



CODEN [USA]: IAJ PBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.2227704>Available online at: <http://www.iajps.com>

Review Article

**SIMPLE REVIEW OF THE RECENT UPDATES REGARDING
EPISTAXIS MANAGEMENT AND EVALUATION****Shahd Saeed Abdulrahman Alghaseb¹, Dalia Abdulelah Murshid², Dalia Ali Aljrary³,
Shaima Mohammed AlGhuraybi³, Rha Tariq Ismail⁴, Nashmi Nawaf Alrashidi⁵,
Yazeed Saad Alsubaie⁵, Ahmed Muteb Alanazi⁶, Muath Mohammed S Alshantqi⁷,
Khaled Abdullah Alzahrani⁸, Wael Saleh Almogheer⁹**¹King Khalid University, ²Arabian Gulf University, ³Batterjee Medical College,⁴Misr University for Science and Technology, ⁵Majmaah University, ⁶Aljouf University,⁷Umm Al-Qurra University, ⁸Warmia and Mazury University, ⁹King Saud University**Abstract**

Background: Epistaxis is considered as the most common otolaryngologic emergency, it's difficult to determine an accurate number for the incidence of epistaxis but it has been reported to be as high as 60%. Generally, most of the time epistaxis does not require a specialist to manage, according to the published data only about 6% of the cases require medical treatment. The management of epistaxis have been evolved over the last 20 years, a lot of literatures were done evaluating different management approaches. Reviewing the recent published articles is important in order to provide a better outcome for the patients.

Objective: In our study we aims to discuss the recent updates related to epistaxis management and develop a comprehensive yet simplified management approach algorithm.

Method: PubMed database were used for articles selection. All relevant articles related to our review were chosen to cover the following topics: Epistaxis, Evaluation of Epistaxis, and Management. We excluded other articles, which are not related to our objectives. The data have been extracted according to specific form to be reviewed by the authors.

Conclusion: Epistaxis can be dramatic and can be a life-threatening problem although in most cases it is relatively minor and usually manageable at home. Health authorities should work to the general knowledge of the population on the first aid management of epistaxis. The treatment should be with a crescendo sequence. Applying direct pressure by pinching the lower part of the nose for at least 10 minutes is the first way of treatment. Chemical cauterization and nasal packing are the most commonly used methods of treatment worldwide due to their wide availability and they are easy to perform. In severe uncontrollable cases of Epistaxis, surgical intervention such as ligation or embolization should be suggested. Surgery is associated with higher success rate, lower recurrence rate and shorter length of stay.

Corresponding author:**Shahd Saeed Abdulrahman Alghaseb,**
King Khalid University.

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lease cite this article in press Shahd Saeed Abdulrahman Alghaseb et al., *Simple Review Of The Recent Updates Regarding Epistaxis Management And Evaluation.*, Indo Am. J. P. Sci, 2018; 05(12).

INTRODUCTION:

Epistaxis means bleeding from the nostril, nasal cavity, or nasopharynx. It occurs due to the bursting of a blood vessel in the nose (1). It is considered one of the most common otorhinolaryngological emergency problems in the world. It occurs in 60% of person all over the world at a point of their life time but only 6% of these patients seek for medical treatment. Generally, most of the time, epistaxis does not require a specialist to manage. Various causes' stands behind epistaxis development such as primary neoplasms and traumatic, hypertension, coagulopathies, inflammatory conditions, infectious diseases, drug use, congenital nasal septal abnormalities and iatrogenic causes, but still most of the cases are idiopathic (2).

The management of epistaxis have been evolved over the last 20 years, a lot of literatures were done evaluating different management approaches. Thus, in our study, we aim to discuss the recent updates related to epistaxis management and develop a comprehensive and simplified management approach.

METHODOLOGY:

Sample

We performed comprehensive search using biomedical databases; Medline, and Pubmed, for studies concerned with assessment of stress ulcer prophylaxis published in English language between 2013 and 2018. Keywords used in our search through the databases were as; "Epistaxis", "Epistaxis Evaluation & Management" "Epistaxis Pathogenesis". More relevant articles were recruited from references lists scanning of each included study.

