Research Article

Endoscopic Sphenopalatine Artery Cauterization for Severe Posterior Epistaxis

Balegh H. Aly Abdel-Hak, Mostafa I. Ahmed, Eman H. Mahmoud
Department of Otorhinolaryngology, faculty of medicine, El-Minia University, Egypt

Abstract
Background: Epistaxis is the bleeding from nose. It is a common complaint and it is the commonest emergency otolaryngologists' encounter. Epistaxis can be life- threatening due to aspiration, hypotension, and anemia as well as associated co-morbidities. Endoscopic control of sphenopalatine artery (SPA) has been advocated as an effective alternative for the control of sever epistaxis. **Aim of the work:** To evaluate effectiveness of endoscopic SPA cauterizations for control of sever epistaxis. **Patient and methods:** The current study included 20 patients with severe posterior epistaxis. Patients with no response to anterior and posterior packing had undergone endoscopic SPA cauterization. **Results**: Fifteen percentage of patients (n=3) had moderate postoperative bleeding, while the other 85% (n=17) had no postoperative bleeding. By endoscopic examination of the three cases with postoperative bleeding readmitted for control of epistaxis under general anesthesia, the anterior ethmoidal artery (AEA) was found to be the source of bleeding and it was controlled by AEA cauterization. **Conclusion:** Endoscopic SPA cauterization technique seems to be safe, simple, fast, and effective for management of severe epistaxis with low morbidity and complications. Endoscopic SPA cauterization should be considered as an immediate second-line management for sever epistaxis when conservative treatment as first-line management fails.
Key words: Epistaxis, Sphenopalatine artery, endoscopic cauterization.

Introduction
Epistaxis is the most common emergency otolaryngologists' encounter. It shows bimodal progress according to the age range. It peaks before the age of ten and between 45 and 65 years of age **(İsmi et al., 2016)**. The estimated incidence is 1/1000 population per year (Abdelkader et al., 2007).

In addition to digital trauma, nasal septum deviation, neoplasms and chemical irritants; systemic factors such as coagulopathies, kidney failure, alcoholism, and vascular anomalies can also be causes. Seasonal changes, allergic rhinitis, exogenous or endogenous estrogens, environmental humidity, and upper respiratory tract infections increase its incidence (McClurg SW, Carrau, 2014).

Epistaxis can be life- threatening due to aspiration, hypotension, and anemia as well as associated co-morbidities. Five-to-fifteen percent of patients requiring hospital admission for this condition will need some form of surgical intervention (Gandomi et al., 2013).

Up to 90% of epistaxis cases have their origin in the Little's area and are managed with chemical cautery or packing, but 10% of cases originate from the posterior nasal area and require more aggressive blockage or other interventions. Posterior nasal packing, including balloon tamponade, has a high failure rate for control of sever posterior epistaxis, ranging from 26% to 52% (Agreda et al., 2011).

Intractable epistaxis remains a challenge for otolaryngologists. Historically, internal maxillary artery ligation via a transantral approach and ligation of the ethmoidal vessels and the external carotid artery have been the treatment of choice when conservative management failed (Gandomi et al., 2013).

In the cases of conservative management failure, ligation of the major arteries or percutaneous embolization of the maxillary artery is performed routinely in most units, but rates of failure and complications are high. Over the past decade, with the widespread popularization of endoscopic sinus surgery and the deeper

understanding of local regional anatomy, endoscopic control of the sphenopa-latine artery (SPA) has been advocated as an effective alternative for the control of sever posterior epistaxis (D'Oto et al., 2019).

The aim of this study was to evaluate the effectiveness of endoscopic sphenopalatine artery cauterization for the treatment of sever epistaxis.

Patients and methods

The current study included 20 patients with severe posterior epistaxis. They all presented to the emergency and outpatient ENT clinics at Minia University hospital. Their age ranged from 12 to 70 years. Detailed history was taken, and clinical examination was performed. Patients with severe posterior epistaxis with no response to anterior and posterior packing had undergone endoscopic sphenopalatine artery cauterization. Patients were followed-up 6 months postoperatively. Informed consent was obtained from all the participants in this study after ethical committee approval from ENT Department, Faculty of Medicine Minia University.

