Sphenopalatine Artery Pseudoaneurysm: A Rare Cause of Intractable Epistaxis After Endoscopic Sinus Surgery

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Abstract: Epistaxis is a frequent health problem and the most common cause of emergency in otorhinolaryngology practice. In this report, a case of a 26-year-old patient with intractable epistaxis after endoscopic sinus surgery was presented. The epistaxis began at the fourth postoperative day and was unresponsive to endoscopic cauterization and anterior and posterior nasal packing. On angiographic investigation, a pseudoaneurysm of the sphenopalatine artery was detected and treated with microcatheter embolization. This is the second case of postoperative sphenopalatine pseudoaneurysm as a complication of endoscopic sinus surgery in the literature.

Key Words: Aneurysm, false, epistaxis, natural orifice endoscopic surgery, embolization, therapeutic

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Endoscopic sinus surgery (ESS) has been used in the treatment of acute or chronic rhinosinusitis for more than 25 years and has good long-term results. The complication rates of this procedure vary from 4.2% to 23%. Most of these complications are minor complications (3.9%–20.24%), and rates of major complication were between 0.0% and 2.25%. Major complications were cerebrospinal fluid leak, meningitis, hemorrhage, and orbital injuries.[1] Bleeding can be classified as a minor (if 200–1000 mL of blood was lost) or a major complication (>1000 mL of blood loss with/without need for transfusion, packing, revision surgery, or selective cauterization or clipping of the anterior ethmoid artery or the sphenopalatine artery [SPA]) according to the severity of bleeding.[2] Most of the bleeding that is caused by ESS comes from small vessels and arterioles that are the blood supply of the sinuses and the nasal cavity. Causes of major bleeding are the sphenopalatine vessel plexus; the anterior ethmoid artery; and, rarely, the posterior ethmoid artery.[3] Sphenopalatine artery pseudoaneurysm is one of the reasons of major bleeding, which was reported in only 1 patient.[4]

Herein, we describe the second case in the literature with an intractable severe posterior epistaxis due to a SPA pseudoaneurysm after ESS, which was successfully managed with endovascular embolization of the internal maxillary artery.

CLINICAL REPORT

A 26-year-old female patient with an intractable epistaxis was admitted. She had an ESS for nasal polyposis (Fig. 1) in another clinic 1 week before admission. Preoperative computed tomography of the patient revealed extensive nasal polyposis. The ESS included bilateral total ethmoidectomy, frontal recess clearance, and sphenoidotomy. An oral antibiotic and topical nasal steroids were administered before surgery. The medical history of the patient was unremarkable. She did not have any known illness and did not use any drugs and antiaggregants. She had a history of 2 obstetric surgeries without any abnormal bleeding.

During the surgery, the surgeon did not note extensive hemorrhage. The nose was packed bilaterally, and packing was removed 2 days after surgery without any obvious hemorrhage. Postoperatively, the patient was given 320 mg of oral gemifloxacin once daily. On the fourth postoperative day, the patient was admitted with a massive bleeding from the right nasal cavity, and bleeding was managed by cauterization under general anesthesia. After that intervention, bleeding recurred on the sixth postoperative day. The patient was hospitalized, and 4 U of erythrocyte suspension was transfused. Then, bleeding was managed by endoscopic cauterization under general anesthesia, and both nasal passages were packed. When posterior nasal bleeding was not controlled with nasal packing and cauterization, the patient was referred to our clinic.

On admission, the patient was pale, but hemoglobin level was 11.9 g/dL after transfusion of 2 U of erythrocyte suspension. Postnasal hemorrhage was observed although bilateral nasal packings were in place. Gauze nasal packings were replaced by 10-cm polyvinyl sponge (Merocel; Merocel Corp, Mystic, CT). An emergency angiography was performed, and a pseudoaneurysm was identified in the right SPA (Fig. 2). The right internal maxillary artery was embolized with 250- to 355-μm polyvinyl alcohol particles by subselective catheterization. After embolization, the region was observed to be mostly devascularized (Fig. 3). The patient was discharged 3 days after embolization without any hemorrhage or other complications, and the 12-month follow-up period was also uneventful.

DISCUSSION

Epistaxis is a frequent health problem, with a 60% lifetime prevalence. Although only 6% of patients with epistaxis require medical therapy, it is the most common emergency in

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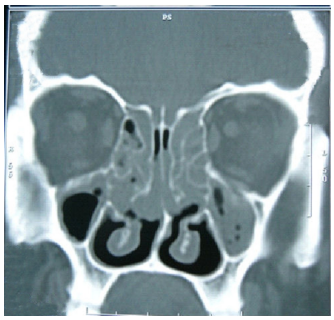


FIGURE 1. Preoperative computed tomography of the paranasal sinuses of the patient in coronal plane showing severe nasal polyposis.