Analysis

No software was used, the data were extracted based on specific form that contain (Title of the study, name of the author, Objective, Summary, Results, and Outcomes). Double revision of each member's outcomes was applied to ensure the validity and minimize the errors.

DISCUSSION:

Epistaxis can be dramatic and can be a life-threatening problem although in most cases it is relatively minor and usually manageable at home. It increases in children because of sports injuries and road traffic accidents due to their aggressive lifestyle while it occur in patient more than 50 years due to vascular pathologies, hypertension and malignancy (3).

In the United Kingdom 20,000 emergency admissions were due to epistaxis in 2014-2015, resulting in 39,000 hospital bed days. The majority of

admissions are in older adults, with a median age at admission of 70 years (4). It was found that Epistaxis increases presentations and admissions in autumn and winter (5).

In Saudi Arabia, there is a cross-sectional study conducted on a random sample of 1114 participants to estimate the prevalence of Epistaxis. History of Epistaxis was found in 549 (49%) patients, and 565 (51%) patients did not experience any history of Epistaxis (1). Another cross-sectional study was conducted to assess the current knowledge of the first aid management of epistaxis and misconceptions among the general Saudi population. It has found that the general knowledge of the respondents on the first aid management of epistaxis is low, even though some of them claimed to have witnessed how epistaxis was managed. (Saleem et al.) advised health care institutions, health administrators together with the health care authorities of the general population should work to increase not only awareness and knowledge among those who have received information of epistaxis but also enhance recall and retention of the first aid management of epistaxis (6). Epistaxis etiologies Can be divided into two subgroups: an idiopathic group and a symptomatic group in which the epistaxis is the symptom of an underlying disease. More than 70% of cases are idiopathic. Hypertension, hypercholesterolemia, smoking, some of the NSAIDs and coagulation disorders are considered as risk factors related to the majority of cases of idiopathic Epistaxis. The organic causes of symptomatic epistaxis are trauma, surgery particularly transsphenoidal, ENT tumors, malformations such as hereditary hemorrhagic telangiectasia (Rendu-Osler disease) or occasionally carotid-cavernous sinus fistula. Tumors can manifest as epistaxis too either benign or malignant. They may be associated with signs and symptoms of nasal obstruction and rhinosinusitis, often unilateral. Juvenile nasal angiofibroma in adolescent males may cause severe nasal bleeding as the initial symptom. Intranasal rhabdomyosarcoma, although rare, often begins in the nasal, orbital, or sinus area in children (7-8).

Clot formation is paramount to both the prevention and control of epistaxis if we look at it from a pathophysiological point of view. Therefore, medication-induced coagulation abnormalities appeared to be a significant systemic factor influencing epistaxis in our study. Such medications include aspirin, clopidogrel, nonsteroidal anti-inflammatory drugs (NSAIDs), warfarin and novel oral anticoagulant drugs (NOACs) (5).

Epistaxis is also classified as either anterior or posterior for management purposes. This classification is based on distinct anatomic boundaries and the blood supply to each region. Between 90 and 95% of Epistaxes are anterior, and the great majority of these arise from Little's area (9). Little's area consists of a consistent arterial anastomotic triangle called Kiesselbach's plexus, consisting of large, thin-walled vessels supplied by the terminal branches of the sphenopalatine and anterior ethmoidal arteries and the superior labial branch of the facial artery (10). Approximately 10% of episodes of epistaxis are posterior bleeds. Posterior bleeds are most commonly arterial in origin. It presents with a greater risk of airway compromise, aspiration and difficulty in controlling the haemorrhage (11). A common source of bleeding in cases of posterior epistaxis is Woodruff's plexus. It is a venous plexus, located in the posterior part of the inferior meatus and around the choanae (10).

After stabilizing the patient clinically and controlling the bleeding, the doctor should proceed to history taking. The history should include asking about duration, severity, and frequency of the current bleeding and also the previous bleedings if there was any. It should be asked or noticed as well if the bleeding is unilateral or bilateral because posterior epistaxis can often bleed from both nostrils. In addition, Patients with posterior epistaxis can feel blood is dripping down their throat rather than their nose. After that, the questions should focus on determining the cause of the bleeding by asking if there is history of local trauma such as nose picking, recent nasal or sinus infection or insertion of a foreign body. It is also important to look for signs and symptoms of anaemia, which can give clues to the chronicity and the severity of bleeding. Asking about history of bleeding from other body orifices is important, too. Liver disease, high blood pressure, easy bleeding or bruising, bleeding disorder, a family history of coagulation disorders, and anticoagulant use should be all excluded. Social history such as alcohol, smoking and recreational drug use specifically cocaine is also significant (11).

