

A CONTROLLED STUDY OF CERVICAL BLOCK IN HEMIPLEGIA

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The controversy on the effect of cervical ganglion block has increased, and has become more confused as more workers have entered the field.

Starting with the observation of Fontaine and Leriche (1934) when they thought that a stellate block could be beneficial to hemiplegics by producing an increase in the circulation intracranially. Subsequent workers seem to fall into two categories, one asserting its value on the basis of clinical observation, and the other denying its effect, on the ground of experimental studies. Kety and Schmidt (1948) found that the estimation of cerebral blood flow by the nitrous oxide method showed no appreciable change before and after block in a series of cases, most of which were hypertensive. Naffziger (1950) was unable to detect any change in the electroencephalogram. On the other hand, de Takats (1936, 1954) asserted the value of the technique on the actual improvement observed, which he stated was immediate and could be spectacular. Naffziger (1950) Pereira (1945) and many others, too, reported similar experiences. It must be remembered that, whilst rationalised therapy is the aim of medicine, a good deal, if not all of established therapy, is attributable to experience by the bedside rather than to systematised reasoning. It should be apparent that any line of therapy must be assessed on the basis of its value clinically, and any physiochemical justification must form a subsidiary basis, for the sake of gaining a greater understanding of the mechanism, rather than a speculation of its usefulness through pure reasoning. In the present stage of knowledge, one may have to be contented with accepting the clinical observation that stellate block is of value, and the easier approach should be to conduct the study with appropriate controls, so that an adequate assessment of its real or apparent value in hemiplegics can be made, eliminating all personal factors, and avoidable sources of errors of observation.

It has been appreciated from the beginning that there can be many sources of error in the estimation of the effect of stellate block. Firstly, the assessment depends entirely on the co-operation of a patient, who can be partially impaired in his mental faculties, and, as such, may not co-operate at all or, worst of all, may

co-operate by fits and starts according to the whims that overtake him, giving rise to a mistaken conclusion of improvement or deterioration. Secondly, the assessment of improvement, particularly in the way of powers of movement, is based on gradations which are not exacting nor totally objective, and, as such, variation in the judgement of powers of movement is common; and by adopting a different mannerism in testing, even by the same observer to the same patient, such variations can be obtained. Thirdly, the psychological readiness of a hopeless case to seize on any straw of hope frequently leads to unjustified claims of improvement, felt subjectively only, due to psychological reasons. Fourthly, the nature of the movement of hemiplegics is such that it is frequently a movement en masse, involving several joints together, and the movement in one joint may cause passive movement in another. This may lead to a false impression of movement in any one joint.

In 1957, a clinical assessment was carried out with these possible sources of errors in mind, (Gwee 1957) and the procedure adopted was briefly as follows:—

1. Choice of patient—confined to hemiplegics who had total paralysis of the limbs at the end of 10 days. This rather arbitrary time limit was imposed, because it was found that a good number of hemiplegics recovered movement quite spontaneously, and, sometimes spectacularly within the first week. Moreover, it would be easier to see the improvement if one began with a totally immobile limb, although this must necessarily reduce the number of possible cases for study, and also the chance of improvement if any.
2. Fixity of technique—a standard approach was used to every patient ensuring these points:—

The patient was urged to move the limbs in a simple command which was used before and after injection, with no variations in words or emphasis. This is to cut down the effect of undue persuasion. The purpose of the block is not indicated to the patient until he has had all the blocks he required for the same reason. The assessment is done by one same observer throughout.

3. Graded assessment of objective gains:— The improvement a patient may get can be of several types—such as improved consciousness, better power of speech, greater powers of movement and increased tone. Although observation was made as a rule of all these items, it was thought that only the ability to move offered a sufficient measurable quality to be of objective value. The grading according to poliomyelitis muscle charting was adopted as follows:—

- 0 = No movement.
- 1 = A flicker of contraction.
- 2 = Power not enough to overcome gravity.
- 3 = Power just able to overcome gravity.
- 4 = Power to overcome gravity and some resistance.
- 5 = Full power.

From that study, the impression gained was that the improvement following stellate block was definite, and in many cases immediate. What is more surprising is the fact that the change is observable even 10 days after the onset, which seems to suggest that the motor deficit is not due entirely to an irreversible infarct of the brain, but that there may be the possibility of reversible changes, such as the super-imposition in an area of infarct of surrounding oedema of brain tissue or spasm of cerebral vessels, which may be amenable to treatment.

