

## CASE REPORT

## An Unusual Variant of the Sphenopalatine Foramen and Artery with an Absent Crista Ethmoidalis: An Intra-Operative Challenge

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### ABSTRAK

*Ligasi arteri sphenopalatine merupakan satu terapi pembedahan untuk masalah hidung berdarah. Prosedur ini memerlukan pengetahuan yang luas mengenai variasi anatomi hidung. Walaubagaimanapun, petanda yang biasanya dipercayai seperti crista ethmoidalis mungkin tidak dijumpai atau tiada langsung. Variasi tersebut adalah penting dan boleh menentukan keberkesanan prosedur ini. Kami memaparkan satu kes variasi foramen dan arteri sphenopalatine yang tiada crista ethmoidalis. Foramen sphenopalatine dijumpai di bahagian atas meatus superior melepasi lamella concha superior di bahagian horizontalnya. Hanya satu cabang arteri yang ditemui keluar daripada foramen sphenopalatine. Foramen sphenopalatine diukur daripada bahagian depan hidung. Ia berukuran 69 mm dari "nasal sill" dan 54 mm dari limen nasi.*

*Kata kunci: arteri sphenopalatine, crista ethmoidalis, foramen sphenopalatine, hidung berdarah*

### ABSTRACT

Sphenopalatine artery ligation (SPL) is a surgical remedy for severe epistaxis. This procedure requires extensive knowledge of the various anatomical variants. Its topographical anatomy varies and reliable landmark such as the crista ethmoidalis may be absent. These variations are crucial and they dictate the outcome of the surgery. We present a peculiar case of a postero-superiorly located variant of the sphenopalatine foramen and artery with an absent crista ethmoidalis. The sphenopalatine foramen was found superiorly at the superior meatus beyond the horizontal part of the lamella of the superior concha. Only one trunk was seen exiting the sphenopalatine foramen. The sphenopalatine foramen was measured

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from the anterior part of the nose. It was 69mm from the nasal sill and 54mm limen nasi.

Keywords: Sphenopalatine foramen, sphenopalatine artery, epistaxis, crista ethmoidalis

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## INTRODUCTION

Endoscopic sphenopalatine artery ligation is a known successful approach to alleviating severe epistaxis. The procedure may rather prove to be tricky with so many anatomical variants. Intimate knowledge of all the possible anatomical variants is vital in performing SPA ligations to achieve excellent surgical outcome. A surgeon with familiarity with the variants should find this a straightforward procedure. (Simmen et al. 2006). We present a peculiar case of a postero-superiorly located variant of the sphenopalatine foramen and artery with an absent crista ethmoidalis. The absent crista ethmoidalis is a significant landmark for the search of the sphenopalatine foramen and its artery (Lee et al. 2002). Furthermore, the location of the sphenopalatine foramen and its number of vessel appearing from it may complicate the outcome and aim of the surgery.

## CASE REPORT

We report on a 56-years-old male who presented with left-sided unilateral epistaxis. He was previously well and his epistaxis failed to stop despite conservative methods. It started two days prior to admission and was estimated at 200 ml each day. Upon arrival in the emergency department, he was found to be hypertensive at 200/110

mmHg which was successfully treated with anti-hypertensive medication. Rigid 0 degree nasal endoscopy was done which revealed blood trickling from the right ostiomeatal complex (OMC). The epicenter was not as yet visible. The epistaxis was so severe that he had blood trickling out of his anterior nares bilaterally as well as posteriorly into his oropharynx. Anterior and posterior nasal packing was done and he was admitted for close observation. A repeat full blood count 24 hrs later revealed a drop of hemoglobin level of 5g/dL from 14g/dL to 9g/dL. The steep fall of hemoglobin level and failure of nasal packing prompted surgical intervention. He underwent an endoscopic sphenopalatine artery ligation under general anaesthesia 24 hrs after admission.

Intra-operatively, fresh blood with old clotted blood was seen in the left nasal cavity with some overspill noted in the right nasal cavity. Once both nasal cavities were suctioned, we found the right side to be normal, with fresh blood oozing from left lateral wall. A right middle meatalantrostomy was performed. The posterior wall of the maxillary sinus was identified. A mucoperichondrial flap was made postero-superiorly and postero-inferiorly to identify the crista ethmoidalis. This was found to be absent which made locating the sphenopalatine foramen a challenge

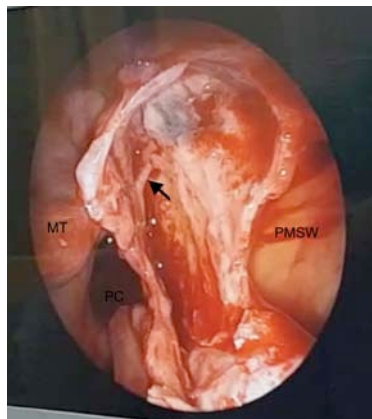


Figure 1: Left nasal cavity with black arrow pointing at the left sphenopalatine artery. (MT: Middle turbinate; PC: Posterior choana; PMSW: Posterior maxillary sinus wall.