Patients were excluded from the study if they met the following criteria: Patients less than 10 years old, Patients more than 70 years old, Patients whom epistaxis were controlled by anterior and/or posterior packing, Patients with coagulopathy, Patients with previous sinonasal surgery.

The clinical diagnosis of posterior epistaxis was based on symptoms and signs elicited during clinical examination.

Routine preoperative investigations were requested for all patients in the form of: CBC, Fasting blood glucose, Liver function tests (ALT and AST), Kidney function tests (urea and creatinine), Coagulation profile (prothrombin time and concentration), ECG and Chest X-ray.

All cases underwent endoscopic cauterization of SPA under general anesthesia, except for one (under local anesthesia) due to pregnancy. They were followed up for 6 months. Parameters were assessed: Certain parameters were assessed during the operative, postoperative and follow-up periods for evaluating the procedure and its consequences and benefits.

Operative technique of endoscopic SPA cauterization

The procedure was performed under general anesthesia in all patients except one patient had local anesthesia as she was pregnant in her first trimester. Initially, the nasal packing was removed and xylocain 2% (1 mL) with 1: 80,000 adrenaline was injected into the SPF.

Once the nose decongested, we proposed the delineation of a target area on the lateral nasal wall for identification of the SPA instead of depending on a fixed landmark which may be variable or even absent. The proposed area was located between the posterior medial maxillary wall; superiorly, the posterior end of the middle turbine; inferiorly, the junction between basal lamella and perpendicular plate of palatine bone; posteriorly and the superior border of the inferior turbinate; anteriorly.

A vertical incision was made on the mucosa of the perpendicular plate of the palatine bone 8-10 mm from the posterior end of the middle turbinate starting from under the basal lamella of middle turbinate and continued along, not beyond, the superior border of inferior turbinate.

Freer elevator was used to dissect the mucoperiostium from the perpendicular plate of the palatine bone starting anteriorly just above the inferior turbinate and continued posteriorly till exposure of the sphenopalatine foramen with the sphenopalatine neurovascular pedicle exiting the foramen. The crista ethmoidalis of the palatine bone can be seen directly anterior to the sphenopalatine foramen. The dissection was continued far posteriorly till the anterior wall of sphenoid sinus to be sure not missing any other accessory arterial branches.

Once it was clearly exposed, a bipolar electrocautery was placed on the main artery for its cauterization. With subsequent cauterization of the two major branches of the main SPA; posterior lateral nasal artery, posterior nasal septal artery and the accessory arterial branches; found in 2 cases.

Finally, the mucoperiosteal flap was repositioned. The nasal cavity was packed. The nasal

pack was typically removed one day after surgery. Patients were discharged the next day with antibiotics and oxymethazoline nasal sprays. Further follow up was done in the out-patient clinics as regard controlling of epistaxis.

Results

Table (1): Age of the study patients. Data are presented as range, mean ± standard deviation.

Variable		Descriptive statistics (n = 20)
Age:	*-Range (years)* *-Mean ± SD*	(6-75) 39.6±17.4

Table (2): Sex of the study patients. Data are presented as number and percentage.

Variable		Descriptive statistics (n = 20)
Sex:	*-Male* *-Female*	7 (35%) 13 (65%)

Table (3): The affected side of the nose. Data are presented as number and percentage.

Variable		Descriptive statistics (n = 20)
Affected side:	*-Bilateral epistaxis* *-Right-sided epistaxis* *-Left-sided epistaxis*	6 (30%) 9 (45%) 5 (25%)

Table (4): The predisposing factors of epistaxis. Data are presented as number and percentage.

Variable		Descriptive statistics (n = 20)
Predisposing factors:	*-Trauma* *-Recurrent rhinosinusitis* *-None*	2 (10%) 1 (5%) 17 (85%)

Table (5): *History of previous treatment.* Data are presented as number and percentage.

Variable		Descriptive statistics (n = 20)
Previous treatment:	*-Anterior and posterior Balloon nasal catheter* *-Anterior and posterior packs* *-Blood transfusion*	20 (100%) 20 (100%) 0 (0%)

Table (6): Operative technique. Data are presented as number and percentage.

Variable		Descriptive statistics (n = 20)
Operation:	*-Bilateral SPA cauterization* *-Left SPA cauterization* *-Right SPA cauterization*	3 (15%) 6 (30%) 11 (55%)

Table (7): Postoperative bleeding. Data are presented as number and percentage.

