

Endoscopic Sphenopalatine Artery Ligation as an Elective Procedure for the Management of Posterior Epistaxis in a Tertiary Care Hospital: A Descriptive Study

A. Steffi¹, Arun Magendran², G. Gandhi³

¹Postgraduate, Department of Otorhinolaryngology, Head and Neck Surgery, Trichy SRM Medical College Hospital and Research Centre, Trichy, Tamil Nadu, India.

²Associate Professor, Department of Otorhinolaryngology, Head and Neck Surgery, Trichy SRM Medical College Hospital and Research Centre, Trichy, Tamil Nadu, India.

³Professor & HOD, Department of Otorhinolaryngology, Head and Neck Surgery, Trichy SRM Medical College Hospital and Research Centre, Trichy, Tamil Nadu, India.

Received: 26-12-2022 / Revised: 25-01-2023 / Accepted: 18-02-2023

Corresponding author: Dr. A. Steffi

Conflict of interest: Nil

Abstract

Background: Epistaxis is one of the most common emergencies in ENT. Its prevalence ranges from 12% to 15%. Upto 90% of the epistaxis have their origin in Little's area which can be easily treated with anterior tamponade, but 10% cases are of posterior in origin which requires more aggressive means of treatment.

Aim & Objectives:

1. The success rate of Endoscopic sphenopalatine artery ligation as an elective procedure in the management of recurrent posterior epistaxis.
2. Post-op complications and long-term outcome following Elective Endoscopic sphenopalatine artery ligation.

Methods: It is a retrospective descriptive study. 40 patients with recurrent posterior epistaxis who underwent Elective Endoscopic sphenopalatine artery ligation in the period between 2021 July – 2022 July were followed up at the end of first, third, fifth week, second month and sixth month of post op period and success rate of this procedure was assessed using available records. Successful endoscopic sphenopalatine artery ligation was defined as "No" further epistaxis or rebleed within 2 months of the procedure. Descriptive statistical analysis was carried out including frequency and percentage. The results were tabulated.

Results: There were 37.5% females and 62.5% males in the sample. The patient's average age was 52.98 years old, with a standard deviation of 16.87 years. The location of the bleeding was found to posterior in all 40 of the cases (100%). In all the patients the procedure was performed under general anaesthesia. During the operation, there were no complications with any of the forty patients. Within the first two months after surgery, there was only one case of bleeding that occurred again.

Conclusion: In the treatment of refractory/recurrent posterior epistaxis, an endoscopic ligation of the sphenopalatine artery is a surgery that is not only safe but also straightforward and successful. In addition, given the low risk of morbidity associated with the surgery, it is our standard practice to investigate the viability of this alternative therapeutic strategy at an early stage in the management of patients whose conditions do not improve with the use of traditional nasal packing.

Keywords: Posterior Epistaxis, Endoscopic Sphenopalatine Artery Ligation, Recurrent Epistaxis, Refractory Epistaxis.

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction:

Epistaxis is the most prevalent type of emergency that occurs in the field of ENT. Less than 0.2% of patients who come with epistaxis will ultimately require intervention, and this number is far lower than the 6% of patients who would require hospitalisation. [1]

Persistent epistaxis is defined as epistaxis that is not controlled by nasal packing or appears with continuing bleeding following the removal of packing. [2] Patients diagnosed with persistent/recurrent epistaxis must be hospitalised in order to undergo additional examination and treatment. Treatments can differ both within a centre and between centres for persistent /recurrent epistaxis, and there is no general agreement regarding the management of this condition. [3] Nasal compression is recommended as the first line of treatment for epistaxis by the American Academy of Otolaryngology - Head and Neck Surgery Guidelines. [4] In cases when there is chronic bleeding that cannot be managed by packing or nasal cauterization, surgical artery ligation or endovascular embolization are proposed as potential treatment options. [5] Endoscopic sphenopalatine artery ligation (ESPAL) has grown in popularity as a treatment for treating chronic epistaxis since it was initially introduced in 1963 by Malcomson et al., and with the recent broad use of endoscopic sinus procedures. [6] It has been demonstrated that the ESPAL method has a higher percentage of success, results in cost savings, and has a comparable rate of complications. There has been consistent publication of high-quality data and evidence based on the role that it plays in the treatment of persistent epistaxis. [7]

In this study, our objective was to determine the success rate of endoscopic sphenopalatine artery as an elective operation for the treatment of recurrent posterior epistaxis. Complications that occurred after the procedure and the long-term results of having an elective endoscopic sphenopalatine artery ligation.

Materials and Methods

The Present study is a retrospective descriptive study conducted for a period of 1 year from 2021 July – 2022 July on 40 patients with recurrent posterior epistaxis who underwent Elective Endoscopic sphenopalatine artery ligation in a tertiary care hospital, Trichy, Tamil Nadu.