Regarding laboratory testing, complete blood test should be obtained if there was any suspicion of anemia or history of recurrent bleeding. Also, platelets count and bleeding profile are important to look at in order to detect any abnormality or bleeding disorder (11).

Imaging like Computed tomography (CT) or magnetic resonance imaging (MRI) are not typically indicated for the investigation of epistaxis unless tumour or other local diseases are suspected as an

underlying cause. Nevertheless, uncontrollable bleedings sometimes get evaluated with Computed Tomographic Angiography for potential endovascular embolisation. Diagnostic angiographic findings are typically normal. Specific angiographic signs are rare but may include a tumour blush, telangiectasia, aneurysm, and/or extravasation. Selective internal carotid artery (ICA) angiography may show rare causes of epistaxis, such as traumatic or mycotic aneurysms, which require different treatment approaches. Complete bilateral selective external and internal carotid angiograms are essential to evaluation. The images should be analysed for detection of central retinal blush in the external carotid artery (ECA) and anastomoses between the branches of the ECA and ICA (12).

Other classification proposed by (Reyrea et al.) regarding the severity is important before any treatment is given. It is essential to define whether the epistaxis is mild or severe. In mild epistaxis, the bleeding is minimal and not heavy. It is mostly unilateral and it does not cause any systemic consequences on the patient. On the other hand, severe epistaxis might present with various presentations and it should be detected immediately. The indications of severe epistaxis include the presence of hemorrhagic shock, a fall in hemoglobin below 8g, loss of huge amount of blood confirmed by systemic signs such as tachycardia, hypotension, or pallor (7).

The initial management of an Epistaxis case starts with resuscitating the patient with ABC. Then, the doctor should proceed to controlling the bleeding. The key here is composure for the reason that Epistaxis can be very dramatic because of the huge amount of blood on the face and clothes in addition to the overreaction and exaggeration of patient's family to the bleeding scene. In cases of mild Epistaxis, the sequence of the treatment is crescendo which means that we start with minor measures of treatment then we move to higher step if they were not effective. The doctor should ask the patient to sit and lean slightly forward to prevent blood from tracking into the pharynx. After that, the patient should apply direct pressure by pinching the lower part of the nose for at least 10 minutes. A bowl should be provided to the patients to spit all the blood in it. Fortunately, most nosebleeds will stop with direct pressure (3).

If pressure was not successful, cauterization or nasal packing can be next. However, several studies suggested the use topical decongestants as first-line therapy for the treatment of epistaxis because they

are widely available and because of their limited side effect profile. Oxymetazoline is an Intranasal spray that works as a vasoconstrictor has been successful in the majority (66%-75%) of epistaxis cases especially in posterior epistaxis. The percentage of success increase if it was combined with other modalities of treatment such as silver nitrate cauterization or nasal packing. On the other hand, Oxymetazoline is not recommended for patients with history of hypertension as they increase blood pressure acutely (13-14). Recently, (Birmingham et al.) published a paper evaluated the effectiveness and potential benefits of topical tranexamic acid (TXA) in the management of acute epistaxis. Their data was similar to an existing evidence found that TXA may be associated with more effective bleeding control. It was also associated with a reduction in resource utilization such as otorhinolaryngologist consultations, and the use of nasal packing, cauterization, and surgical intervention. Nevertheless, it did not demonstrate a significant difference in Emergency Department length of stay among patients with acute epistaxis treated with topical TXA or standard care (15).

