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## **Endoscopic Diathermy of the Sphenopalatine Artery in Severe Posterior Epistaxis**

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The present study evaluated the role of endoscopic electrocoagulation of sphenopalatine artery for persistent posterior epistaxis despite of conservative measures. Patients were selected from the Dar Al Shifa hospital, Kuwait, complaining of recurrent epistaxis. Thirteen patients were treated with endoscopic electrocoagulation of sphenopalatine artery from February 2006 and January 2008. The basic principle of this surgical technique which involves identification of the sphenopalatine artery via endonasal endoscopy and electrocoagulation. The technique has been described. Endoscopic coagulation of sphenopalatine artery was carried out unilaterally in 3 patients and bilaterally in 10 patients. The artery was identified in all cases with successful postoperative results. This method is an effective surgical technique for persistent posterior epistaxis with low morbidity.

**Key words:** Epistaxis, endoscopic coagulation, sphenopalatine artery

## INTRODUCTION

Severe posterior epistaxis is a potentially life-threatening condition for the patient. Normally, the bleeding point itself cannot be visualized.

The arterial supply to the nasal fossa is complex and involves branches from both the external and internal carotid arteries. The sphenopalatine artery is a terminal artery of the internal maxillary artery and enters the nasal cavity through the sphenopalatine foramen. It artery serves as the major supply to the nasal fossa via the lateral and medial branches. The lateral branches supply the inferior, middle and superior turbinates; the medial or septal branches supply the nasal septum (Sharp *et al.*, 1997).

A closure by ligation or diathermy of the sphenopalatine artery prevents direct retrograde and collateral blood supply from contralateral and ipsilateral carotid systems (Lee *et al.*, 2002).

Traditional techniques of arterial ligation such as transantral ligation of the internal maxillary artery or ligation of the external carotid artery have been associated with a failure rate of as high as 10-15%. The reasons for failure include cross anastomosis, a dominant contralateral internal maxillary artery and also failure to identify and ligate all branches. For effective decrease in arterial pressure, ligation is best undertaken as close to the bleeding area as possible. Endoscopic ligation of the sphenopalatine artery (ESPAL), which is at a point distal to all retrograde and anastomotic connections, is conceptually an effective and logical site to direct treatment (Budrovich and Saetti, 1992).

Prades (1978) and was the first to consider microsurgical sphenopalatine artery ligation (SPAL) via route to the pterygopalatine fossa. Sulsenti *et al.* (1987) employed an operating microscope to clip the artery endonasally.

The indication for endoscopic ligation or diathermy of sphenopalatine artery is severe hemorrhage unresponsive to conservative treatment and such as nasal packing and adjuvant medicine (Shaw *et al.*, 1993).

Epistaxis that is secondary to a coagulopathy of whatever nature is not an indication for ESPAL and usually responds to nasal packing and reversal of bleeding disorder. I however and if the coagulopathy is reversed and the patient continues to bleed then ESPAL may be considered (Schaitkin *et al.*, 1987).

## MATERIALS AND METHODS

Between February 2006 and January 2008 and 13 patients were evaluated in the Dar Al Shifa hospital Kuwait complaining primarily from severe epistaxis.

All 13 cases were initially treated with conventional anterior nasal packing, either with ribbon gauze or with Merocel. Nine of these patients were presented with a history of recurrent episodes of epistaxis over 2 years, controlled only with anterior and posterior nasal packing on each occasion. The other 4 patient were presented with the first episode of persistent nasal bleed. As bleeding persisted, they then required posterior tamponade with a posterior nasal pack or a Foley's balloon catheter. Full medical assessment and blood investigations were carried out to assess haemoglobin level and to identify any coagulopathies. The packs were removed after 48 h. Patients had persistent bleeding upon removal of the packs and had to be repacked for a further period of 48 h. When bleeding still persisted despite these measures, surgical intervention via endoscopic coagulation of sphenopalatine artery was carried out. This procedure was carried out bilaterally in 10 patients and unilaterally in 3 patients based on the history of epistaxis and presentation of the patients.

**Technique:** The procedure is performed in the operative theater with the patient under general anesthesia. Both 0 and 30° endoscope, 4 mm in diameter and were used. Hypotensive anesthesia is used to reduce bleeding to maintain a clear surgical field

At the start of the procedure, 1 mL of 1% xylocaine with 1 in 1,00,000 adrenaline was injected via a 1 inch needle into the greater palatine foramen. This was intended to reach the terminal tributaries of the internal maxillary artery in the pterygo-palatine fossa and to cause vasoconstriction. In addition, a high volume injection of saline (3 mL) was also injected at the same site to pressure tamponade the vessel. The nasal packs were removed only after this injection

### Steps:

- The nasal cavity is decongested with 1:1000 epinephrine on cotton pledgets. Injection with 1% lidocaine with 1:100,000 units of epinephrine is performed in the operative field (i.e., middle turbinate and lateral wall of the posterior part of the middle meatus)
- After appropriate vasoconstriction, an incision is made 1 cm anterior to the posterior end of the middle turbinate. The incision is vertical and extends from the undercover of the middle turbinate down and but not acceding the superior limits of the inferior turbinate. The incision is taken down to the bone through the mucosa and periosteum