Patients

After receiving approval from the institutional review board, a total of 40 patients with recurrent posterior epistaxis who underwent elective endoscopic sphenopalatine artery ligation between the year July 2021 and July 2022 were selected and the follow up records at the end of the first, third, and fifth weeks, as well as the second month and sixth month of the post-operative period were collected retrospectively. The success rate of this procedure was evaluated using the diagnostic nasal endoscopy records that were available. The endoscopic occlusion of the sphenopalatine artery was considered successful if there was "No" more epistaxis or rebleeding within two months of the procedure.

Inclusion criteria:

1. All patients with recurrent posterior epistaxis who needed hospital admission.

2. All patients whose bleeding was not controlled by conservative management.

Data Collection

Pre-intervention data

Age, gender, comorbidities (including hypertension, diabetes, coagulopathies, hemato-oncological diseases and anti-coagulation treatment prior to admission), number of previous hospitalizations due to epistaxis, and history of sinonasal surgery are all factors that are taken into consideration.

Intervention data

Any and all treatments administered before, during, and after admission to the hospital for the purpose of preventing epistaxis.

Post-intervention data

Recurrent events of epistaxis, broken down into early (up to 48 hours after controlling the epistaxis) and late (from 48 hours up to one month after controlling the epistaxis); mortality (defined as death up to one year following admission); post-intervention complications (major complications documented within two months or in the first follow-up visit following admission, including: synechia, septal perforation, anosmia, palatine ischemia, new onset of chronic sinusitis (documented details in diagnostic nasal endoscopic records)).

Surgical procedure

The ESPAL technique was carried out while the patient was under the influence of general anaesthesia and positioned in the supine posture. The procedure was performed via a trans nasal endoscopic technique.

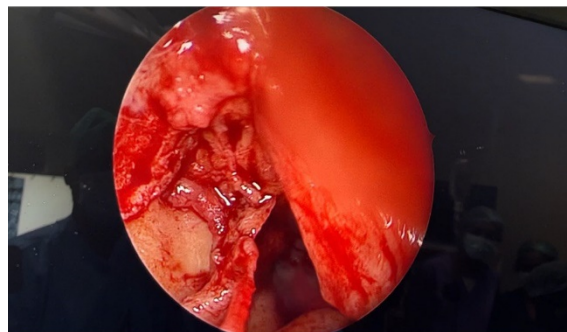


Figure 1: Crista ethmoidalis identified sphenopalatine artery visualized

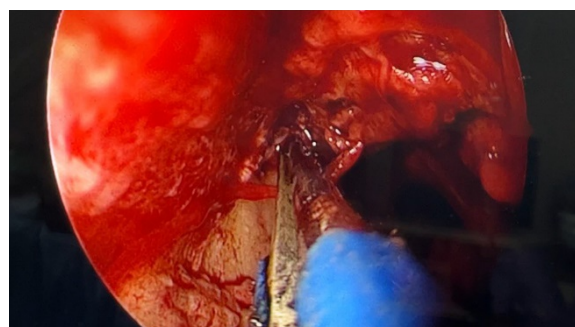


Figure 2: Sphenopalatine artery cauterized using bipolar diathermy

Following the achievement of local vasoconstriction with a lidocaine-adrenaline-soaked nasal pack, an examination of the nasal cavity was performed using a 0° endoscope. The

lignocaine and adrenaline injection (lignocaine 2% with adrenaline 1:80,000) was administered to the lateral wall in front of the posterior end of the middle turbinate and above the posterior border of

the inferior turbinate. After that, a suction freer was used to raise the mucosal flap on a subperiosteal plane, where it was placed over the palatine bone. An angled curette was utilized in order to locate and remove the ethmoidal crest that was located on the palatine bone. After locating it behind the ethmoid crest, the sphenopalatine foramen and the arterial branches that are connected to it were separated out. After the vessels were either clipped or cauterized, the mucosal flap was repositioned so that it was back against the lateral wall. Nasal cavity packed with merocele pack for 24 hours after that pack was removed and saline nasal douching was given for 7 days postoperatively to minimize the crusting following the procedure.

Statistical analysis

The application known as the Statistical Package for the Social Sciences was utilized in order to carry out statistical analyses (IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY, USA). Categorical variables are described using frequencies and percentages. The mean and standard deviation are the metrics that are used to characterize variables that followed a normal distribution (SD). Chi-squared tests were

utilized in order to determine the degree of connection between categorical variables. Following an examination of continuous variables for a normal distribution, a Mann–Whitney test was carried out in order to compare the two different groups. A p value of less than 0.05 when using two tails was determined to be statistically significant.

