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Clinical Record

Non-sphenopalatine dominant arterial supply of the nasal cavity: an unusual anatomical variation

D Biswas, S K Ross, A Sama, A Thomas*

Abstract

Objective: We present a rare and clinically relevant anomaly of the sphenopalatine artery in relation to its blood supply of the nasal mucosa, with implications for the management of epistaxis.

Method: Case report and review of the world literature, using Medline through Pub Med (1950–2005), EMBASE (1980–2005) and Ovid (1958–2005), searching for papers using a combination of terms including 'spheno-palatine artery', 'anterior ethmoidal artery' and 'epistaxis'.

Results: In the presented case of refractory epistaxis, endoscopic and subsequent endovascular management failed to identify a significant supply from the sphenopalatine arteries bilaterally. The main supply was found to be from the anterior ethmoidal arteries.

Conclusion: After a detailed search, the authors failed to locate any similar case in the English literature.

Key words: Epistaxis; Sphenopalatine Artery; Ethmoidal Arteries

Introduction

Anatomical variations of the sphenopalatine artery have previously been well described.[1–3] However, the complete absence of this vessel has not yet been reported in the context of epistaxis management. In this report, we highlight the difficulty experienced in the management of a case of epistaxis. The anterior ethmoidal arteries were found to contribute the main arterial supply of the nasal cavity.

Refractory posterior epistaxis is often a challenge for otolaryngologists. Current algorithms for managing this condition can call for interruption of the arterial blood supply to the nasal mucosa, accomplished either by an endonasal endoscopic approach or by arteriography-guided embolisation. The reported sphenopalatine artery anomaly is rare but has direct clinical relevance. It may be added to the list of causes of failure of endoscopic ligation of the sphenopalatine artery.

Case report

An 80-year-old man presented to our university-affiliated, tertiary level, teaching hospital with bilateral, intractable epistaxis. The bleeding was refractory to conventional management with cautery and packing. The patient was receiving warfarin for atrial fibrillation, ischaemic heart disease and previous transient ischaemic attacks.

The initial international normalised ratio was 2.7.

Rigid endoscopy did not reveal a definite bleeding point; however, it appeared to be posterior.

Initial endoscopic dissection under general anaesthesia failed to locate the sphenopalatine artery.

Angiography was therefore performed on the same day (see Figure 1). This showed that the major arterial supply to the nasal mucosa was actually from the anterior ethmoidal arteries bilaterally.

Following this, bilateral anterior ethmoidal artery ligation was successfully performed via an external approach.

At one year follow up, there was no recurrence of symptoms.

Discussion

The importance of the functional anatomy of the nose has grown since the advent of endoscopy and interventional radiology. It is hoped that our report of the above vascular anomaly will add to the understanding of this field.

The complexity of the vascular anatomy of the nasal cavity lateral wall, in relation to the management of severe posterior epistaxis, has been highlighted by Padua *et al.*, Simmen *et al.* and Lee *et al.* in cadaver dissections.[1–3] These showed that the primary blood supply to the posterior nasal cavity is derived from the terminal branches of the sphenopalatine and posterior nasal arteries. Given this, Schwartzbauer *et al.* conducted an anatomical study to examine the relationship of these two arteries as they exit the pterygopalatine fossa and enter the nasal cavity.[4] None of these publications mentioned an absent sphenopalatine artery.

Previous papers have highlighted the difficulty of dissecting the sphenopalatine artery. In particular, Kumar *et al.*, from a detailed literature search, identified a 2 per cent failure rate of sphenopalatine artery ligation, in a pooled series of 127 cases from 11 studies.[5] Budrovich and Saetti also reported their difficulties in isolating the sphenopalatine artery during surgery.[6] The anatomical variation of this region, and the scarcity of endoscopic studies showing surgical landmarks, may contribute to this