Anterior rhinoscopy might often reveal the source of the bleed especially if the bleed is anterior. Therefore, most anterior bleeding can be effectively treated by cauterization with silver nitrate or electrocoagulation. It is more commonly used, especially by the non-ENT physician. For the reason that it is less costly and easier to perform (16). Silver nitrate cautery showed a success rate of 79% in treating anterior epistaxis. The doctor performing the cauterization should be more cautious in cases of bilateral bleeding because it increases the risk of perforation (17). It is suggested that a vasoconstrictor such as Phenylephrine and local anesthetic like lidocaine should be applied locally before starting the procedure. Illumination and adequate visualization are very important for the procedure success. Once bleeding points get identified, the doctor should apply the cautery for approximately 10 seconds starting from the edge of the bleeding point and move centrally in a radial fashion. Then, hemostatic gauze can be applied locally in order to supplement the cauterization (18).

Anterior or posterior nasal packs are recommended next if cauterisation was unsuccessful. It is done applying direct mechanical pressure on the site of the bleeding. Traditionally, Ribbon gauze packing is used by packing in it into the nasal cavity by layering until it reaches the cavity roof. Ribbon gauze should be soaked with lubricant and antibiotic before inserting it. Other methods have been developed such

as modern packs for simple insertion and are effective. Merocel nasal tampon is made of polyvinyl alcohol, which is a compressed foam polymer that is inserted into the nose and expanded by application of water. There is also an inflatable balloon packing which is called RapidRhino nasal packing as similarly Foley's catheter were used historically. Nasal packing is an effective method of treatment and it is not difficult to be performed even by non-ENT physicians. Unfortunately, several complications have been reported along or after the use of nasal packing such as discomfort, pain, gag reflex, eustachian tube dysfunction, and local infections of the nasal cavity (18). Fortunately, most of the complications are temporary and self-limited. Nevertheless, infections of the nasal cavity can develop into more problematic situations like infection of the vestibule or sinusitis or it can cause septal abscesses and perforations (16). Therefore, soaking the pack with local antibiotic is important. Moreover, some studies suggested systemic prophylactic antibiotics for at least 48 hours in order to prevent infection spread. This is advised especially for immunocompromised patients or for patients with cardiac anomalies particularly prosthetic heart valves. The pack should be removed after 24 or 48 hours. If the bleeding recurred after removal, another packing should be performed or more preferably surgical intervention should be considered (11-19).

If nasal packing failed to control the bleeding, surgical intervention should be suggested especially in severe epistaxis. In the past, ligation of the internal maxillary artery and the external carotid artery are ligation techniques have been used to treat posterior epistaxis. They were not commonly used techniques because these approaches are invasive and associated with a considerable rate of complications and failure (9). However, with the recent evolvement of medicine and with the presence of more specific and focused endoscopic methods, arterial ligation became a preferred surgical form of posterior epistaxis treatment. Recent data has shown that the endoscopic treatment of posterior epistaxis is superior to posterior nasal packing and embolization because it showed better outcomes regarding pain, cost-effectiveness and most importantly bleeding control (10). (McClurg et Carrau) published a paper regarding endoscopic management of posterior epistaxis. They found that ligation of the sphenopalatine and posterior nasal arteries is a very effective treatment for severe posterior epistaxis. Concomitant anterior ethmoidal artery ligation may be more effective than sphenopalatine artery or posterior nasal artery ligation alone. Surgical intervention of posterior epistaxis provides a low-

morbidity and cost-effective treatment (20).

In patients with poor cardiovascular status, embolisation of the distal branches of the bilateral internal maxillary arteries and ipsilateral distal branches of the facial artery is more preferable method of treatment. This is for the reason that embolization can be performed with the patient under local anaesthesia in a majority of cases. The embolization is preferred to carry out by an experienced interventional neuroradiologist. The targeted artery is imaged by angiography as mentioned earlier. After that, via a percutaneous transarterial catheter, an occluding agent should be injected. The mainstay of current embolotherapy (occluding agents) for epistaxis is polyvinyl alcohol or Gelfoam. Embolization can be associated with devastating complications such as blindness and facial paralysis. These major complications did not exceed 2%. On the other hand, embolization has been used to treat epistaxis for more than 30 years and it was shown to be associated with high success rates that can reach to more than 90% in many studies.

Therefore, embolization should be performed when the less dangerous measures fails. This will depend on local expertise, experience, patient risk factors, and the cause of bleeding (21).