The present series is a continuation of the above project for the assessment of the value of stellate block, and is conducted with the object of assessing its value with controls. The cases of hemiparesis or hemiplegia were divided serially at random into 3 categories according to the time of admission as follows:—

Group I:— The patient was seen, and the assessment of motor loss made and recorded. Treatment was given either as oral tablets or injection of vitamin preparations, and examination was made again to see if there was any immediate change within 10 minutes. The command to execute any motor movement was standardised, so that it is the same in content and frequency before and after the treatment. The result was recorded as nil, moderate, or good.

When the improvement was perceptible but not up to 2, such as from 0 to 1 or 1 to 2, then it was recorded as moderate. When it was 2 or more, such as 0 to 2 or 2 to 4, then it was recorded as good. Nil meant no perceptible improvement.

Then the case was seen daily, and the motor deficit was estimated daily until discharged. At discharge, he would be recorded as ambulant, bedridden, or dead. If he was able to walk by himself without manual support by a second person, then he was regarded as ambulant, otherwise he would be classed as bedridden.

Group II:— Every second case that came in would fall into this group. The same procedure was adopted apart from the fact that instead of the oral administration or injection of vitamins, a cervical block on the contra-lateral side would be made.

Group III:— Every third case admitted would be in this category. Instead of the cervical block, he would be given an intravenous transfusion of papaverine 50 to 150 mgm. depending on his tolerance. A drip of 150 c.c. of dextrose saline containing 150 mgm. of papaverine hydrochloride was given intravenously as rapidly as possible and stopped or slowed only when a patient complained of discomfort. The assessment of motor deficit and improvement was done likewise before and after the drip, which generally took about 5 minutes.

All groups would have treatment for their co-existing complaints such as hypertension, syphilis or hypostatic pneumonia, and all would have the same nursing care, and physiotherapy. In addition, group 2 cases were given stellate block, and group 3 intravenous papaverine which had been regarded as an efficient vasodilator when injected intravenously.

Only a single observer carried out the whole study to ensure that psychological effect and personal factor such as persuasion and suggestion would not influence the judgement and the willingness of the patient to co-operate. No attempt was made to compare improvement in speech, consciousness and subjective well-being, as it was thought that an accurate objective assessment could not be made in such instances.

Results:

A total of 70 cases of hemiplegics due to cerebral thrombosis was involved, and divided according to the time of admission, at random, serially, to fall into 3 groups, so that the first case would be in the control group, the second given ganglion block and the third given intravenous papaverine. In one of the cases, owing to a misunderstanding, ganglion block was done instead of injection of papaverine, resulting in 24 cases in group I, 24 cases in group II, and 22 cases in group III. The results are tabulated below:—

Table I

Total cases - - - - -	70
Total ambulant cases at admission - -	9
Total ambulant cases at discharge - -	33
Total dead - - - - -	7
Total bedridden - - - - -	30
Total cases with immediate changes -	18
Total cases with delayed changes - -	32

Table II

	Expected ratios %	Actual figures %
I. 1. Immediate response	26%	0
2. Delayed response	46%	25
3. Ambulant	47%	33 (8% if those already ambulant are excluded).
4. Bedridden	43%	54
5. Dead	10%	13
II. 1. Immediate response	26%	63
2. Delayed response	46%	75
3. Ambulant	47%	58 (54% if those already ambulant are excluded).
4. Bedridden	43%	29
5. Dead	10%	13
III. 1. Immediate response	26%	13
2. Delayed response	46%	33
3. Ambulant	47%	46 (38% if those already ambulant are excluded).
4. Bedridden	43%	42
5. Dead	10%	4

Table III

Group	Sex		Age			
	Male	Female	Below 30	31 - 40	41 - 50	51 and above
I.	15	9	—	—	6	18
II.	15	9	—	1	7	16
III.	13	9	—	—	5	17

Table IV
Morbidity

Group	Total stay						Duration of bed ridden state				
	Below 3 days	4-7 days	1-2 weeks	2-3 weeks	over 3 weeks		<3 days	4-7 days	1-2 weeks	2-3 weeks	> 3 weeks
I Total 21 (excluding 3 dead)	0	6	5	2	8		2	2	0	0	17
II Total 21 (excluding 3 dead)	1	4	6	0	10		1	4	2	0	14
III Total 20 (excluding 1 dead)	0	2	6	1	10		1	3	3	0	13

