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REVIEW

Endoscopic posterior nasal neurectomy: an alternative to Vidian neurectomy

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Summary

Although Vidian neurectomy is very effective as a means of alleviating symptoms of chronic rhinitis (allergic rhinitis and vasomotor rhinitis), it is presently seldom used because of a high incidence of complications such as disturbed lacrimal secretion and sensory disorders of the cheek and gum. In 1997, Kikawada succeeded in endoscopically cutting the posterior nasal nerve (a ramus of the Vidian nerve) at the level of the sphenopalatine foramen under clear vision. This technique has since been improved into one that allows safe and rapid completion of the operation using a bipolar device. This new technique of endoscopic posterior nasal neurectomy with a bipolar device will be presented in this paper.

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Introduction

It is known that Vidian neurectomy provides an effective means of alleviating the symptoms of allergic rhinitis and vasomotor rhinitis. However, because of a high incidence of complications such as disturbed lacrimal secretion and palsy of the cheek and gum, this operative procedure is seldom used at present.

The posterior nasal nerve is a peripheral branch of the Vidian nerve, entering the nasal cavity through the sphenopalatine foramen after bifurcation of the nerve into the lacrimal gland. This nerve consists not only of parasympathetic secretory fibers but also of sensory nerve fibers leading from the second ramus of the trigeminal nerve. Because of these anatomical features of the posterior nasal nerve, cutting this nerve is expected not only to exert effects similar to those expected of Vidian neurectomy but also to yield additional effects arising from simultaneous blockade of sensory nerve fibers, thus making this procedure superior to Vidian neurectomy [1].

This novel procedure, so-called posterior nasal neurectomy, was first attempted by Kikawada in 1997. Since then, the procedure has undergone repeated modifications and has become established as a safe and rapid operation using a bipolar device [2]. Posterior nasal neurectomy is both reliable and makes control of intraoperative bleeding easier than before.

None of the complications seen with Vidian neurectomy has developed in any individual following operation with this procedure.

Operative procedure

Posterior nasal neurectomy is performed under general anesthesia. A hard endoscope (0° or 30°) is used. First, epinephrine solution (diluted 1:100 000) is injected topically to the posterior end of the middle nasal meatus in a volume of 3–5 mL (Fig. 1). Then, the palatine bone and mucoperiosteum are freed. In this way, intraoperative bleeding can be controlled, and subsequent manipulations such as mucosal incision and elevation of mucosal flap become easier.

Incision is done at the posterior end of the middle nasal meatus. The sphenopalatine foramen is often located at a point posterosuperior to the posterior end of the horizontal part of the middle turbinate basal plate. For this reason, incision is made longitudinally at a point about 1.5 cm

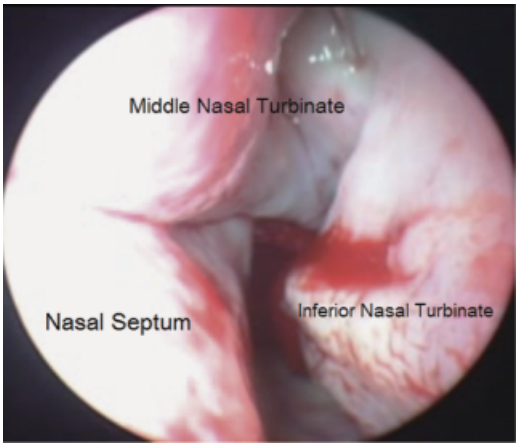

Fig. 1. Hard endoscopic view of middle nasal meatus.

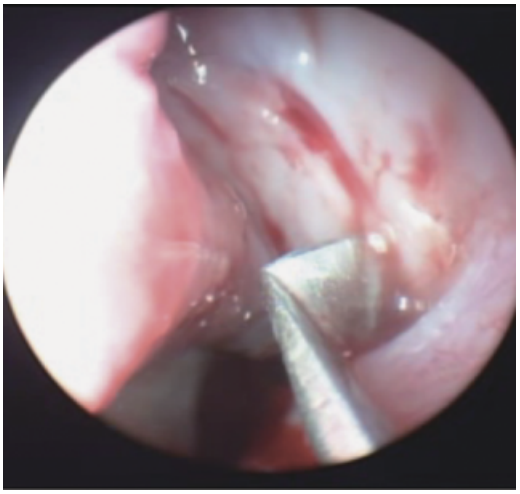

Fig. 2. Longitudinal incision at the posterior end of the middle nasal meatus. Incision is made about 1.5 cm anterior to the posterior end of the middle turbinate basal plate perpendicular to the inferior turbinate.

