The solution has proved free from the drawbacks and disadvantages affecting all the preparations previously described. It has the great advantages of low viscosity (so that accurate injection is easy without the use of special syringes) and of an almost neutral reaction (and hence freedom from irritant effect and from the tendency to tissue necrosis). A third argument in its favour is that it is easily prepared and sterilized in any hospital dispensary; a quantity sufficient for a full intercostal block costs only a few pence.

This solution is advocated as the best at present available for further experimentation by surgeons interested in the possibilities of prolonged local analgesia.

We have to thank the Chief Medical Officer, Ministry of Health, for permission to publish this paper.

ADDENDUM.—Since this paper was written reports have appeared of the toxicity, especially on intravenous injection, of some of the proprietary preparations used for prolonged analgesia. As accidental intravenous injection is always a possibility in performing intercostal block, or in injecting a large nerve, we have had toxicity tests carried out on the benzocaine-urethane solution. Dr. A. C. White, of the Wellcome Research Laboratories, has kindly performed tests which show that in mice, while intravenous injection in a dosage of 2.5 ml. per kg. is uniformly fatal, a dose of 1.25 ml. per kg. can be given to a consecutive series of 10 mice without ill effect. Such a dose is, of course, about one hundred times as great as would be injected in any one site in our technique, and ten times the total dosage needed for a complete bilateral intercostal block. It would seem, therefore, that this is a hazard which need cause no serious concern to users of this solution.

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STELLATE GANGLION BLOCK IN GENERAL PRACTICE

BY

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Anaesthetizing or blocking of the stellate ganglion was originally described 20 years ago, but I can find no evidence to suggest that it has ever been recommended or used as a procedure suitable for the general practitioner. It may be of interest to record that I have performed this operation under normal general practice conditions on 342 occasions on 139 patients.

There seems to be little doubt that the credit for the origination of this procedure must be given to Professor René Leriche. He and Fontaine in 1934 were the first to refer to it. In 1936 he and Fontaine produced a further paper. Neither of these papers was the subject of much comment at the time. In their first paper they published the result of 200 stellate ganglion injections which they had done in the previous nine years, and

stated that stellate ganglion infiltration was not effective unless it was followed by Horner's syndrome and facial vasodilatation.

In 1938 Mackey and Scott described 19 cases of apoplexy which they treated by stellate ganglion block. Of these, nine cases showed improvement. They summarized their results by saying that these did not justify the adoption of anaesthesia of the stellate ganglion as a routine method of treatment in apoplexy, but that further study was necessary before the method was rejected as of negligible value. Nevertheless, as in several of their cases Horner's syndrome was not produced, this cannot be regarded as a fair sample.

Most of my cases are those of hemiplegia due to cerebral thromboses. The attitude of the medical profession towards these has become one of nihilism. This state has arisen for several reasons: (1) There has not been sufficient effort to separate the three major causes—(a) cerebral embolism, (b) cerebral thrombosis, (c) cerebral haemorrhage; (2) it has been thought that cerebral damage is inevitable; (3) some patients have recovered without specific treatment (Gilbert and de Takats, 1948).

A clinical classification of cerebral vascular accidents on an aetiological basis of haemorrhage, thrombosis, or embolism is essential, since a patient suffering from cerebral haemorrhage should not be subjected to stellate block, or at least it should not be done until a long period of observation has indicated that bleeding has ceased (Butt and Mathers, 1948).

From my point of view the most significant symptom in the differential diagnosis between cerebral thrombosis and cerebral haemorrhage is the presence of neck rigidity in cerebral haemorrhage. If neck rigidity is present stellate ganglion block should be avoided. Any theory directed towards relief of a disordered physiological state brought about by cerebral thrombosis can have but one purpose, and that is to restore the blood supply to the specific area of the brain (Volpitto and Risteen, 1943).

Villaret and Cachera (1939) produced cerebral emboli artificially in dogs and watched the vessels of the pia through windows in the skull. These vessels went into spasm even in areas not directly affected by the emboli and persisted thus for some weeks. The sympathetic nerve supply to the cerebral vessels comes from the upper thoracic segments of the spinal cord and passes by way of the stellate and cervical ganglia. If, therefore, these are anaesthetized the cerebral blood flow is increased. Volpitto and Risteen (1943) made two trephine holes into the skull under local analgesia, and the cortex was visualized before and after injection of the stellate ganglion with procaine. They observed that the increase in the calibre of the pial vessels is limited to the affected side. The effect is immediate and does not increase with further time or additional procaine. The scalp and dural vessels become dilated, as do the vessels of the cerebral cortex.

If improvement is to follow a cervical sympathetic block the improvement should be noticed within ten minutes. Should there be a relapse, a further injection should be given (Gilbert and de Takats, 1948).

I have chosen for treatment cases of hemiplegia due to cerebral thrombosis, Raynaud's disease, severe cardiac pain in angina pectoris, and stiff shoulders. I have reported only cases in which there was an actual block of the stellate ganglion, this being shown by the presence of

Horner's syndrome, the components of which appear in this order: (1) narrowing of the palpebral fissure, (2) contraction of the pupils, (3) enophthalmos, and (4) absence of sweating on the side of the injection. To this must be added a noticeable increase of warmth on the injected side. Also, in half to three-quarters of the cases a conjunctivitis appears on the affected side.

