Review article

Management of Epistaxis: A review

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ABSTRACT

Management of epistaxis has been evolved since ancient history. Still now the first aid of pinching the nasal ala is practicing all over the world. Indirect, direct and surgical management is practiced clinically in the hospital setting. Choice of therapy depends on many factors. Sometimes more than one therapy is necessary to control of nose bleeding. A variety of reasons cause epistaxis like trauma, inflammation, infection, tumor and some systemic causes. Many of the cases are idiopathic. It is not proven whether hypertension is the cause or the effect of epistaxis. In anterior epistaxis the bleeding site is easily identifiable, but in posterior epistaxis it is very difficult to identify the exact point. Sometimes epistaxis present as life threatening condition, other is minor ailment. So it difficult to set a single remedy to handle the epistaxis. Airway is first concern for managing of epistaxis. Sometimes blood transfusion is needed to overcome the loss. Development of endoscopic procedure has changed the scenario of epistaxis management. Further achievement is done by embolization technique. In some vascular phenomenon like hereditary hemorrhagic telangiectasia bleeding control is challenging despite of these modern techniques.

Keywords: Epistaxis, Management of Epistaxis

INTRODUCTION

There are several emergencies in the otolaryngology practice. Among them epistaxis or bleeding from the nose is one of the most frequent emergencies.[1] Sometimes nose bleeding becomes so severe that it may endanger the life. Epistaxis affects both young and elderly. Peaks occurs below age ten and above age of forty years.[2] This blood comes out from the nose as well as from the mouth. Some posterior bleeding is not directly coming out rather is swallowed. This swallowed blood comes out as mixed with vomitus, cough or it can present as black coloured stool. People get scared and often it becomes real challenge for the physician. To finding out the source of bleeding is very difficult. About 70-80 percent cases it remains unidentified.[3] Management of epistaxis depends on whether the source is identified or not. If the source of bleeding is identified and the management is directed to the identified source, then it is known as direct therapy. And if the source of bleeding is not identified then the management of epistaxis is called indirect therapy.[4] In recent years with the advancement of technology idiopathic cases are now declining.[3] In that situation indirect therapy of epistaxis management is also declining. And the direct therapy is practiced more confidently as the source of is secured here.[5] In spite of having difficulties in finding the source of bleeding, search for the identification of the source is always considered in best clinical practice.

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Vascular Anatomy

Nasal mucosa has many vascular functions and its vascular supply comes from the terminal branches of both internal and external carotid arteries.[6] And it is extremely vascular mucosa due to its multiple anastomoses. These vascular anastomoses form the plexuses. Some are arterial plexuses and some are venous. Vessels the ipsilateral side contribute to form the plexuses but sometime contralateral vessels have some contribution to form a plexus. The vascularity of the nasal mucosa comes from the facial and maxillary branch of external carotid and the ethmoid branches of internal carotid artery. The branch of facial artery that supplies the nose is the superior labial artery. This superior labial artery supplies the anterior nasal septum. And the sphenopalatine artery branch of maxillary artery is the key branch that supplies the nose, especially in the posterior part. The spenopalatine artery enters the nose through sphenopalatine foramen. It has two branches naming posterolateral and the septal. This artery has significant role in posterior epistaxis. Another branch of maxillary artery that supply nose is the greater palatine artery. This greater palatine artery is the branch of descending palatine branch of maxillary artery. This greater palatine artery enters into the nose through the incisive foramen and supplies the anterior part of the nose. The mucosa of the nose is supplied by the internal carotid artery through its first branch the ophthalmic artery. The ophthalmic artery gives the ethmoid branches. The anterior ethomidal artery and the posterior ethmoidal artery. These arteries enters into the nasal cavity from the cranial cavity through bony tunnels. The anterior ethmoidal artery enters through the anterior ethmoidal canal that passes anteromedially. This artery is very much important during endoscopic sinus surgery. Bleeding from this artery during endoscopic sinus surgery sometimes results into blindness. As transection of the artery retracts back into the orbit. Posterior ethmoidal artery passes through the posterior ethmoidal canal to enter the nasal cavity. After entering into the nasal cavity, the posterior ethmoidal artery divides into the lateral and medial branches. The lateral and medial branches of the posterior ethmoidal artery supply the upper part of the lateral wall and the septum respectively. The microvasculature of nasal mucosa has a sub epithelial capillary network, and these capillaries have fenestrations. Another part of the micro vascular system is the distended venous sinuses.[7] These blood vessels are controlled by autonomic nerves.

