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STELLATE GANGLION BLOCK IN THE TREATMENT OF MÉNIÈRE'S DISEASE AND IN THE SYMPTOMATIC RELIEF OF TINNITUS

BY

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SUMMARY

Sixty-six patients with a variety of disturbances of the inner ear have been treated by over 350 stellate ganglion blocks. There have been no serious complications. Details of the technique used are described and the results obtained tabulated.

Stellate ganglion block using local anaesthetic drugs has been advocated by many (Hoogland, 1952; Passe and Seymour, 1948; Passe, 1952; Dorochenko, 1937; Woolmer, 1949) and condemned by some (Cawthorne and Hewlett, 1954; Mawson, 1963) as a treatment for Ménière's disease. The theories of causation of Ménière's disease are legion. The possible reason why sympathetic block might be a rational line of treatment is based on the theory of ischaemia caused by a spasm of the inferior auditory branch of the inferior cerebellar artery, constrictor fibres to which are transmitted through the stellate ganglion.

During the past fifteen years 66 patients with Ménière's disease and other abnormalities of the inner ear have been treated by stellate ganglion block. This paper describes the techniques used, the complications following injection, and the results obtained.

PATIENTS AND MATERIAL

Patients are referred to the clinic by the consultant otologist and every patient referred is given at least one injection. There is thus no selection of patients most of whom have had a long history of their symptoms and a plethora of medical and other treatments. All of the patients have complained of tinnitus and the diagnoses are shown in table I. The largest group, 26, had Ménière's disease; 20 patients had tinnitus with no detectable disease and unaccompanied by vertigo, these have been designated constitutional tinnitus. A further 20 patients had labyrinthitis, a long history of chronic otitis media or other diseases of the ear, or migraine. The primary object of the treatment has been to relieve the tinnitus and, when present, the vertigo. In only a small proportion of the patients with Ménière's disease has the hearing improved as shown by audiogram, but in at least one case the improvement was dramatic.

Routine.

Patients are seen in the Ear, Nose and Throat out-patient department. The proposed injection treatment is explained to them and the chances of a successful outcome discussed. A stellate ganglion block is then performed on the affected side; in bilateral disease the worst side is treated first. This is important since the injection of the wrong side or the better of two sides may exacerbate the symptoms. In view of the slight possibility of the brachial plexus being affected by the local analgesic, patients are advised not to drive; should they come by car another driver is advisable. A week after the initial injection the patient's condition is re-assessed. When there has been no improvement after a successful block the treatment is discontinued. When there is improvement a course of injections is started and is based on the duration of relief of symptoms. In these cases it is usual to find that the duration of improvement increases after successive injections which are given at increasing intervals until the maximum improvement has been produced; this might be expected after 4–6 injections. One patient received 28 injections over a period of 2–3 years until a satisfactory level of improvement had been achieved. Usually the duration of improvement can be measured in days or weeks but

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TABLE I

Diagnosis in 66 patients treated by stellate ganglion block.

	No. of patients
Ménière's disease	26
Constitutional tinnitus	20
Tinnitus as a sequela of infection or trauma	7
Tinnitus as a sequela of Bell's palsy	4
Other	9

occasionally the suppression of symptoms lasts only a few hours. Patients in the latter group are admitted to hospital and daily injections given for a week. If this concentrated course of treatment fails to cause lasting relief, operative treatment is recommended. Four patients suffering from Ménière's disease, who had worthwhile relief of short duration, were referred for stellatectomy with good results.

Technique.

Smith's tissue displacement technique (Smith, 1951) and recommended by Davies (1952) has been used for all these cases. When correctly applied the risks of perforation of the oesophagus or puncture of the pleura are minimal and intravascular injection should not occur. The method depends upon retraction of the common carotid artery and internal jugular vein by pressure of the index and middle finger in front of the lower border of the sternomastoid muscle on the affected side. The lower finger will also tend to displace downwards the dome of the pleura. A No. 1 1½″ (3.75 cm) disposable needle and a 10 ml disposable syringe are used for the injection. Bupivacaine 0.25 per cent 6 ml with 1,000 units of hyaluronidase is used. The needle is applied to the filled syringe and is then pushed between the fingers through the previously anaesthetized skin. At a depth of about 3 cm the injection is made. It is essential that the two palpating fingers feel the carotid pulsation as the artery and vein are retracted laterally. It might be assumed that if the injection were performed in the sitting position the dome of the pleura would be at a lower level and the danger of perforation minimal, in fact this is not so and cases of pneumothorax have been reported when adopting this technique (Davies R. M., personal communication, 1966).