Technique

In my series of cases an anterior approach to the stellate ganglion was used. This approach differs from that used by most other authors. It is done with a No. 1 serum needle on a 10-ml. syringe. The needle is passed medial to the sternal head of the sternomastoid muscle a finger-breadth above and lateral to the sternal notch. With the middle and ring fingers of the left hand the carotid artery is palpated and then moved laterally. The serum needle is inserted at a right angle and is pushed straight through just lateral to the trachea. In most cases there is no difficulty in hitting the transverse process of the seventh cervical vertebra. The stellate ganglion is situated between the transverse process of the seventh cervical vertebra and the neck of the first rib. Then 10 ml. of 1% procaine hydrochloride is injected. In my later cases, when there has been cerebral thrombosis I have injected bilaterally. With this method, as opposed to the more usual anterior approach through the two heads of the sternomastoid, most of the complications are avoided. These are: puncture of the subclavian artery, puncture of the meninges, and surgical emphysema or pneumothorax (Leriche and Fontaine, 1934).

The Table shows the results of 124 cases of cerebral thrombosis treated in this way. It is apparent that improvement was present in 17 out of the 23 cases seen within

Results

Time Lapse	No.	Complete Recovery	Good	Fair	No Improvement
Within 24 hours ..	23	12	5	0	6
" 2-7 days ..	27	8	6	9	4
" 1-4 weeks ..	18	1	5	5	7
" 1-6 months ..	34	0	0	8	26
" 6-12 " ..	22	0	0	4	18
Total ..	124	21	16	26	61

24 hours. The interesting feature at the other end of the scale is that of the long-standing hemiplegias. Within 6 to 12 months there was some improvement in 4 out of 22 cases. Leriche (1952) gives one injection of 10 ml. a day for 15 days for the "strokes" of recent origin, and in the longer-standing cases he gives 12 to 36 injections. It has not been possible for me to give as many as this, but if some degree of recovery has not taken place within three injections I count it as a failure.

Raynaud's Disease.—Three cases were treated: one had relief for one week, and one for one month, in the third there was no effect. This is a very small number of cases, but it was interesting to see that the effects on the second arm were identical with those on the first.

Cardiac Pain in Angina Pectoris.—In general practice one is confronted always with a few cases of long-standing angina pectoris. Some of these patients may have had a coronary thrombosis 10 to 15 years ago, and in others the electrocardiogram is normal or almost so. I have been very careful to select cases of long standing for injection. Of the five cases treated, two had complete relief, two had some relief, and in one there was no effect. In all these cases bilateral ganglion blocks were done.

Stiff Shoulder.—In all cases these were post-traumatic. There is a time in treating this type of shoulder when active exercises and heat are producing very little result and the interval is too short since the time of injury for manipulation under an anaesthetic. This small series of seven cases represents those patients seen in general practice during

the course of the last year: two had complete relief, one had slight improvement, and in four there was no effect.

Summary

The stellate ganglion has been injected 342 times in 139 patients. These patients were seen in a general practice in South London and the injections took place in the patient's own home, the consulting-room, nursing-homes, an L.C.C. welfare home, and the out-patient department of a general-practitioner hospital. A technique of the anterior approach to the stellate ganglion is described, and it is suggested that this is a safe procedure for use in general practice. The general practitioner obviously sees more cases of cerebral thrombosis first, and it is comparatively easy for him to inject the stellate ganglion within the first 24 hours. With this short time lag the prospect of a complete recovery or great improvement is very great. In this series of cases the procedure itself has not given me a moment's anxiety.

I should like to thank my colleagues for allowing me to anaesthetize the stellate ganglion in many of their patients.

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GYNAECOMASTIA IN TWO BROTHERS

BY

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In 1950 I reported on a youth of 17 suffering from gynaecomastia. Subsequently the same condition developed in the younger brother. The latter has been investigated, and further studies have been carried out on the elder brother.

Case 1

The elder brother was first seen in 1947, aged 17. He complained of breast enlargement, which started at the age of 14. He had never shaved and had had neither erections nor emissions. Libido seemed to be absent. His hobbies were those of a boy. He had suffered no injuries to or disease of the testicles.

Pronounced gynaecomastia was present (see Fig. 1). The penis was small and the urethra opened at the base of the glans. Scrotum and testicles appeared normal. The pubic hair was of feminine distribution and axillary hair was scanty. The face was covered with a fine down. His height was 63½ in. (161 cm.) and span 66 in. (168 cm.); head to pubis measured 32 in. (81 cm.) and pubis to ground 31½ in. (80 cm.). His voice was soft and his manner retiring. There was no plethora or glycosuria, and the blood pressure was normal.

His bone age corresponded to chronological age. 17-ketosteroid excretion was considered to be within normal limits. Although the original estimate was rather high, this was not confirmed by subsequent tests, which yielded figures of 12, 18, and 14.5 mg. within 24 hours. The original estimate of F.S.H. excretion was regarded as being within normal limits (Dr. A. M. Hain). Another, some months after a period of testosterone therapy, showed a 24-hour output of more than 40 and less than 160 units