VIDIAN NEURECTOMY FOR VASOMOTOR RHINITIS: A REVIEW OF 47 CASES*


Since the end of 1966 vidian neurectomy has been performed for vasomotor rhinitis on over 70 patients in this Department. These operations have been undertaken by 4 different surgeons, but most of them were performed by two of us (J.L.M. and R.J.V.M.). The standard transantral approach using the operating microscope has been employed as described by Golding-Wood. The cases selected were those which had failed to respond to other treatment for this condition. Because of the well-known phenomenon that almost any nasal operation will temporarily benefit this condition, the results have been assessed only after the lapse of a minimum period of one year. In 47 patients the required time has elapsed. As many as possible were recalled for a special examination, and those unable to come were asked to complete a questionnaire. At the examination the details of the history of the condition before operation were confirmed and the patient's assessment of the benefits was recorded. Any adverse sequelae were investigated and Schirmer's test for lacrimal function was performed.

RESULTS

Three of the 47 patients could not be contacted. In one case the letter was returned 'unknown', in one no answer has been received to several letters, and one patient has returned to her distant home and is too illiterate to complete the questionnaire. Of the 44 who were traced, 29 reported for examination and 15 who could not come replied to a questionnaire. Two results were anomalous and are excluded from the assessment: in one the operation was abandoned due to thick bone in the posterior antral wall, yet in spite of this the patient states he is cured! In the other the patient claims to be unchanged on the side of the operation but cured on the opposite side.

Of the 42 analysed, a good result was obtained in 34, in 2 the benefit was only temporary, and 6 were not helped. One side had been operated upon in 31 patients and both sides in 13 patients. In 11 of the unilateral cases benefit had also been experienced on the contralateral side. The average time since operation was 19 months, with a range of 12-26 months.

Of the 47 patients, 14 were White, 32 Coloured and one Bantu, while the sex ratio was 17 male to 30 female. Age distribution was 11-20 years, 19; 21-30 years, 12; 31-40 years, 10; 40-50 years, 5; and 51 years and over, 1.

Schirmer's test was performed at the follow-up examination on 28 cases and showed marked reduction of lacrimal secretion on the operated side in 26, slight reduction in one, and no reduction in one. This last patient was the one who claimed to have been cured on the contralateral side only. Marked reduction in lacrimal secretion was found in all the 5 patients re-examined who did not report any permanent benefit, showing that the nerve had been in fact successfully divided.

Complications noted were the return of nasal polypi in one case; dryness of the eyes, needing drops, in 2; postoperative antrum infection in 4; numb or tender teeth in 7; and sensitivity over the canine fossa in 11.

Of the 2 patients with dryness of the eyes, in one the trouble developed only after the second side had been operated upon. She is pleased with the result in spite of the dry eyes. The second patient had had a unilateral operation with complete relief on the side of the operation and partial relief on the opposite side. Lacrimal secretion is equally scanty on both sides.

The main symptoms for which the patients sought relief were as shown in Table I. The number of failed cases is too small for the drawing of definite conclusions, but among them those whose only symptom was nasal obstruction seem to predominate.

| TABLE I. ANALYSIS OF FAILED CASES |
| Complaint | Cured and improved cases | Failed and relapsed cases |
| Blocking | 34 | 8 |
| Rhinorrhoea | 25 | 2 |
| Sneezing | 23 | 3 |

Failed Cases

The failed and relapsed cases have been individually reviewed in an attempt to discover reasons for failure and to guide in the selection of future subjects for this operation.

Case 2: female, aged 26 years (unilateral operation). On review it seems to have been a case of rhinitis medicamentosa and probably the operation should not have been performed. Blocking was the only symptom.

Case 7: female, aged 22 years (bilateral operation). For a time she improved, but then relapsed for no apparent reason. Blocking was the only symptom.

Case 8: female, aged 18 years (unilateral operation). For a time she was better, but then relapsed due to a return of polypi, which seem to have been the main cause of blocking before the operation. An external ethmoidectomy will be done. Blocking was the only symptom.