It has been noted that although successful block is followed by the development of Horner's syndrome and the symptoms of Mueller† in about half a minute very few patients experience warmth in the upper extremity, which is typical of a block of the superior thoracic ganglion. It is assumed that this is because of the deliberate attempt to position the needle point at or above the inferior cervical ganglion. Even those patients who show the symptom, described by Leriche, of pain in the scapula on stimulating the stellate ganglion with a needle point rarely experienced warmth in the hand or arm.

In the last 100 injections using bupivacaine and hyaluronidase there have been 3 failures and 3 artery punctures.

RESULTS

Of the 26 patients suffering from Ménière's disease 15 were relieved or much improved after 4 to 28 injections. The symptoms were unchanged or were only slightly improved in 11. Six of the 20 patients with constitutional tinnitus and 10 of the 20 patients in the third group were relieved or much improved (table II).

TABLE II

Results of treatment.

Ménière's disease (26)	
Relieved or much improved	15*
Slightly improved or unchanged	11
Constitutional tinnitus	
Relieved or much improved	6
Slightly improved or unchanged	14
Tinnitus due to infection, trauma, etc.	
Relieved or much improved	10
Slightly improved or unchanged	10

* 4 of these after operative sympathectomy.

* 4 after operative sympathectomy.

The following brief case reports provide an indication of results observed when the response to injection is favourable.

Case 1.

A female aged 60 complained of symptoms of severe left-sided Ménière's disease since 1951. Medical treatment over the following three years gave only temporary relief. In May and June, 1954, she received six stellate ganglion blocks with procaine. These produced complete relief of her symptoms for periods of up to 10 days. In January 1955, she was referred for left stellatectomy. There was an unusual degree of fibrosis in the region of the ganglion possibly as a result of her repeated injections. She was considerably improved after the operation.

† Injection of the tympanic membrane and warmth of the face.

Case 2.

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Case 3.

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Case 4.

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Case 2.
Female, aged 60. First seen in April 1959, this patient had a long history of severe right-sided Ménière's disease. Three blocks were performed at weekly intervals with good results. Three years later the tinnitus returned but after a further six injections in March and April, 1963, this symptom was relieved and has not returned.

Case 3.
Female, aged 32. This patient, a deaf mute, was first seen in July 1962, and complained of right-sided tinnitus and vertigo. A diagnosis of Ménière's disease was made. Three injections were given at weekly intervals and her symptoms were relieved for two months. Three more injections were given in the November, following which she was symptom-free until November 1967, when she had one attack of tinnitus and vertigo which lasted a few minutes. She was seen again in August 1968, following another short attack of vertigo but with no tinnitus. A further stellate block was done since when she has been free of symptoms.

Case 4.
Male, aged 53. First seen in May 1954, with the symptoms of severe right-sided Ménière's disease of six months' duration. Six ganglion blocks were given over a period of four weeks. His hearing did not improve but complete relief was obtained from his tinnitus and vertigo. When seen 12 years later he was still symptom free.

Complications.

Mawson (1963) regards stellate ganglion block as a major procedure because of the possibility of pneumothorax, intravascular injection or perforation of the oesophagus, any of these complications being potentially lethal. Hoogland (1952) in several hundred injections states that he has not observed any serious complications although he does note that the pleura may be punctured or a haematoma collect in the mediastinum. He cites another case in which the needle entered the vertebral canal, a paresis of the arm resulted after the injection.

In this series 350 injections have been given. In one patient treated 15 years ago the needle was inclined too far medially in front of the vertebral body and the large volume of procaine used at that time tracked across the midline and produced a Horner's syndrome on the opposite side. In three instances needle penetration was excessive and partial brachial plexus block resulted. In one of the first patients treated bizarre neurological symptoms developed 48 hours after successful stellate ganglion block. It later transpired that he was also suffering from multiple sclerosis which emphasizes the necessity for a full medical examination to be carried out on all patients. At about the same time, before the present technique was adopted, one patient received an intravascular injection of procaine 2 per cent 4 ml. Consciousness was lost momentarily but there were no after effects.