From the Departments of Otorhinolaryngology, and *Radiology, Queen's Medical Centre, University of Nottingham, UK.
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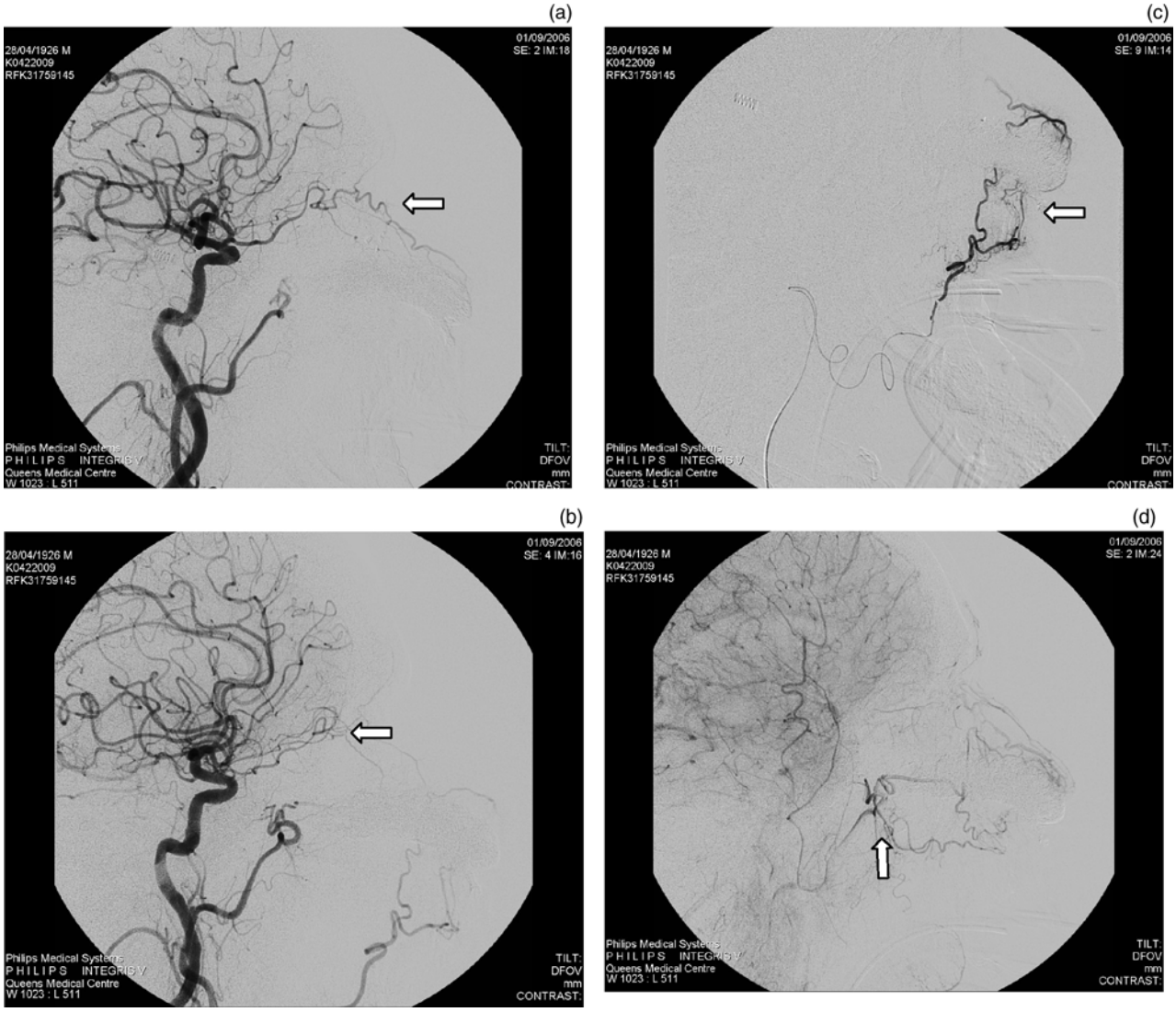

FIG. 1

Conventional, bilateral angiography of the internal carotid and external carotid arteries (right common femoral artery approach with a 4F JB2 catheter, with common carotid injections), showing that the main feeding vessels to the areas of hyperaemia within the nasal cavity appear to be the ethmoidal arteries bilaterally (a and b) and the right facial artery (c), with a very insignificant contribution from the left sphenopalatine artery (d).

difficulty.[1] However, there are no cases reported in English literature in which a significant sphenopalatine artery was not identifiable during endoscopic dissection, involving an experienced rhinologist and angiography, in management of refractory posterior epistaxis.

- **Anatomical variations of the sphenopalatine artery have previously been well described. However, absence of this artery has not previously been reported in the context of epistaxis management**
- **This case highlights a rare difficulty in managing posterior epistaxis; the anterior ethmoidal arteries were found to contribute the main arterial supply of the nasal cavity**
- **Angiography and subsequent anterior ethmoidal artery ligation should be considered if the sphenopalatine arteries are absent, or not identified during surgical exploration, to enable definitive management of epistaxis**

Conclusion

This case highlights an important and clinically relevant anatomical variation of the sphenopalatine artery. Otolaryngologists should be aware of this rare abnormality while exploring the sphenopalatine artery for management of epistaxis. Angiography and subsequent anterior ethmoidal artery ligation should be considered if the sphenopalatine arteries are absent or not found during surgical exploration, to enable definitive management of epistaxis. Awareness of this rare entity is important for prompt and appropriate management of posterior epistaxis.

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Address for correspondence:
Mr Deb Biswas,
Department of Otolaryngology,
Queen's Medical Centre,
University of Nottingham,
Derby Road,
Nottingham NG7 2UH, UK.

Fax: 00441159709748
E-mail: drdbiswas@hotmail.com

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