Case 16: female, aged 31 years (bilateral operation). She had a history of allergy and was asthmatic. The discharge from the nose was sometimes yellow. Some benefit was derived from trimming of the inferior turbinates at the second operation. She suffered from all 3 symptoms of blocking, sneezing and rhinorrhoea.

Case 22: female, aged 21 years. She had complained of a yellow discharge in the past, but a pre-operative X-ray report was negative. She developed an empyema of the antrum after operation. Blocking was the only symptom.

Case 28: female, aged 66 years (unilateral operation). No cause for the failure could be found. Blocking and rhinorrhoea were present before the operation.

Case 35: male, aged 13 years (unilateral operation). This patient was deaf and dumb so that a history was difficult to obtain. He also appeared to have an allergic tendency. All 3 symptoms were present.

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Case 39, female, aged 26 years (unilateral operation). She had had a yellow discharge. A pre-operative X-ray was clear, but she now reports in reply to the questionnaire that she has an offensive nasal discharge. Blocking was the only symptom at the time of the operation.

DISCUSSION

According to Christensen the vidian nerve, or nerve of the pterygoid canal, is composed of unmyelinated postganglionic sympathetic fibres, small myelinated preganglionic parasympathetic fibres, and larger sensory fibres with the cell body in the geniculate ganglion. Malcomson showed that stimulation of the cervical sympathetic chain produces vasomotor constriction of the nasal mucosa which is abolished after vidian nerve section, proving that other possible routes for sympathetic fibres such as the anterior ethmoidal or maxillary arteries are not in fact significant. He also showed that stimulation of the central end of the divided vidian nerve causes sneezing, which is not produced when the ordinary sensory fibres in the maxillary nerve are stimulated. This suggests that the sneezing reflex is mediated by sensory fibres running with the vidian nerve and joining the facial nerve at the geniculate ganglion. The bilateral relief of symptoms which is not infrequently observed after unilateral operation would therefore appear to be due to the cutting off of nerve impulses carried by these fibres. The threshold of irritation needed to precipitate the sneezing reflex may well be determined by the summation of impulses arising from the two nasal cavities, so that cutting off those from one side only may lower the strength of the stimuli below reflex threshold. Stimulation of the parasympathetic fibres causes congestion of the cavernous tissue in the nose and secretion of the fluid. Millonig et al. described the nasal stuffiness that followed cervical sympatheticomcy for various conditions and also remarked on the shrinking and drying of the nasal mucosa that followed intracranial section of the great petrosal nerve, performed in their case for the relief of headache. Reading et al. described the dry nose that follows damage to the great petrosal nerve from fractures of the temporal bone, and they relieved one case of vasomotor rhinitis by deliberate section of this nerve. Ziegelman had previously suggested this procedure for the relief of this condition.

Wilson attributes vasomotor catarrhs of the nose to a mode of life that lacks adequate sympathetic stimulation. The preganglionic neurones of the parasympathetic system supplying the nasal mucosa arise from cells in or near the superior salivatory nucleus in the hindbrain and emerge in the nervus intermedius which joins the facial nerve. At the geniculate ganglion these fibres leave as the great petrosal nerve, emerge from the hiatus falopi, and run on the surface of the anterior face of the petrous temporal bone to the foramen lacerum. Here they are joined by postganglionic sympathetic fibres from the plexus on the internal carotid and form the vidian nerve. This tunnels the sphenoid in a canal medial and inferior to that for the maxillary division of the trigeminal, and so reaches the sphenopalatine fossa. Here the parasympathetic axons synapse at the sphenopalatine ganglion and postganglionic fibres are distributed to the nasal mucosa and, via the zygomatic nerve, to the lacrimal gland, to which they are the secretomotor supply.

The vidian nerve, therefore, contains both the sympathetic and parasympathetic supply to the nasal mucosa, and the normal patency of the airway is maintained by a balance between the tone of these two opposing systems, and adjusted to varying physiological needs and climatic conditions.

