

The advantage of this technique compared with the ordinary ventriculo-auricular shunt seemed to be 1) lesser displacement of tip of venous tube by neck movement or by growth of the body 2) no need of special check on heart during operation.

All 5 subjected patient under this technique had communicating hydrocephalus with high intracranial pressure. Postoperatively, these patients showed continuous effect of the shunting system and showed clinical improvement, i.e., lessened convulsion, spasticity in extremity, intracranial pressure, headache or better mental state, activeness and improved E.E.G. findings .

Complications such as mechanical failure, thrombosis or septicemia were not encountered in the series.

22. Experimental Studies on Blood in Subarachnoid Space

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A genesis of hydrocephalus following subarachnoid hemorrhages was experimentally studied. Autogenous whole blood, suspension of red blood cells, plasma and hemolysed red blood cells were injected repeatedly in the cisterna magna of adult rabbits. Volumes or amounts injected were 1.3-2.0 cc. of whole blood, suspension of red blood cells washed from 1.5-2.0 cc. of whole blood, 0.8-1.7 cc. of plasma, and hemolysed red blood cells aquired from 1.0-1.5 cc. of whole blood (washed in saline and hemolysed in distilled water). Intervals of injections were mostly 7-8 days but up to 21 days in some rabbits. Sacrifice and autopsy were done 7-20 days after the last injections. Dilatation of the cerebral ventricles was recognized with high incidence (7/9) only in the group of rabbit which received more than 3 times of injections of whole blood and not in ones of other groups. Hydrocephalus was of communicating type accompaigned with widening of the aqueduct. Ferric iron reaction revealed hemosiderin-deposits in fibrosed or organized leptomeninges and in subpial layers of the basal cortex of the rabbits injected with whole blood or suspension of red blood cells. It is postulated that there must be clot formation and its organization in subarachnoid space which in turn requires fibroblastic reactions of the leptomeninges induced by irritant actions of some blood components. Intracisternally injected hemolysed red blood cells had peculiar effect; generalized convulsive seizures with opisthotonus and tonic extensions of all extremities were observed at or some seconds after the injection. These convulsive seizures often resulted in acute death or extreme emaciation of the animals. In this respect, it seems very important whether

any portion of red blood cells in subarachnoid space can be eliminated in intact state without hemolysis.

Using autogenous red blood cells tagged with radioactive chrome, $\text{Na}_2^{51}\text{CrO}_2$, absorption rate of intact labelled-RBC was studied. About 1.0 ml of saline suspensions of labelled-RBC ($4-5 \times 10^5$ cps.) was injected in the cisterna magna of adult rabbits and radioactivities in peripheral blood were counted every 24 hours for 6 days, and calculated in per cent of total injected dose. Results were as follows in normal adult rabbits (mean values of 10 experiments):

Days	1	2	3	4	5	6
%	11.8	16.3	16.6	16.2	15.7	15.6
s	6.1	8.3	8.9	8.2	7.2	7.1

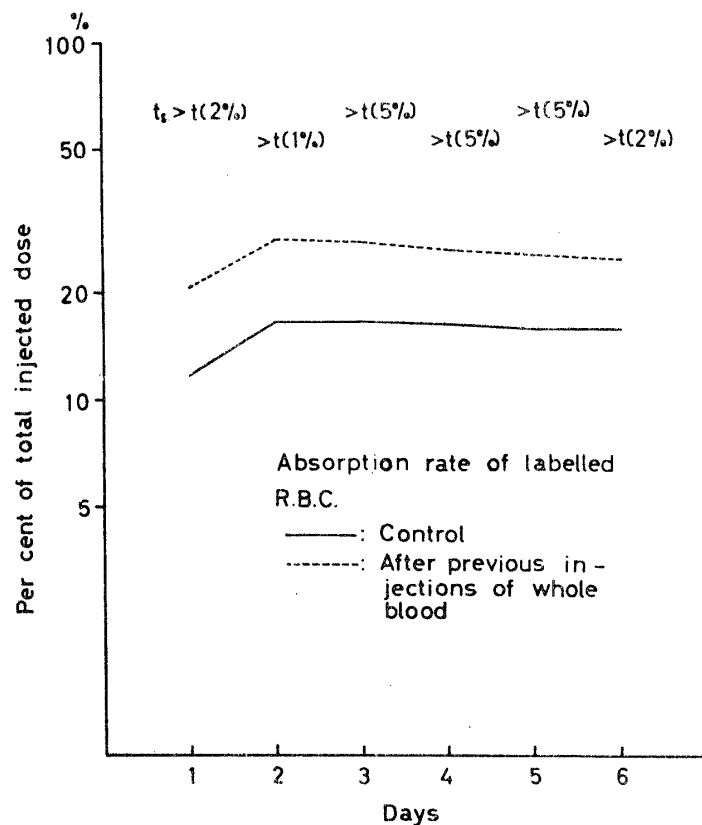


Fig. 1.

Absorption rate of labelled-RBC 4-7 days after 2-3 times of previous injections of whole blood (1.5 cc. in each time) was also measured, which showed statistically significant elevations compared with figures of untreated controls:

The mechanisms by which intact RBC are eliminated from subarachnoid space and paradoxical enhancement of it after previous injections of blood in the cisterna magna are still to be studied.

Days	1	2	3	4	5	6
%	20.5	27.9	27.2	25.8	25.0	24.5
s	6.4	5.6	6.6	6.2	6.5	5.5
s_s	>t(2%)	>t(1%)	>t(5%)	>t(5%)	>t(5%)	>t(2%)

Radioactivities in blood streams were minimal, when labelled-RBC were injected into epidural tissues or, when hemolysed labelled-RBC into the cisterna magna.

23. Cerebral Angiography in Mentally Retarded Children and Some Trials of Neurosurgical Procedure for These Patients

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Cerebral angiographic examination was performed in a systematic manner on 108 cases of the mentally retarded children.

The extracranial portion of the internal carotid of most of mentally retarded children was longer than that of healthy ones. The carotid siphon showed the open type especially in the severely retarded cases. The media angle in most cases was longer than that of healthy ones. In 40% of the mentally retarded children the various pathological changes were observed on the carotid angiograms.

a) The abnormalities of the internal carotid arteries were observed as follows; Seven cases of sharp kink or tortuosity, 2 cases of localized narrowing and 2 cases of the irregularity of the wall of internal carotid artery were seen.

b) Many abnormalities of the intracranial main arteries were also found in the retarded children.

Four cases showed occlusion or stenosis of the anterior or middle cerebral arteries.

In 5 cases the main cerebral arteries were abnormally distensible. In 4 cases the course of the anterior cerebral artery showed the type of smooth winding arch resembling the running of the artery in the later stage in the fetal stage.

In 8 cases the straight deviations of the anterior cerebral arteries indicating the cerebral hemisphere were observed.

In 4 cases the abnormal runnings of the large arch of the anterior cerebral arteries were seen.