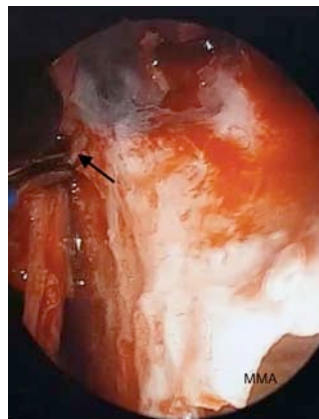


Figure 2: Cauterization of the left sphenopalatine artery (MMA: Middle Meatal Antrostomy)

as it was not immediately visible. The sphenopalatine foramen was found superiorly at the superior meatus beyond the horizontal part of the lamella of the superior concha (Figure 1). Only one trunk was seen exiting the sphenopalatine foramen. The sphenopalatine foramen was measured from the anterior part of the nose. It was 69 mm from the nasal sill and 54 mm limen nasi. The trunk of the sphenopalatine artery was successfully cauterized and bleeding stopped (Figure 2). Anterior nasal packing was done at the end of the procedure.

The patient was well with no epistaxis, post-operatively. The anterior nasal packing was removed the next day. He was discharged well following two days of observation.

## DISCUSSION

The present patient with epistaxis was initially subjected to anterior and posterior packing as per local

protocol. When this failed to check the epistaxis, he underwent endoscopic sphenopalatine artery ligation. Numerous reports recommend this technique as it has a high success rate (Graz-Cabrerizo et al. 2014; Abdelkader et al. 2007). The intimate knowledge of the multiple variants of the sphenopalatine foramen and its artery is essential to a successful outcome.

Studies had been done revealing the commonest location of the sphenopalatine foramen (SPF). According to Lee et al., 90% is located within the superior meatus, between the middle turbinate and the posterior horizontal end of the lamella of the superior turbinate, attaching to the lateral nasal wall while in 10%, the foramen extended superiorly beyond the posterior horizontal portion of the lamella of the superior turbinate (Lee et al. 2002). In this case, in terms of its location it is consistent with the report i.e. located at the superior meatus beyond the horizontal part of

Table 1: The number of branches emerging from the sphenopalatine foramen in percentage by authors

Author	1 branch (%)	2 branches (%)	3 branches (%)
Lee et al. 2002 n=50	0	76	22
Simmen et al. 2006 n=75	2.7	32	31
Padua et al. 2008 n= 122	67	21	12
Gras-Cabrerizo et al. 2013 n= 107	63	32	5

the lamella of the superior turbinate. However, the measurements 69 mm from the nasal sill and 54 mm limen nasi were deviated from a study  $59.4 \pm 4.2$  mm and  $49.1 \pm 3.7$  mm (Lee et al. 2002).

The crista ethmoidalis (CE) is a vital anatomical landmark which unfortunately was absent in our patient. Bolger et al., observed 95.5% of the cadavers had the SPF posterior to the crista ethmoidalis (Bolger et al. 1999). The presence of the (CE) in 96.4% is highlighted by Rezende et al. (2012). Its absence is a rare phenomenon and provides a difficult intra-operative challenge in the search for the sphenopalatine foramen and artery, especially in an acutely bleeding patient.

Much has been documented on the number of branches of the SPA (Table 1). Lee et al. reported SPA divided into two branches 76%, three branches 22%, four branches 2% (Lee et al. 2002). Simmen et al. (2006) reported a range from 1 to 10 branches branched from the SPA. Two or three branches are the commonest at 32% and 31%. More recently, Padua & Voegels (2008) and Gras-Cabrerizo et al. (2014)

contradicted that the single trunk is the commoner finding with incidence of 67% (Pádua & Voegels 2008), and 63% (Gras-Cabrerizo et al. 2014). The number of branches vary depending on the authors finding the branches before and after crossing the SPF. All branches had to be ligated to logically to avoid failure in endoscopic SPA ligation. In our patient, only one branch was found. This single branch of the SPA was cauterized and it successfully checked the epistaxis.

## CONCLUSION

The anatomy of the lateral nasal wall varies significantly. Intimate knowledge of all the possible anatomical variants is vital in performing SPA ligations to achieve excellent surgical outcome.

## REFERENCES

- Abdelkader, M., Leong, S.C., White, P.S. 2007. Endoscopic control of the sphenopalatine artery for epistaxis: long-term results. *J Laryngol Otol* 121(8):759-62.
- Bolger, W.E., Borgie, R.C., Melder, P. 1999. The role of the crista ethmoidalis in endoscopic sphenopalatine artery ligation. *Am J Rhinol* 13(2): 81-6.
- Gras-Cabrerizo, J.R., Ademá-Alcover, J.M., Gras-Albert, J.R., Kolanczak, K., Montserrat-Gili, J.R.,

- Mirapeix-Lucas, R., Del Campo, F.S., Massegur-Solench, H. 2014. Anatomical and surgical study of the sphenopalatine artery branches. *Eur Arch Otorhinolaryngol* **271**(7): 1947-51.
- Lee, H.Y., Kim, H.U., Kim, S.S., Son, E.J., Kim, J.W., Cho, N.H., Kim, K.S., Lee, J.G., Chung, I.H., Yoon, J.H. 2002. Surgical anatomy of the sphenopalatine artery in lateral nasal wall. *Laryngoscope* **112**(10): 1813-8.
- Pádua, F.G., Voegels, R.L. 2008. Severe posterior epistaxis—endoscopic surgical anatomy. *Laryngoscope* **118**(1): 156-61.
- Rezende, G.L., Soares, V.Y., Moraes, W.C., Oliveira, C.A., Nakanishi, M. 2012. The sphenopalatine artery: a surgical challenge in epistaxis. *Braz J Otorhinolaryngol* **78**(4): 42-7.
- Simmen, D.B., Raghavan, U., Briner, H.R., Manestar, M., Groscurth, P., Jones, N.S. 2006. The anatomy of the sphenopalatine artery for the endoscopic sinus surgeon. *Am J Rhinol* **20**(5): 502-5.

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