From the above, it is clear that a predominance of parasympathetic tone will cause congestion of the cavernous tissue and excess secretion of fluid in the nose, such as is found in the condition known as vasomotor rhinitis. This imbalance may result from several causes such as allergy, hormonal influences, a non-stimulating mode of life (Wilson), sexual excess, climatic factors (Jarvis) or drugs such as reserpine. There is a strong racial influence in the prevalence of this condition (Jarvis). The first line of treatment for vasomotor rhinitis must be to remove these causative or aggravating factors, where possible, and to give relief by antihistamines, or minor nasal procedures such as cauterization of the inferior turbinates, correction of marked degrees of septal deviation, or zinc ionization. When these measures have been given an adequate trial and have failed to bring relief, a direct attack on the autonomic regulating system may be considered to be justifiable, and interruption of the parasympathetic nerve supply is the obvious procedure. In theory the parasympathetic could be interrupted by section of the nervus intermedius—at the cost of loss of taste from the anterior two-thirds of the tongue and of loss of salivary secretion in the submandibular and sublingual glands. It could also be achieved by section of the great petrosal nerve as it lies under the dura on the petrous temporal bone. This has, in fact, been done with success by Golding-Wood but it entails a small craniotomy and carries the risk of causing a facial nerve palsy. In theory the parasympathetic could be interrupted by section of the great petrosal nerve, performed in their case for the relief of headache. Reading et al. described the dry nose that follows damage to the great petrosal nerve from fractures of the temporal bone, and they relieved one case of vasomotor rhinitis by deliberate section of this nerve. Ziegelman had previously suggested this procedure for the relief of this condition.

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The trans-antral approach to the sphenopalatine fossa has been adopted by Sewall, who also discusses other possible approaches. Chasin and Lofgren, Golding-Wood and Hiranandani also use this route, which is the one that has been employed in the present series of cases. Recently Chandra advocated a transpalatal approach.

THE OPERATION

The normal pre-operative checks should include blood pressure recording and tests to detect any abnormal bleeding tendencies. The paranasal sinuses will have been X-rayed and if doubtful pathology has been shown, proof punctures will have been performed. Any antritis discovered will have been treated and
operation deferred until the infection was cleared. In the process of assessment of the patient, allergy tests, eosinophil counts in the blood and nasal smear and serological tests for syphilis will usually have been undertaken.

Local infiltration with Lignocaine containing 1 in 300,000 epinephrine or the latter alone in a concentration of 1 in 300,000 assists in offering a bloodless field. This is done in 3 stages, and 7 minutes are allowed to elapse before the incision is made. The first injection of 4–6 ml of the solution is given into the pterygopalatine fossa via the greater palatine canal, using an angled needle. Then the area of the sublabial incision is infiltrated and finally after the antrum has been opened an injection is made under the mucosa of the posterior wall before it is raised as a flap.

The best approach to the vidian nerve is via the maxillary air sinus which is opened by the standard Caldwell-Luc exposure. A posterior mucosal flap is raised, hinged laterally, and the posterior bony wall is removed by hammer and gouge, including the postero medial angle. The exposed periorientum is incised with a sharp-pointed diathermy electrode with a low intensity current. The pterygopalatine fossa is thus entered and its abundant fat, rich venous plexus and the pulsations of the terminal part of the maxillary artery and its branches are noted. In earlier cases the main artery and its branches were occluded by forceps, but with increasing skill this time consuming part of the operation was found to be unnecessary.

The first landmark to be identified is the pterygoid process, and then the great palatine nerve as it enters the canal of the same name. The artery and its companion artery are followed until the sphenopalatine ganglion is visualized. After incising and elevating the periorientum on the pterygoid process the funnel-shaped mouth of the vidian canal is seen lying behind and a little medial to the ganglion. Identifying the canal subperiostally is a useful step which ensures that all the contents of the canal are divided. The maxillary nerve is distinguished by the fact that it lies 10 mm above and lateral to the vidian nerve, and the entrance to its canal has a sharp lip in distinction to the funnel shape of the vidian canal.

