically between medically and surgically treated cases as far as prognosis was concerned.

TABLE V
REVIEW OF TOTAL CASES

	Improvement		Recurrence	Death
	Without deficit	With deficit		
Medically treated	28	21 (75 %)	3	1
Surgically treated	37	26 (70.2 %)	—	4
Total	65	47 (72.3 %)	1	7

Discussion

Table V shows that although most of the cases with trauma were treated surgically, there was no difference between those and the medically treated trauma cases; they both showed the same rate of improvement. On the other hand, post-infectious cases were better improved with medical treatment. Generally good prognosis was less in the post-infectious group than in the trauma group. This result can be related to the lower resistance of the patient and the prolonged pathological condition of the brain.

The study shows that age did not affect the prognosis. The fact that the cases over one year of age were mostly treated surgically shows that this group must be more prone to trauma with severe lesions. The rate of good prognosis under one year of age was 73 % whereas it was 61 % in the older group. These rates support the above probabilities.

A fairly equal rate of improvement was seen in the moderately severe cases. This shows that surgical methods are not necessarily a choice for the treatment of mild and moderately severe cases, and they are effective only at a rate of 50 % among the severe cases.

In our group surgical treatment was effective in late diagnosed cases where medical treatment was found to give better results among early diagnosed cases.

A comparison of our findings with those of others is seen in Table VI.

TABLE VI

	Deaths %	Normal %	With deficit %
Herzberger	9	77	23
Schulman	13	72	28
Yashon	23	77	23
Rabe	15	64	36
McLamin	0	73	27
Ingraham and Matson	9	77	23
Renda	7	47	11 (includes recurrences)

Conclusion

The prognosis of children with subdural collections is not directly related to the duration of pathology, the early admission, age, the severity of the lesion or etiology, the better prognosis seen in the medically treated post-infectious cases leads us to believe in a more conservative approach for these cases. We can conclude that surgical treatment is necessary in these cases only when they develop increased intracranial pressure and its signs.

A prospective study has not yet been made in this field. All the previous works are retrospective in which some cases were followed for a long period of time.^{1 2} Some of the cases studied were treated only medically and did not show a lower level intelligence or more neurological deficit than in the surgically treated cases. Rabe and his friends suggested that the poor prognosis is related to none of the factors reviewed in this study but to the previous disposition of the brain and organism.³ Our results are more in favor of Rabe's.

Summary

65 cases with subdural collections were studied regarding etiology, type of treatment and prognosis. Those treated medically were compared with surgically treated cases and better prognosis was seen in the medically treated post-infectious cases. Surgical treatment was found necessary only in cases which developed intracranial pressure.

REFERENCES

1. Yashon, D., Jane, J. A., White, R. J., Sugar, O: Traumatic subdural hematoma of infancy, Arch. Neurol. 18: 370, 1968.
2. Mc Laurin, R. L., Isaacs, E., Lewis, H. P.: Results of nonoperative treatment in 15 cases of infantile subdural hematoma, J. Neurosurg. 34: 753, 1971.

3. Rabe, E. F., Flynn, R. E., Dodge, P. R.: Subdural collections of fluid in infants and children, *Neurology* 18: 559, 1968.
4. Meacham, W. F., McPherson, W. E., The diagnosis and treatment of subdural fluid collection in infants, *Ped. Clinics of N. Amer.* 17: 19, 3363,
5. Moyes, P. D.: Subdural effusions in infants, *The Canad. Med. Ass. J.* 100: 231, 1969.
6. Till, K.: Subdural hematoma and effusion in infancy, *Brit. Med. J.* 3: 400, 1968.
7. Cort, M.: Subdural Effusions: An Iatrogenic Complication of Bacterial Meningitis, *Pediatrics* 46: 316, 1970.
8. Ingraham, F. D., Matson, D. D.: Posterior Fossa Tumors. *Neurosurgery of infancy and childhood*, Springfield, Charles C. Thomas Co., 1954, p. 225.