Anterior and posterior epistaxis

On the basis of the bleeding source the epistaxis is classified as anterior and posterior epistaxis. But it is very much difficult to define the anterior epistaxis from the posterior epistaxis. As because there are no clear-cut anatomical structures that can divide the nasal cavity into anterior and posterior part. When the source of bleeding can be identified with head-light, then some authors called it anterior epistaxis. In case of anterior epistaxis, it can be managed with anterior nasal packing.[5] But others name it differently. The proposal of Mcgrray is very straightforward.[3] He used an anatomical landmark to define the anterior and posterior epistaxis. The landmark he proposed is the pyriform aperture. He called anterior epistaxis when blood comes from the in front of the plane of pyriform aperture. That is the soft part of the nose. And posterior epistaxis when blood comes from posterior to the plane of the aperture.[3] In case of anterior epistaxis blood comes out

from the anterior parts of the nose, especially from the Little's area.[8] Bleeding from many sub sites are considered as posterior epistaxis. Sub sites of posterior epistaxis are the posterior part of the septum, lateral nasal wall and floor of the nasal cavity. This classification of anterior and posterior epistaxis helps to define the direct and indirect therapy of epistaxis management.

In case of children epistaxis is seen usually anterior epistaxis and the mucocutaneous junction of the nasal septum is the commonest site of bleeding. In childhood recurrent epistaxis von Willebrand disease should be excluded. And in adolescent male should exclude the angiofibroma.

Many of the epistaxis causes cannot be identified. Sometime systemic causes can produce epistaxis. Hypertension may be one cause, but clear evidence does not support it. Patient with epistaxis may have sympathetic outburst seeing blood in front of him this may cause rise of blood pressure. It should be established whether hypertension is the cause or the effect of epistaxis. Patients having hepatic and renal impairment sometimes present with epistaxis. In rare situation women having endometrial tissues into the nose may have epistaxis during menstruation.

Indirect Management

Nasal packing is one of the most practiced indirect therapies for the management of epistaxis. Nasal packing can be placed in anterior and posterior parts of the nose. When nasal pack is inserted through the anterior nasal aperture and it is placed within the nasal cavity, then it is called as anterior nasal packing. When nasal pack is given in the postnasal space or in the nasopharynx then it is known as posterior nasal packing. Insertion of anterior nasal pack is easier than the posterior nasal pack. For this reason, anterior nasal packing is most frequently practiced in management of epistaxis. For application of anterior nasal packing nose should be cleaned then ribbon gauze soaked with liquid paraffin is inserted in both nasal cavities. It is inserted layer by layer in folded fashion along the floor of the nose. Nasal pack should not be kept for a long time because of some severe complications. And systemic antibiotic should be given along with anterior nasal packing. It should be removed within 2-3 days. The complications of anterior nasal packing are pain during insertion and removal. Anterior nasal packing itself can damage the nasal mucosa as a result it turns into further bleeding. After removal of anterior nasal packs sometimes synechia has been developed. To reduce this type of complications there are some modifications in the techniques for anterior nasal packing like mucosal coverage with aluminum foils.[9] Posterior nasal packing is effective indirect measure that is used in hospital setting and higher expertise is needed for its application. It is also called surgical management. Due to its complexity alternate technique for management of epistaxis has been searched. A therapy of application of hot water is practiced over hundreds of years. Irrigation with warm water about 50^0C hot is used as a therapy. Hot water irrigation is producing less trauma to nasal mucosa compared to posterior nasal packing.[10] But hot water irrigation is not risk free. Common complication is encountered during hot water irrigation is aspiration. To minimize this complication some modification of hot water irrigation has been proposed. One of the modifications is the introduction of catheter in the nasal cavity and the balloon is placed in the posterior choana so that water is prevented to enter into the airway.[11] This modified technique

significantly reduces the risk of aspiration during hot water irrigation for epistaxis management. Fibrinolytic therapy like Tranexamic Acid and Aminocaproic Acid can be uses as systemic therapy.[12] Tranexamic acid can be used in both topical and systemic form.[13] Haemorrhage can be controlled with locally applied haemostatic agents. For the management of nasal bleeding it has also practiced. A commercially available haemostatic agent FloSeal (Baxter Healthcare), is applied locally. [14] It showed a good result. But application of a local agent within the nasal cavity is not always easy. In case of posterior epistaxis, it is very difficault to apply such agents. But in case of the anterior epistaxis it can be use very easily. So, the control of epistaxis depends on whether the location of the bleeding source. In a study it is seen that the FloSeal has better result in anterior epistaxis than the posterior.