Variable		Descriptive statistics (n = 20)
Postoperative bleeding:	*-Yes*	3 (15%)
	-No	17 (85%)

One patient had trauma, another one had both infection and trauma, while the other case had no cause. By endoscopic examination the anterior ethmoidal artery (AEA) was found to be the source of postoperative bleeding on its bony canal which partially eroded and it was controlled by endoscopic AEA cauterization.

Discussion

Epistaxis is the most common emergency otolaryngologists' encounter. It shows bimodal progress according to the age range. It peaks before the age of ten and between 45 and 65 years of age (İsmi et al., 2016). The estimated incidence is 1/1000 population per year (Abdelkader et al., 2007).

In addition to digital trauma, nasal septum deviation, neoplasms and chemical irritants; systemic factors such as coagulopathies, kidney failure, alcoholism, and vascular anomalies can also be causes of epistaxis. Seasonal changes, allergic rhinitis, exogenous or endogenous estrogens, environmental humidity, and upper respiratory tract infections increase incidence of epistaxis (McClurg SW, Carrau, 2014).

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The aim of the current study was to evaluate the effectiveness of endoscopic sphenopalatine artery cauterization for the treatment of sever posterior epistaxis.

The current study included 20 patients with severe posterior epistaxis. Detailed history was taken, and clinical examination was performed. Patients with severe posterior epistaxis with no response to anterior and posterior packing had undergone endoscopic sphenopalatine artery cauterization. Patients were followed-up 6 months postoperatively.

Regarding the clinical characteristics of the patients; we showed that the mean age of the study patients was 27.25± 13.92 years, ranged from 12 to 70 years. These results were in similar to Rahmanzadeh-Shahi et al., (2018); who showed that the mean age of patients with epistaxis was 40.22 ± 2.07), but it was lower than Lou and Lou, (2019) and Kunz et al., (2018); who showed that the mean age was 72.4 ± 5.1 years and 74.2 ± 13.6 years respectively. Moreover, Brown et al., (2018); showed that the mean age of epistaxis patients was 58 years and ranged from18 to 85 years, and Buchberger et

al., (2018); who showed that the mean age at presentation was 64.2 ± 20.38 years.

Among our patients, females (65%) were more than males (35%). These results were in accordance to Lou and Lou, (2019), Buchberger et al., (2018), Kunz et al., (2018), Akdoğan et al., (2018), Brown et al., (2018), and Yang et al., (2018); who showed that male patients were more than female patients. However, this contrasted to Rahmanzadeh-Shahi et al., (2018); who showed that female patients with epistaxis were more than males.

Our work showed that right-sided epistaxis occurred in 45%, then bilateral epistaxis (30%), and lastly the left-sided epistaxis (25%). Lou and Lou, (2019); showed that bleeding on the left side was encountered more than its counterpart on the right side. Buchberger et al., (2018); showed that left side had the highest incidence, followed by the right side, and finally the bilateral one.

We documented that most of our patients had no apparent predisposing factors (85%), followed by history of trauma (10%), and finally a history of recurrent rhinosinusitis was reported in 5%. This was in consistent with Buchberger et al., (2018); who showed that unknown etiology was on the top of the known predisposing factors, followed by trauma. They also reported that 13.5% of cases were hypertensive. Furthermore, Wei et al., (2018); showed that 16.1% of their epistaxis patients had a history of hypertension and Stadler et al., (2018); showed that 3.3% of cases were traumatic epistaxis, 54.2% had history for hypertension, 2.5% had endogenous bleeding tendency.

Results of the present work demonstrated that all patients were previously treated with anterior and posterior Ballon nasal catheter (100%) and anterior and posterior nasal packs (100%). None of them required blood transfusion. These results were in accordance to Zhou et al., (2018) and Buchberger et al., (2018); who revealed that packing was performed in 24.2% and 62.4% of epistaxis patients respectively. Brown et al., (2018); study resolved that non-dissolvable packing was used in 14 (28.6%). Kosugi et al., (2018); showed that anterior nasal packing was the main initial treatment.

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From the present study, we concluded that the SPA cauterization technique seems to be safe, simple, fast, and effective for the management of severe posterior epistaxis with low rates of morbidity and complications. Endoscopic SPA cauterization should be considered as an immediate second-line management when conservative treatment as first-line management fails.

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