- A Freer elevator is used to raise a mucoperiosteal flap posteriorly and upward. Typically, a bony ethmoidal crest, crista Ethmoidalis, is exposed just anterior to the sphenopalatine foramen, the level of which is typically corresponds to the posterior free edge of the middle turbinate. The neurovascular bundle exiting the foramen emerges in a horizontal plane. Wide anastomosis to the level of posterior wall can be used as anatomical guide to the pedicle which is only a millimeter or so posterior to this
- After identifying the artery, which at this point might be bifurcated into 2 branches and diathermy using a bipolar grasping the artery is used for coagulation of the artery
- The mucoperiosteal flap is replaced to its original position. A light nasal packing for few hours was done. The patient is normally discharged in the next day after surgery

## RESULTS

Between February 2006 and January 2008, 13 patients were treated with this technique. Follow-up was for 6 months. They were 11 (84.6%) male and 2 (15.4%) females. The mean age was 51 (age range between 48 and 57 years). Nine patients had history of long standing hypertension (69%), 3 patients recently discovered hypertension (23%) and idiopathic bleeding in 1 patients (8%). The procedure took about 30 min. Endoscopic coagulation of sphenopalatine artery was carried out unilaterally in 3 patients and bilaterally in 10 patients. The anterior nasal pack was removed on the second postoperative day. No patient had any complication consequent to the procedure. All patients had successful control of epistaxis. All patients were discharged after pack removal.

## DISCUSSION

Traditionally the treatment options have included one or more of the following: nasal packing, septoplasty and arterial ligation of internal maxillary artery and external carotid artery or anterior ethmoidal artery. Apart from a high failure rate ranging from 26 to 52% and posterior nasal packing is associated with considerable discomfort and mucosal trauma, morbidity due to hypoxia (Shaw *et al.*, 1993).

Traditional arterial ligation methods are also associated with significant morbidity and failure rates. The transantral approach to the maxillary artery may cause damage to the nasolacrimal duct or infraorbital nerve and

thus cheek anaesthesia. External carotid artery ligation is associated with risk of damage to hypoglossal nerve and vagus nerve. Moreover there is a high failure rate due to extensive anastomosis distal to the site of ligation (Budrovich and Saetti, 1992).

Recently angiography and embolization of the bleeding vessels and endoscopic clipping or cauterization of sphenopalatine artery have been added to the management options. Percutaneous embolization of the maxillary artery requires the expertise of an experienced interventional radiologist, which is not uniformly available. It is also associated with serious neurological complications (Bant and Wood, 1999).

The microscopic surgical approach to the sphenopalatine foramen was first described by Prades (1978), as an approach for Vidian neurectomy. Subsequently, advances in techniques of nasal endoscopy, led to the sphenopalatine artery being accessed in the management of posterior epistaxis. This has resulted in the popularization of endoscopic ligation of sphenopalatine artery in the management of refractory epistaxis.

In this study, successful control of epistaxis obtained in all patient with coagulation of the sphenopalatine artery with no surgical complications, thereby avoiding the morbidity associated with prolonged nasal packing and other external surgical approaches.

In Sharp *et al.* (1997) elevated a mucosal flap over the sphenopalatine foramen and then used a transnasal endoscopic approach to apply either diathermy or clips to the sphenopalatine vessels in 10 patients with intractable epistaxis; they reported no treatment failures.

Similarly, Pritkin *et al.* (1998) applied bipolar diathermy and hemostatic clips to the sphenopalatine vessels via a transnasal endoscopic route in 10 patients with intractable epistaxis and they also reported a success rate of 100%.

Srinivasan *et al.* (2000) had compared transnasal endoscopic sphenopalatine artery diathermy with conventional approaches and including septoplasty and nasal packing and external carotid artery ligation. They found that the sphenopalatine artery diathermy group experienced a shorter hospital stay on average and they experienced no surgery-related complications.

Prepageran and Krishnan (2003) showed that endonasal endoscopic coagulation of sphenopalatine artery is a safe and efficient method of controlling persistent posterior epistaxis with minimal complication.

Buchwald and Jensen (2006) showed that this is a minimally invasive technique which is effective and significantly reduces the discomfort for the patient.

## CONCLUSION

In this study, the only additional modification is that high volume injection of saline via the greater palatine foramen to pressure tamponade the sphenopalatine artery in the pterygo-palatine fossa was done. It provides for a transient decrease in sphenopalatine artery blood flow and this will be helpful to control bleeding in management of refractory epistaxis. This transient control enables the removal of the pack and the time to undertake a formal coagulation of the vessel.

Thakar and Sharan (2005) in their study use the same technique with injection of saline in the greater palatine foramen and can achieved control of bleeding.

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