Direct Management

In case of anterior epistaxis as by definition the bleeding source is visible so direct therapy is frequently practiced. For the young children when blood comes from the septal mucocutaneous junction the first aid of pinching the ala is very much effective. Other direct therapies are Electro-cautery and chemical cautery like silver nitrate is used for this purpose. Use of these direct therapies like chemical cautery in the posterior part of the nose for the treatment of the posterior epistaxis is very difficult.[15] Because visualization is not only difficult but also bleeding itself obscure the field. To overcome this problem nasal endoscopy has an advantage that it has both bright illumination as well as the magnification.[16] Fiber Optic flexible nasal endoscope is used for the examination of the nasal cavity. This is very much helpful in paediatric setting. Nasal endoscope having telescope with different angulation is used for the examination and therapeutic purpose. Nasal endoscope along with the suction apparatus help the examiner in case of active bleeding from the nasal cavity. Clearing the blood clots with suction the nasal mucosa is visualized with the nasal endoscope then haemostasis can be done with electro-cautery. Among the different types of electo-cauteries the unipolar and bipolar cauteries are widely used. But unipolar electrocautery should be used with great caution in nasal cavity for controlling of bleeding. This unipolar electro-cautery produces more heat into the nasal cavity, this heat then transmits into the eyeball resulting in blindness.[17] Some electrocauteries have suctioning function along with it. That is very helpful in case of management of epistaxis, because while blood is coming from the source vessel the suction can clear it continuously. Electrocautery can be used with endoscope as well as with the headlight. Headlight is useful for anterior epistaxis and endoscope is helpful for posterior epistaxis. For the application of electrocautery in the septum it is necessary to be careful because cauterization in the both sides of the septum may produce septal perforation. Electrocautery can be done under local or general anesthesia and should not be done without any anesthesia because during electrocaurety patient may feel a burning sensation. Local anesthesia can be achieved by decongestant or anesthetic agent with epinephrine.

Surgical management

When the direct and indirect therapies for the management of epistaxis are flailed then some surgical interventions are required. Although posterior nasal packing is discussed in the indirect therapy section it is a surgical procedure. Other surgical

procedures are ligation of the bleeding vessel, some form of septal surgery, embolization of the bleeding vessels is practiced for management of epistaxis.[3]

Posterior nasal packing has some discomforts and it is poorly tolerated in elderly patients having multiple comorbidities like arteriosclerosis, hypertension, diabetes, hepatic and renal impairment.[6] Then the ligation of bleeding vessels has become popular. Among the ligation techniques ligation of sphenopalatine artery, ligation of maxillary artery and ligation of external carotid artery has been proposed. Recently sphenopalatine artery ligation is practiced endoscopically. External carotid artery ligation is practiced less commonly as because the nose has some contralateral anastomosing blood vessels and ligation of external carotid artery also produces cerebral ischemia. Ligation of maxillary artery is also less commonly practiced. Because Caldwell-Luc approach is needed to perform this procedure. But now-a-days maxillary artery ligation can be done endoscopically. Though it has higher success rate,[18] but sometimes it is difficult to find out the vessel in pterygopalatine fossa.

When bleeding from nose cannot be controlled with local measures then examination under local or general anesthesia is needed. During this procedure nasal cavity is thoroughly examined and tremendous search is done for any bleeding points. If point can be controlled with bipolar diathermy, then it is enough. But if it fails then endoscopic ligation of sphenopalatine artery can be done. Sphenopalatine artery is situated near the ethmoid crest in the middle meatus. Exposure of the artery is done by elevating submucosal flap. There are variations in the anatomy of spnenopalatine artery. It gives variable number of branches in its course. This variation is the main cause of failure in the control of epistaxis with sphenopalatine artery ligation.

Arterial embolization has proven as an effective treatment of epistaxis. But this procedure has a risk of development of cerebrovascular accident. More risk is seen in case of embolization of internal carotid branches than that of the external carotid. This technique should be reserved only for the epistaxis that is refractory to other treatments.

Anterior ethmoidal artery gives troublesome bleeding. It may happen during trauma or surgery. This can cause blindness if hemorrhage occurs itntaorbitally. External open approach or endoscopic approach can be used to identify and ligate the vessel.

In case of hereditary hemorrhagic telangectasia control of bleeding is very difficult. Sometimes closure of nasal cavity may be required.[19]

CONCLUSION:

Identification and closure of bleeding point is the best way of controlling the epistaxis. But it is not always possible to do the best means due to difficulties in identification. So first aid, indirect as well as direct technique of management of epistaxis will remain simultaneously.

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