EPISTAXIS

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Hemorrhage of nasal origin ranks high on the list of disease entities and complications seen by the oto-laryngologist. They may be easily diagnosed, located and treated or may be impossible to locate and be frustrating nightmares to stop. Spontaneous nasal hemorrhage is a frequent occurrence in medicine in general, and in a vast majority of patients, the arrest of bleeding is spontaneous, self-controlled or easily managed by local therapy. This therapy usually consists of visualizing the bleeding point, and using local anesthesia, pressure, cautery (both chemical and electric), and properly placed nasal packing of various forms over the bleeding point. Usually these methods are quite effective, and, after a few days, the patient is well on his way to recovery. This is due to the fact that most of these types of bleeding are anterior, in Kiesselbach's (little's) area, are easily visualized and readily exposed to direct, local attack as described above.

There remains, however, a group of cases where bleeding is persistent, profuse and recurrent to the point that the patient may eventually lose so much blood that serious states of anemia, shock and even death ensue. These latter cases are usually posterior, behind a septal spur or underneath a protruding turbinate. This inability to locate the exact point of bleeding adds much guess-work to the eventual therapy. These cases require posterior packing, plus tight, well-placed anterior packing, and in addition, require general medical assistance in replacement of fluids and blood, plus general therapy to alleviate the originating cause. These difficult cases need not all be posterior, as I have seen several cases of massive nasal hemorrhage that were quite anterior and therefore easily seen. But due to the fact that the bleeding was arterial, and the patients usually in advanced years with arterio-sclerotis heart disease and generalized arterio - sclerosis, these anterior cases were as difficult to treat as posterior ones.

The etiology of epistaxis will not be discussed at great length here because we believe that in severe epistaxis, it is a disease entity of its own and has to be treated as such. It is generally felt, however, that epistaxis in general, at least the severe cases, is one seen in advanced years and secondary probably to associated hypertension and arterio-sclerosis; although the ratio of nasal hemorrhage to hypertension percentage-wise is far below the expected number. Systemic diseases, organic nasal disorders, trauma with its associated deviations and deflections to the nasal septum and pyramid, neoplasms, blood dyscrasias, inflammation and infections are also causative factors in nasal hemorrhage.

Since more cases of epistaxis occur in the winter and early spring months, it is felt that nasal mucosal drying, due in part to the lowered humidity of the inspired air, is the principal cause. In atrophic rhinitis, especially on the wide side, is the aforementioned fact true.

It has been felt by certain authors that infection is the primary cause of epistaxis. This, I feel, is only in part, true. The fact that infection **can** cause irritation or inflammation or localized tension in a certain part of the nasal

chamber is true. These conditions, i.e., irritation, inflammation, localized tension, drying, oedema, can be caused by infection **as well as by** misdirected air currents, atrophy and altered physiology from wide and traumatized noses. When these latter conditions are present, any added stress can precipitate nasal hemorrhage, especially if the area involved exactly overlays and involves part of the underlying vascular system.

The vascular supply to the nose is mainly the (1) anterior ethmoid artery (from the internal carotid) which supplies, in general, that portion of the nose anterior to and superior to the middle turbinate; (2) the spheno palatine artery (from the external carotid, via the internal maxillary) which supplies in general, that portion of the nose posterior to and inferior to the middle turbinate. The corresponding areas of the septum roughly adhere to this distribution except that the septal branch of the superior labial and the great palatine also enter into the anterior portion of the nose. Both of these arteries are from the external carotid. It must be remembered that there is much anastomosis of all these arteries of the nose, and therefore a complete cessation of bleeding by tying off any one certain artery does not necessarily stop all of the hemorrhages. The relationship of the blood supply to the surgical landmarks of the nose is of importance in determining the means of controlling bleeding by surgical interference. The carotid system is unique in regard to the multiple pathways of possible anastomosis. The internal carotid has a free anastomosis at the circle of Willis with the corresponding vessel of the opposite side. The capability of the anastomosis to maintain cerebral blood flow has been demonstrated by Shenkin, Dandy and Sweet. As stated before, the blood supply to the internal nose is mainly the terminal branches of both the internal and external carotid arteries. The external carotid artery enters the nose as the sphenopalatine division of the internal maxillary artery and supplies the posterior and inferior two-thirds of the medial and lateral wall of the nose. On emerging from the sphenopalatine foramen in the middle meatus, it then crosses in the mucosa of the anterior inferior border of the sphenoid sinus and separates into a lateral nasal and medial septal division.