Intra-arterial injection should never occur if careful aspiration is carried out before completing the injection. On eight occasions blood has flowed from the needle or been aspirated, on each occasion the needle was withdrawn a few millimetres and the injection completed without incident. The vertebral artery usually lies laterally but it may be anterior or posterior to the ganglion, it never lies medially. For this reason it would appear that the direct approach as described by Smith (1951) might carry a small risk of vascular puncture, thus a more medial approach is now made towards the vertebral body medial to and slightly above the ganglion aiming more at the sympathetic cord joining the middle and inferior ganglion.

Occasionally the voice is affected possibly by blocking the connections between the stellate ganglion with the recurrent laryngeal nerve. This has occurred in four patients, in one of them twice, all had right stellate ganglion blocks.

Neither the oesophagus nor the pleura has been punctured in this series although in one patient, when the needle approach was made without positive identification of the common carotid artery, symptoms of pleural irritation were evident. There were no abnormal signs and X-ray of the chest was normal.

DISCUSSION

Several clinicians have used stellate ganglion block as a method of estimating the prognosis of sympathectomy in cases of Ménière's disease. Passe (1952) achieved complete relief of vertigo in 60 per cent and tinnitus in 20 per cent, with some improvement of hearing in 60 per cent, of his cases after this operation. Wilmot (1961), who stressed the importance of early sympathectomy before severe damage to the labyrinth occurs in cases with vascular insufficiency of the inner ear, also used stellate ganglion block as a prognostic procedure.

Stellate ganglion block as the sole method of treatment was first reported by Dorochenko (1937) who gave details of two patients treated

with complete recovery. Williams (1952) quotes Hibler (1948), who treated seven cases and cured five of them, and Schubert (1949), who treated thirty patients with ganglion block and had good results in cases of recent onset but could obtain little relief in cases of long standing.

The largest series to date has been that of Hoogland (1952) who treated thirty-seven cases of Ménière's disease and obtained satisfactory results in twenty-two (60 per cent) and temporary improvement in seven (20 per cent). Vertigo was relieved in 25 patients (68 per cent), tinnitus in 14 (38 per cent) and the hearing improved in 9 (24 per cent). Relapses occurring after twelve to eighteen months were treated satisfactorily by further injections. He concludes that stellate ganglion block is a satisfactory treatment for patients with Ménière's disease which has not responded to medical treatment.

In this series a similar pattern of results is evident. It would appear that stellate ganglion block is a satisfactory treatment in its own right and in patients showing a short period of relief after multiple injections operative stellatectomy can confidently be recommended. Tinnitus in other conditions presents a difficult therapeutic problem and stellate block does not appear to have been used by other workers. A controlled series would show whether the results of treatment are significant. There can be no doubt of the gratitude of the patients who have been relieved of this distressing symptom.

The antero-lateral approach of Leriche-Arnulf (Arnulf, 1947) is a more hazardous technique than that of Smith (1951) if judged by the experiences of Hoogland. Properly used the tissue displacement technique is very safe and a high proportion of successful blocks may be expected.

Stellate ganglion block is recommended as a treatment of Ménière's disease and other conditions causing tinnitus especially those of recent onset.

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LE BLOQUAGE DU GANGLION STELLAIRE DANS LE TRAITEMENT DE LA MALADIE DE MENIERE ET LORS DU SOULAGEMENT SYMPTOMATIQUE DU TINNITUS

SOMMAIRE

Soixante-six malades avec divers troubles de l'oreille interne ont été traités au moyen de plus 350 bloquages du ganglion stellaire. Il n'y a pas eu de complications graves. Les détails de la technique sont décrits et les résultats obtenus sont présentés sous forme de tableaux.

BLOCKADE DES GANGLION STELLATUM IN DER BEHANDLUNG DER MENIERE' KRANKHEIT UND ZUR SYMPTOMATISCHEN ERLEICHTERUNG BEI TINNITUS

ZUSAMMENFASSUNG

Sechsundsechzig Patienten mit verschiedenen Beschwerden von seiten des Innenohrs sind durch über 350 Ganglionstellatum-Blockaden behandelt worden. Dabei ist es nicht zu ernsten Komplikationen gekommen. Einzelheiten der angewandten Methode werden beschrieben und die erzielten Resultate tabellarisch festgehalten.