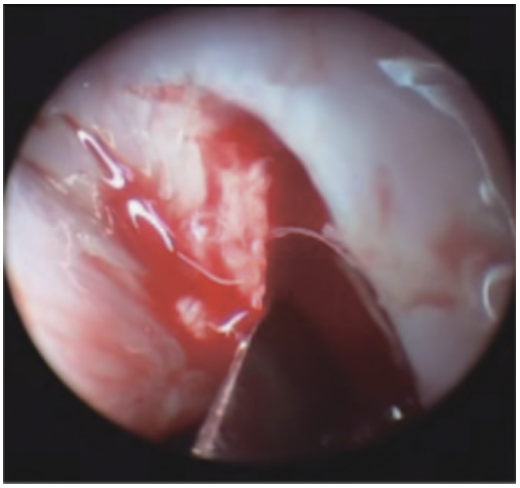

Fig. 3. Elevation of the mucosal flap by dissector. Mucosa and bone can be freed easily if local injection has been done appropriately in advance.

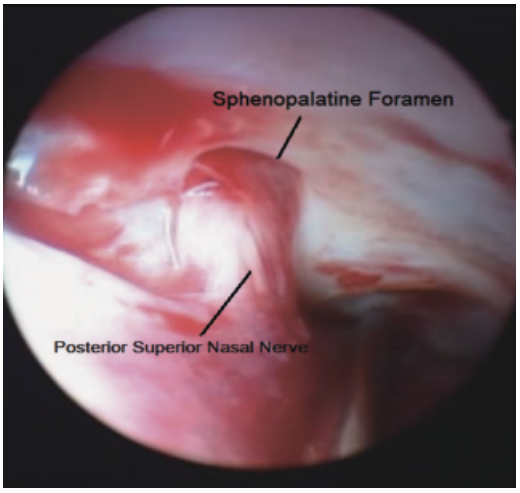

Fig. 4. Sphenopalatine foramen and posterior superior nasal nerve. Adequate dissection of mucosa allows the surgeon to confirm the sphenopalatine foramen immediately below the sphenoidal process of the palatine bone.

anterior to the posterior end of the horizontal part of the middle turbinate basal plate in a way perpendicular to the inferior turbinate (Fig. 2).

For incision, laser of various kinds (semiconductor laser, KTP laser) or a triangle tip knife is used. Laser incision is advantageous in providing good haemostatic effects in some cases. However, care is needed because of the possibility that deep application of laser perforates through the palatine bone, causing unexpected bleeding. At our facility, a triangle tip knife is often used. If incision is made perpendicularly to the inferior turbinate, it is possible to avoid injury of the branch of the sphenopalatine artery in the inferior turbinate and thereby to minimize bleeding.

For elevation of the mucosal flap, a dissector is inserted into the space created by incision between the mucosa and the bone. Then, dissection is done along the bone. The mucosa and bone can be freed easily if local injection has been done appropriately in advance (Fig. 3). Adequate dissection of the upper and lower areas allows the surgeon to confirm the sphenopalatine foramen immediately below the sphenoidal process of the palatine bone (Fig. 4).

The sphenopalatine artery runs parallel to the posterior nasal nerve and is covered with a thin layer of periosteum. If this periosteum is divided, a clear view of the artery and the nerve can be obtained. However, use of a dissector sometimes injures the artery's main stem or branch, resulting immediately in a poor visual field.

Bleeding can be minimized if the periosteum is divided while bipolar electrocautery is performed. If the periosteum is further freed, the sphenopalatine artery and

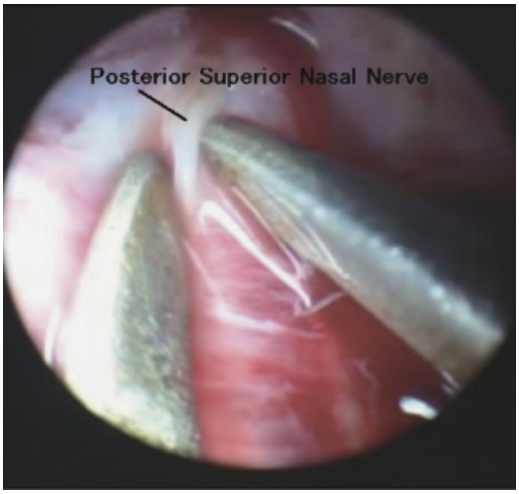

Fig. 5. Confirmation of the posterior superior nasal nerve.