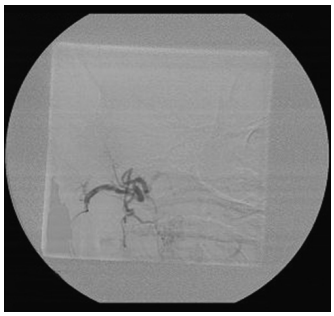


FIGURE 3. Selective external carotid artery digital subtraction angiogram after embolization showing devascularization of the SPA.

otorhinolaryngology practice.[5] The etiology of epistaxis can be simple or complex and may be due to local factors (eg, trauma, surgical complications, vascular malformations) or a sign of systemic diseases (eg, hypertension, anticoagulant use), and for the rest, it may be a combination of all. Clinically, epistaxis can be classified on the basis of its location, severity, or etiology. According to its location, it is classified as anterior or posterior bleeding. Anterior epistaxis arises usually from the Little area, which has an anastomosis called Kiesselbach plexus, which is generally self-limiting or can be easily controlled by minor interventions, whereas posterior epistaxis is usually severe and can spontaneously or postoperatively and predominantly arise from the SPA.[6] Epistaxis may be spontaneous or traumatic. Spontaneous bleeding is usually mild; however, it may be severe especially in the elderly. Traumatic causes are digital manipulation, nasal trauma, or surgical trauma. Surgical trauma due to ESS may be intraoperative or postoperative. Mild bleeding is due to mucosal damage and increases with inflammation of the sinus mucosa. However, the cause of severe bleeding is transaction or injury to a major arterial structure such as anterior or posterior ethmoidal arteries, branches, or the main trunk of the SPA or the internal carotid artery. Postoperative bleeding may be caused by direct surgical trauma or trauma and erosion of arteries by nasal packing. Sphenopalatine artery pseudoaneurysm as a cause of severe postoperative bleeding after ESS was reported in 1 case before.[4] In our review of the literature, only few cases were found, and SPA pseudoaneurysm was reported as posttraumatic persistent epistaxis.[4,7] Sphenopalatine artery pseudoaneurysm is generally reported as a complication of Lefort osteotomy and hypophyseal surgery.[8,9] Pseudoaneurysms are different from true aneurysms. A true aneurysm involves all 3 layers of the wall of an artery (intima, media, and adventitia). True aneurysms include atherosclerotic, syphilitic, and congenital aneurysms. A false aneurysm or pseudoaneurysm does not primarily involve such distortion of the vessel. The pathogenesis may include intraoperative trauma, infection, pressure necrosis from packing, or a combination of these factors. Pseudoaneurysms are mostly caused by trauma, and posttraumatic bleeding can be seen within a few days or weeks after the trauma. After trauma to the vessel, partial laceration occurs, and hematoma and inflammation fill the destructed area. By the development of granulation tissue, fibrous tissue overlays the endothelial tissue. By the arterial pressure, this intact and relatively weak wall enlarges and forms the pseudoaneurysm. This structure enlarges like a balloon and has the risk for rupture if the endoarterial pressure is higher than the arterial wall tension pressure.[10]

Optimal management options are either ligation or embolization of the bleeding vessel, and choice of the options depends on anatomic factors, patient preference, and availability of experienced staff and resources.[9] In the past, early open surgical repair was recommended for the treatment of almost all pseudoaneurysms. However, after the first description of angiographic embolization for posterior epistaxis in 1974, it was popularized for management of pseudoaneurysms.[11] In this procedure, the maxillary artery was cannulated, and a contrast material was injected to identify the bleeding point, then the region was embolized. This procedure was performed frequently for several years, but it requires a skilled and experienced interventional radiologist. When performed by an experienced radiologist, it has a high success rate, is minimally invasive, and is associated with low mortality.[12] The complications of embolization are mostly minor and not comparable with the open surgical procedures. In the literature, there are different approaches for management, but usually, transantral ligation and embolization were compared. Strong et al[13] reported success rates for ligation and embolization as 89% and 94%, respectively. Cullen and Tami[14] showed a failure rate of 16% for embolization and 18% for internal maxillary artery ligation. Reported complications for embolization are ischemic necrosis of the upper lip (facial arterial embolization), unilateral trismus (related to deep temporal arterial occlusion), and ischemic sialoadenitis (facial arterial embolization).[15] Other complications reported in the literature are facial nerve paralysis, tongue necrosis, tonsillar ulceration, facial atrophy, and transient submandibular gland swelling and other potential complications related to the site of femoral access. Stroke and other neurovascular complications are rarely reported major complications.[16]

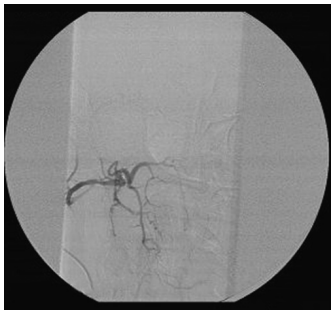


FIGURE 2. Selective external carotid artery digital subtraction angiogram showing pseudoaneurysm of the SPA.

CONCLUSIONS

In case of intractable bleeding, abnormalities of major vessels must be considered. Although the SPA pseudoaneurysm is an extremely rare cause of intractable epistaxis after ESS, angiography is the only imaging modality for diagnosis, and it also offers a safe

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therapeutic approach when a radiology team experienced on endovascular interventions is available.

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