The nerve thus identified is cut with the diathermy which is also introduced into the canal to cauterise its contents. The artery of the vidian canal may be of a fair size and may need to be coagulated before the periorientum is incised. The vidian canal is filled with bone wax, the mucosal flap is replaced and the sublabial incision loosely sutured.

Once the maxillary sinus is opened, the rest of the exposure is done using an operating microscope with a 300-mm focal length objective. No elaborate instruments are needed.

Postoperative Course

As with any Caldwell-Luc operation there is some swelling of the cheek which, however, subsides in a few days. Haemorrhage may be a problem, and antrum infection has developed in a few cases. The maxillary nerve may inadventently be injured, and in one case not included in the present series an unexplained temporary 6th nerve palsy resulted. The late sequelae have already been discussed.

EVALUATION OF RESULTS

The degree of relief experienced by the great majority of the patients is encouraging, but we are not satisfied that the number who fail to obtain freedom from symptoms cannot be reduced considerably.

It is felt that in the enthusiasm for trying out a new procedure insufficient attention may have been given to the selection of cases for this operation. The patients' records are not always sufficiently detailed to allow the pre-operative condition to be correlated with the result achieved, and to obviate this a proforma is currently being employed to standardize the pre-operative examination and investigations. In particular the symptoms for which relief is desired must be recorded in detail, as well as the clinical appearance of the nasal mucosa. Reports on X-rays of sinuses, blood and nasal smears for eosinophils, and records of all minor operations and drug treatments are entered on the proforma. The presence of polypi and the history of their previous removals must be noted. Allergy investigations have proved disappointing in our experience and have not been undertaken unless there was a definite indication. Hirandani also found little help from investigation and desensitization treatment of possible allergic factors.

The operation record should include a note on whether the maxillary artery was clipped or not, and the manner of dealing with the vidian nerve.

At the postoperative review each symptom present before operation is reassessed, and the state of the nasal mucosa noted. Any complications after operation or permanent adverse effects are recorded, and Schirmer's test is performed to prove that the vidian nerve was in fact divided.

A study of the failed cases in the present series shows that 3 out of 8 there was a history of a yellow discharge before operation. In 2 of the 3 in which the postoperative X-ray showed clear antra, but both appear to have developed antrum infection subsequently.

By contrast, in the 34 patients who obtained a good result, a yellow discharge was recorded in the history of 1, and 2 had antrum infections a few weeks before operation. However, 3 of the 4 who had developed pus in the antra after operation obtained a good result.

The 8 failed cases all complained of nasal obstruction before operation, and in 5 it was the only symptom. Only 2 had rhinorrhoea and 3 had sneezing attacks. Golding-Wood states that he avoided operation in cases showing motor rhinitis. Forty-seven patients on whom vidian nerve section had been performed were followed up after a year or more had elapsed since operation. Of these, 44 were traced and the permanent benefits were assessed by examination in 29 and by questionnaire in 15. After exclusion of two anomalous findings, a good result was found in 34. In 2 the benefits had been only temporary, and 6 were not helped.

In 31 unilateral operations the opposite side had also benefited. In 29 and by questionnaire in 15. After exclusion of two anomalous findings, a good result was found in 34. In 2 the benefits had been only temporary, and 6 were not helped.

SUMMARY

The operation of vidian neurectomy is a valuable procedure that may be employed with great benefit in intractable vasomotor rhinitis. Forty-seven patients on whom vidian nerve section had been performed were followed up after a year or more had elapsed since operation. Of these, 44 were traced and the permanent benefits were assessed by examination in 29 and by questionnaire in 15. After exclusion of two anomalous findings, a good result was found in 34. In 2 the benefits had been only temporary, and 6 were not helped. In 31 unilateral operations the opposite side had also benefited in 11 instances. Adverse sequelae are recorded and the failed cases studied in an attempt to discover the cause of an unsatisfactory result. The relevant anatomy and operative procedures are discussed.

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REFERENCES