Results

During the time period covered by this study, participants included forty patients who had previously undergone endoscopic sphenopalatine artery for the treatment of posterior epistaxis. There were 37.5% females and 62.5% males in the sample. The patient's average age was 52.98 years old, with a standard deviation of 16.87 years. The ages ranged from 27 all the way up to 80 years old. The demographic information can be seen in table 5. The location of the bleeding was found to posterior in all 40 of the cases (100%). In all the patients the procedure was performed under general anaesthesia. During the operation, there were no complications with any of the forty patients. Within the first two months after surgery, there was only one case of bleeding that occurred again.

Table 1: Gender Distribution

Gender	Total = 40	
	Frequency	%
Male	25	62.5%
Female	15	37.5%

Table 2: Distribution of relevant medical and treatment history

	Frequency	Percentage (%)
Hypertension	10	25%
renal failure	0	0%
coagulation abnormalities	0	0%
Anticoagulants intake	3	7.5%
NSAID intake	3	7.5%

Table 3: Distribution of site of bleeding

Site of Bleeding	Frequency	Percentage (%)
Anterior	0	0%
Posterior	40	100%

Table 4: Type of anaesthesia used

Type of Anaesthesia	Frequency	Percentage (%)
General	40	100%
Local	0	0%

Table 5: Distribution of recurrent bleeding after the procedure

Recurrent Bleeding	Frequency	Percentage (%)
1 st Week	0	0%
3 rd Week	0	0%
5 th Week	0	0%
2 nd Month	1	2.5%

Table 6: Demographic data

S. N.	Variable	Frequency	Percentage
1	Age [mean (SD)]	52.98 (16.87)	
2	Sex		
	Male	25	62.5%
	Female	15	37.5%
3	H/O hypertension	10	25%
4	H/O renal failure	0	0%
5	H/O coagulation abnormalities	0	0%
6	H/O anticoagulants	3	7.5%
7	H/O NSAID	3	7.5%
8	Site of bleeding		
	Anterior	0	0%
	Posterior	40	100%
9	Anaesthesia		
	GA	40	100%
10	Blood transfusion	0	0%
11	Complications during procedure	0	0%
12	Epistaxis within 2 months	1	2.5%

Discussion

While the blood vessels that are responsible for anterior epistaxis are typically simple to identify and may be managed by the use of cauterization, the blood vessels that are responsible for posterior epistaxis can be frustrating for the surgeon as well as the patient.[8]

In the past, the treatment options have typically consisted of one or more of the following procedures: nasal packing, septoplasty, and arterial ligation of either the internal maxillary artery, the external carotid artery, or the anterior ethmoidal artery. In addition to having a high probability of failure that ranges from 26 to 52 percent, posterior nasal packing is

linked with significant discomfort, mucosal damage, and morbidity caused by hypoxia. [9-12]

The conventional methods of artery ligation are also linked to severe morbidity as well as high rates of surgical failure. [13] It is possible for the transantral approach to the maxillary artery to produce injury to the nasolacrimal duct or the infraorbital nerve, which would result in anaesthesia of the cheek. The ligation of the external carotid artery is related with an increased risk of injury to the vagus nerve and the hypoglossal nerve. In addition to this, there is a significant chance of failure because extensive anastomosis was performed at a location

that was distant to the site of ligation. [14-15]

The treatment options for this condition have recently been expanded to include endoscopic clipping or cauterization of the sphenopalatine artery, as well as angiography and embolization of the vessels that are bleeding. [16]

It is not always possible to find an experienced interventional radiologist who is qualified to do the percutaneous embolization of the maxillary artery because it requires their knowledge. Additionally, it has been linked to a number of severe neurological problems. [16]

Prades was the first person to describe the microscopic surgical approach to the sphenopalatine foramen. He did it in the context of doing a Vidian neurectomy. [17] After that, developments in nasal endoscopic procedures made it possible to reach the sphenopalatine artery during the treatment of posterior epistaxis. This was a significant step forward in the treatment of this condition. As a consequence of this, the endoscopic occlusion of the sphenopalatine artery has become increasingly common as a treatment for stubborn cases of epistaxis. Studies conducted by Sharp et al., Pritkin et al., and Srinivasan et al. all revealed a success rate of over 90% without any major problems. [18-20]

It is possible that our findings, which demonstrate the potential benefits of ESPAL in controlling persistent epistaxis regardless of presenting comorbidities, could serve as a resource for doctors in the process of patient selection. It has been demonstrated in the past that hypertension is a prevalent comorbidity among patients who have epistaxis; therefore, the significance of this finding cannot be overstated.

This study suffers from a number of shortcomings. To begin, it makes use of a retrospective approach, which by

definition is prone to introducing bias. In addition, the limited size of the sample.