(Carey et Sheahan) created a list of instructions that should be given to the patient upon discharge. The patient should avoid vigorous physical activity and contact sports for 1–2 weeks, sneezing (sneeze with open mouth if possible), picking or touching dried clots in the nose, blowing or sniffing forcefully through your nose for 1–2 weeks, and constipation because straining can restart epistaxis. Eating a balanced diet with adequate fibre and hydration can help regarding avoiding constipation and laxatives can be used if necessary. In addition, the patient must be instructed to seek care immediately if the nasal packing is soaked with blood, if offensive nasal discharge was noticed, or any of lightheadedness, dizziness, shortness of breath or inability to talk was experienced (5).

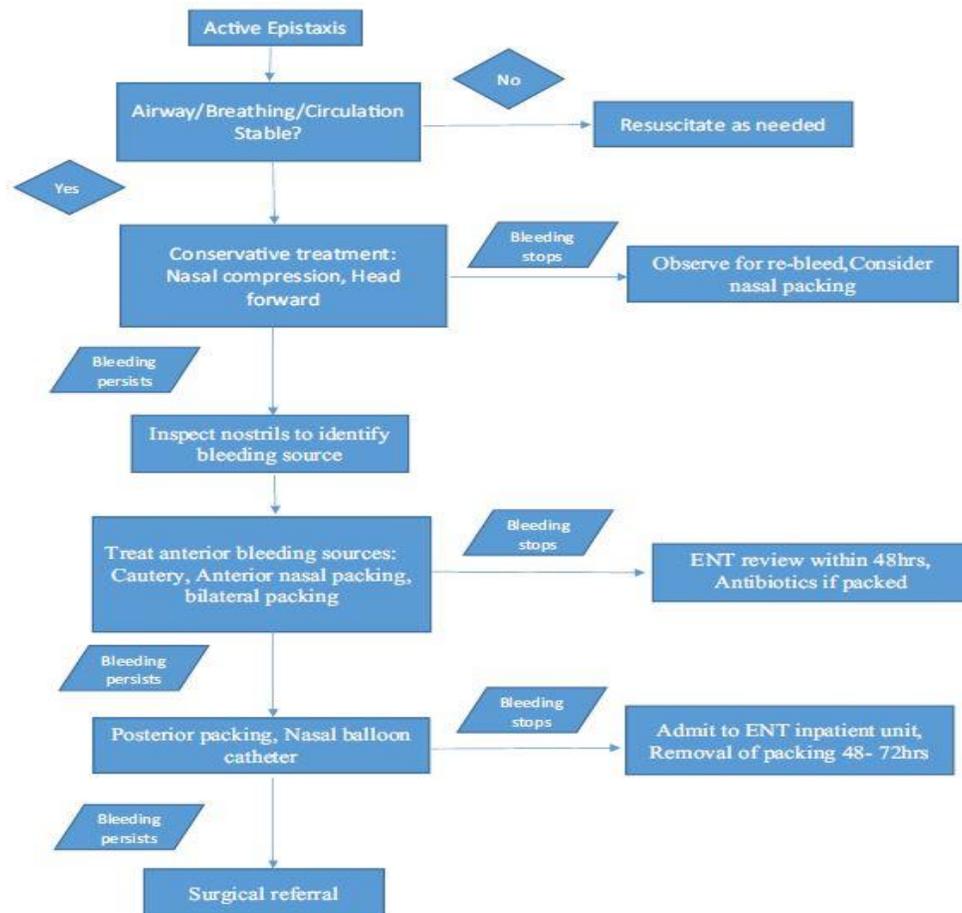


Figure 1: an algorithm for Epistaxis Management (adapted from Carey et Sheahan paper)⁵

CONCLUSION:

Epistaxis can be dramatic and can be a life-threatening problem although in most cases it is relatively minor and usually manageable at home. Health authorities should work to the general knowledge of the population on the first aid management of epistaxis. The treatment should be with a crescendo sequence. Applying direct pressure by pinching the lower part of the nose for at least 10 minutes is the first way of treatment. Chemical cauterization and nasal packing are the most commonly used methods of treatment worldwide due to their wide availability and they are easy to perform. In severe uncontrollable cases of Epistaxis, surgical intervention such as ligation or embolization should be suggested. Surgery is associated with higher success rate, lower recurrence rate and shorter length of stay.

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