Table V

Group	Immediate response		State at discharge			
	+	-	Ambulant	Bed ridden	Died	
I Male Female	0 0	15 9	5 3	8 5	2 1	
II Male Female	10 5	5 4	10 4	3 4	2 1	
III Male Female	1 2	13 6	7 4	6 4	0 1	

Table VI

Age	Immediate Response		State at discharge			
	+	—	Ambulant	Bedridden	Died	
45	0	3	1	2	0	
46-50	0	2	1	1	0	
51-55	0	4	2	2	0	
> 56	0	15	4	8	3	
< 45	4	1	4	1	0	
46-50	2	0	2	0	0	
51-55	2	4	4	1	1	
> 56	7	4	4	5	2	
< 45	0	2	2	0	0	
46-50	0	2	2	0	0	
51-55	1	4	2	3	0	
> 56	2	11	5	7	1	

Table VII — Added features

Group	Impairment of consciousness	speech defect	Hypertension
I	4	4	19
II	2	8	18
III	1	5	16

Immediate response (within 10 minutes).

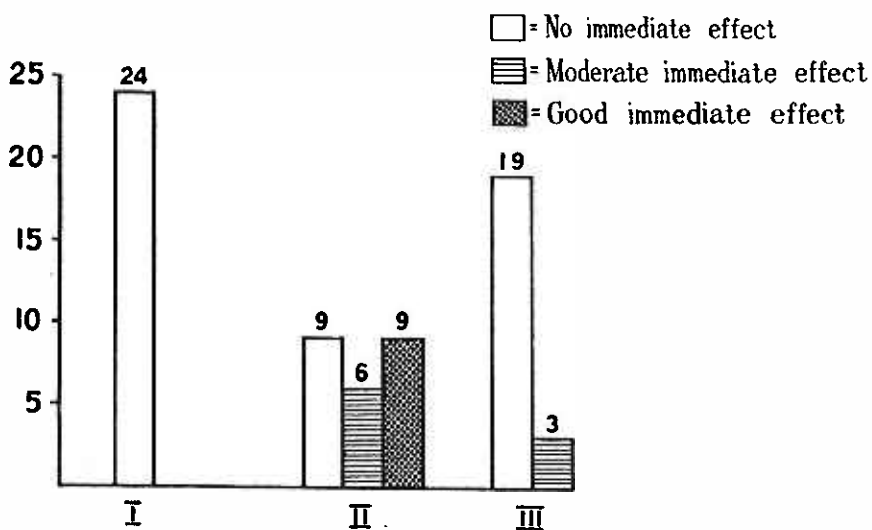


Figure I

Delayed response (up to 1 week).

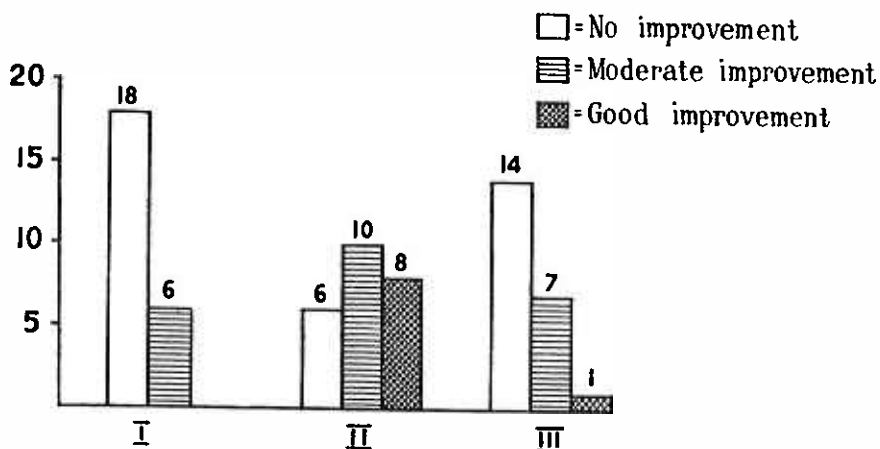


Figure II

State at discharge.