Conclusion

In the treatment of refractory/recurrent posterior epistaxis, an endoscopic ligation of the sphenopalatine artery is a surgery that is not only safe but also straightforward and successful. In addition, given the low risk of morbidity associated with the surgery, it is our standard practice to investigate the viability of this alternative therapeutic strategy at an early stage in the management of patients whose conditions do not improve with the use of traditional nasal packing.

References

- Schlosser RJ. Epistaxis. *New England Journal of Medicine*. 2009 Feb 19;360(8):784-9.
- Viehweg TL, Roberson JB, Hudson JW. Epistaxis: diagnosis and treatment. *Journal of oral and maxillofacial surgery*. 2006 Mar 1;64(3):511-8.
- Umapathy N, Quadri A, Skinner DW. Persistent epistaxis: what is the best practice? *Rhinology*. 2005 Dec 1;43(4):305-8.
- Tunkel DE, Anne S, Payne SC, Ishman SL, Rosenfeld RM, Abramson PJ, Alikhaani JD, Benoit MM, Bercovitz RS, Brown MD, Chernobilsky B. Clinical practice guideline: nosebleed (epistaxis). *Otolaryngology–Head and Neck Surgery*. 2020 Jan;162(1_suppl):S1-38.
- Hey SY, Koo Ng NK, McGarry GW. Endoscopic sphenopalatine artery ligation: general applicability in a teaching unit. *Ear, Nose & Throat Journal*. 2019 Feb;98(2):85-8.
- Tessler I, Warman M, Sharav S, Batito HR, Halperin D, Cohen O. The role of endoscopic sphenopalatine artery ligation in the management of persistent epistaxis—A 15-year single-center experience. *American Journal of*

- Otolaryngology. 2020 Nov 1;41(6):10 2715.
7. Chitsuthipakorn W, Seresirikachorn K, Kanjanawasee D, Snidvongs K. Endoscopic sphenopalatine foramen cauterization is an effective treatment modification of endoscopic sphenopalatine artery ligation for intractable posterior epistaxis. *European Archives of Oto-Rhino-Laryngology*. 2020 Sep;277(9):2463-7.
 8. Kucik CJ, Clenney TL. Management of epistaxis. *American family physician*. 2005 Jan 15;71(2):305-11.
 9. Newton E, Lasso A, Petreich W, Kilty SJ. An outcomes analysis of anterior epistaxis management in the emergency department. *Journal of Otolaryngology-Head & Neck Surgery*. 2016 Dec;45(1):1-5.
 10. Melia L, McGarry GW. Epistaxis: update on management. *Current opinion in otolaryngology & head and neck surgery*. 2011 Feb 1;19(1):30-5.
 11. Pope LE, Hobbs CG. Epistaxis: an update on current management. *Postgraduate medical journal*. 2005 May 1;81(955):309-14.
 12. Diamond L. Managing epistaxis. *Jaapa*. 2014 Nov 1;27(11):35-9.
 13. Kumar S, Shetty A, Rockey J, Nilssen E. Contemporary surgical treatment of epistaxis. What is the evidence for sphenopalatine artery ligation? *Clinical Otolaryngology & Allied Sciences*. 2003 Aug;28(4):360-3.
 14. Villwock JA, Jones K. Recent trends in epistaxis management in the United States: 2008-2010. *JAMA Otolaryngology-Head & Neck Surgery*. 2013 Dec 1;139(12):1279-84.
 15. Kotecha B, Fowler S, Harkness P, Walmsley J, Brown P, Topham J. Management of epistaxis: a national survey. *Annals of the Royal College of Surgeons of England*. 1996 Sep; 78(5): 444.
 16. Traboulsi H, Alam E, Hadi U. Changing trends in the management of epistaxis. *International journal of otolaryngology*. 2015 Aug 16;2015.
 17. Prades JM, Asanau A, Timoshenko AP, Faye MB, Martin C. Surgical anatomy of the sphenopalatine foramen and its arterial content. *Surgical and radiologic anatomy*. 2008 Oct;30(7):583-7.
 18. Sharp HR, Rowe-Jones JM, Biring GS, Mackay IS. Endoscopic ligation or diathermy of the sphenopalatine artery in persistent epistaxis. *The Journal of Laryngology & Otology*. 1997 Nov;111(11):1047-50.
 19. Pritikin JB, Caldarelli DD, Panje WR. Endoscopic ligation of the internal maxillary artery for treatment of intractable posterior epistaxis. *Annals of Otology, Rhinology & Laryngology*. 1998 Feb;107(2):85-91.
 20. Srinivasan V, Sherman IW, O'sullivan G. Surgical management of intractable epistaxis: audit of results. *The Journal of Laryngology & Otology*. 2000 Sep; 114(9):697-700.