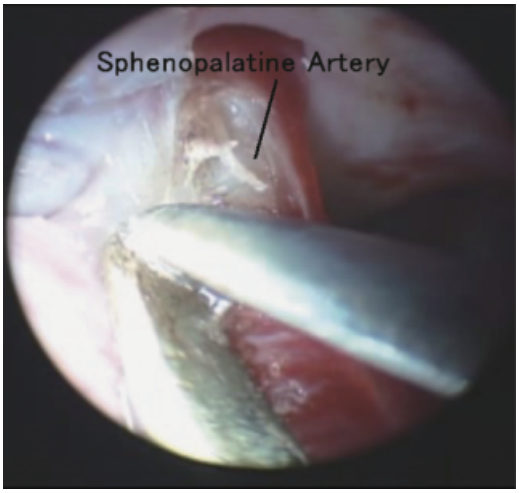

Fig. 6. Confirmation of the sphenopalatine artery.

posterosuperior nasal ramus of the posterior nasal nerve can be confirmed (Figs 5 and 6).

When performing neurectomy, two nerves are usually seen on the anterior plane of the artery; however, there may be some variation in the number and location of the nerve. To ensure reliable neurectomy, complete excision of the area around the sphenopalatine artery is needed. The area around the artery is excised completely by bipolar device while taking care to avoid injury of the artery (Fig. 6).

For coagulation of the sphenopalatine artery, the artery is pinched by bipolar device so as to effect adequate coagulation (Fig. 7). Preservation of the artery allows prevention of delayed after-bleeding, which can occur even remotely after surgery (Fig. 7).

Finally Merocel sponge, cut into an appropriate size, is inserted into the wound and olfactory sulcus to complete the operation.

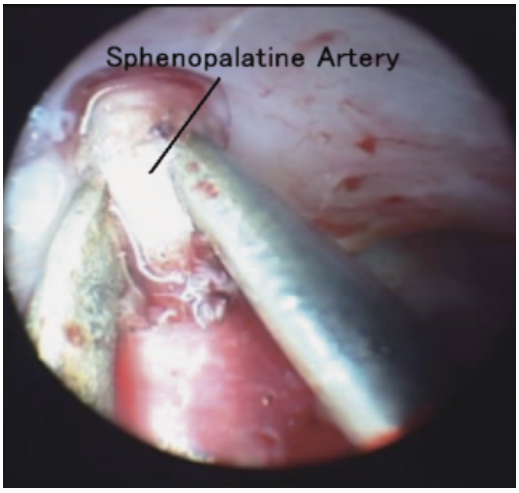

Fig. 7. Coagulation of the sphenopalatine artery using a bipolar device.

Complications

Of the 1056 patients who underwent this surgery at our facility between 1997 and 2005, seven patients developed bleeding behind the nasal cavity (from the posterior edge of the nasal septum or the vicinity of the natural foramen of sphenoidal sinus) at 1–4 weeks post-operatively [2]. This seemed compensatory bleeding due to coagulation of bilateral sphenopalatine arteries. In all these cases, endoscopic haemostasis was successful.

No case of disturbed lacrimal secretion or trigeminal neuralgia has been observed to date.

Outcomes

A questionnaire survey was conducted in 94 patients $\geqslant 2$ years after surgery. Efficacy of the procedure was evident in about 80% of cases [1]. A similar report from another facility also demonstrated satisfactory alleviation of symptoms at 2 years after surgery with this procedure [3]. According to another report, assessment at 6 months to 4 years after surgery revealed alleviation of symptoms (nasal discharge, nasal congestion, and sneezing) in about 90% of cases [4].

Conclusion

Posterior nasal neurectomy is a very simple operative procedure with low invasiveness. The surgeon can have clear vision of the posterior nasal nerve and sphenopalatine artery during the operation, facilitating excellent safety, and reliability. Intraoperative massive bleeding is quite unlikely because bleeding is controlled by bipolar device during surgery. Experienced surgeons can complete this operation in 5–10 min. Complications that are often seen following Vidian neurectomy are unlikely with this procedure.

If posterior nasal neurectomy is applied to cases of perennial rhinitis and vasomotor rhinitis resistant to conservative treatment, long-term control of symptoms is possible, thus contributing to improving the quality of life of patients.

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