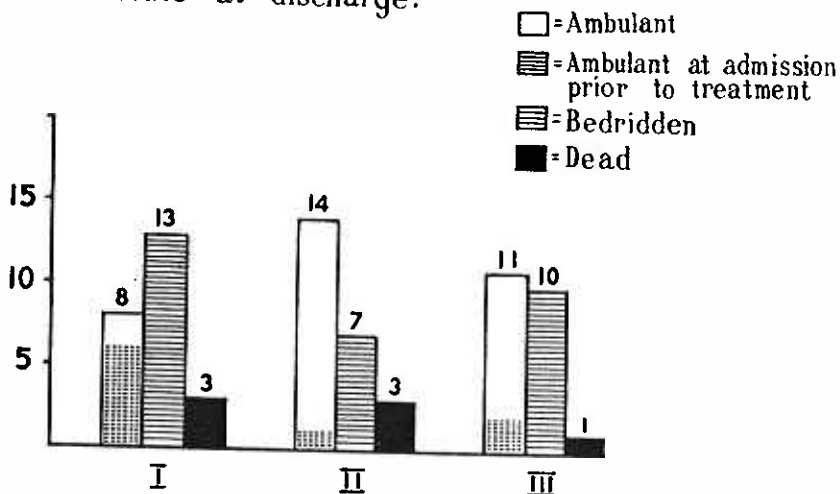


Figure III

Analysis of results and discussion:—

Table I sets out the total number of cases treated, and the results of the treatment. From this table is computed the expected rates of incidence regarding ambulation, dead, immediate response and other changes, and these are compared with the actual incidence in table II.

It can be seen that the mortality is not affected by cervical block. The low mortality in the papaverine is just within statistical significance, and may be worth further study. On the other hand, the figures for immediate response and recovery of ambulatory power are greater in cervical block and statistically significant.

Tables III, V, VI and VII give the figures with regard to sex, age groups, and incidence of added clinical anomaly. The uniformity of incidence in all groups strongly suggests that the sampling has been effective, and the groups are strictly comparable.

Table IV gives the figures for the length of hospitalisation, and it would appear that irrespective of the treatment, nearly half the cases had to be in hospital for over 3 weeks.

Figures I, II and III show the marked increase in number of cases able to walk at discharge in cervical block group, and also the significant absence of immediate improvement in the control or papaverine group.

The results in general would suggest that cervical block has a definite favourable effect in inducing immediate improvement, and increasing the chance of the ability to walk quite early on. The mortality, however does not seem

to be affected by the treatment. The conclusion would be that cervical block has definite beneficial effects in cerebral thrombosis with regard to recovery of motor function but has no significant value in reducing mortality.

SUMMARY

A controlled study of cervical ganglion block was undertaken, and the results suggest that the technique is of definite value in hemiplegics regarding recovery of function but does not reduce mortality.

ACKNOWLEDGEMENT

I am grateful to Prof. E.S. Monteiro, Professor of Clinical Medicine, University of Malaya, for the permission to carry out this study, and to submit the report for publication. I wish also to record my thanks to Mr. Tye Cho Yoke, Department of Social Medicine, University of Malaya for his advice regarding statistics.

REFERENCES

- de Pereira, A. (1945) Blocking of the middle cervical and stellate ganglions with descending infiltration anaesthesia. *Arch. Surg.*, 50, 152.
- de Takats, G. (1936) The use of papaverine in acute arterial occlusions. *J.A.M.A.*, 106, 1003.
- de Takats, G. (1954) Controversial use of cervical sympathetic block in apoplexy. *Ann. Int. Med.*, 41, 1196.
- Gwee, A.L. (1956) Cervical ganglion block in hemiplegics. *Proc. Alum. Assn. Malaya*, 9, 39.
- Kety, S.S. and Schmidt, C.F. (1948) The nitrous oxide method for the quantitative determination of cerebral blood flow in man: theory, procedure and normal values. *J. Clin. Investigation*, 27, 476.
- Leriche, R. and Fontaine, R. (1936) De l'infiltration stellaire dans les embolies cerebrales, dans les spasmes vasculaires postoperatories de l'encephale et chez les hemiplegiques. *Rev. de Chir.*, 74, 755.
- Naffziger, H.C. and Adams, J.E. (1950) Role of stellate block in various intracranial pathologic states. *Arch. Surg.*, 61, 286.