The lateral branch descends to supply the mucosa over the inferior turbinate and its meatus. The vessel anastomosis with the nasal branches of the descending palatine artery. The medial divison of the artery terminates on the septum by anastomosing with the ethmoidal arteries and the septal divisions of the superior labial artery from the external maxillary portion of the external carotid artery. The internal carotid system terminates in the nose as the anterior and posterior ethmoidal vessels; the latter arteries are of small caliber and, like the septal branches of the external maxillary, are unimportant except for the anastomotic pathways they contribute. The anterior ethmoidal artery takes origin in the orbit from the ophthalmic artery and enters the nasal space from the medial wall of the orbit. It enters the nose from the crista galli and supplies the mucous membranes lining the sinus spaces above the middle turbinate and also gives off meningeal branches to the dura.

As stated before, the arrest of nasal hemorrhages of anterior origin is usually controlled because of the ease of seeing the bleeding point and

following the routine of pressure, cautery and properly placed anterior packing. However, serious epistaxis resulting in persistent nasal hemorrhage with moderate to excessive blood loss, require a posterior nasal plug with properly placed anterior packing for proper control of nasal bleeding. This is usually accompanied by puting the patient at bed rest in the hospital with adequate control of shock, secondary anemia, concomitant medical therapy and recurrent bleeding. I have felt that the use of large doses of vitamin C, Premarin 20 mg. i.v. once or twice daily and in the severe cases, Mephyton 25 mg. i.v. has been of great help.

The packing, which may be of iodoform, saline or vaseline and ½″ wide (mesh gauze) can be removed slowly as early as the fifth day in anterior cases. The packing is removed slowly and the removal stopped as soon as there is any sign of blood stains on the mesh, or the removal becomes difficult.

Posterior packing should be left in from 7—10 days, at which time the posterior plug can be removed, leaving in the anterior packing. This packing then can be removed as described above. Removal of packing should always be accomplished in multiple stages.

Vascular ligation is reserved for those cases where bleeding recurs in spite of all the above precautions with precision packing and where continued bleeding endangers the patient's life. It must be remembered that ligation is a permanent curative procedure **only** when performed according to the accepted surgical principle of **terminal** ligation of blood vessels for control of hemorrhage.

The following is a listing of all the possible blood vessels that may be ligated (whether feasible or not) to control hemorrhage:

1. Common carotid artery
2. Internal carotid artery
3. External carotid artery
4. Internal maxillary artery (branch of external carotid)
5. Sphenopalatine artery (branch of internal maxillary)
6. Anterior ethmoidal artery (branch of internal carotid).

To these may be added combinations such as 3 and 6, 4 and 6, and finally 5 and 6.

1. Common carotid artery

Early in the eighteenth century, **Abernathy** advocated this procedure. It is still commonly accepted today although it actually restricts only 50% of the blood flow through the internal carotid artery because of the adequacy of the circle of Willis. It also has a high mortality rate, especially in older people. This has been stated as being 15% or higher.

2. Internal carotid artery

Ligation of this artery is the most dangerous and least desirable procedure of any; **much more so** than ligation of the common carotid. Complications are present in about 57% of all cases, most ending in death or permanent sequela. **It is to be completely avoided.**

3. **External carotid artery**

This artery has been accepted as a method of choice for the last one-half century. This is probably due to the fact that much nasal bleeding is from the sphenopalatine artery, a terminal branch of the external carotid. This procedure is questionable due to the fact that long term prognosis may be short-lived due to the rich collateral circulation beyond the ligation. It has been reported that nasal bleeding, stopped by ligature of the external carotid, may be reestablished within a week of ligation of that artery. This I have found to be so. Complications of this procedure are many: laryngeal and pharyngeal oedema, unilateral paralysis of the tongue, tracheostomy and in some cases difficulty in exposure for ligation.

4. **Internal maxillary artery**

This artery is reached by the transantral approach and in some cases is a very effective one. The artery lies just posterior to the posterior wall of the maxillary antrum and can be tied or clamped off rather easily. If bleeding persists, the anterior-ethmoid must be involved.

5. **Sphenopalatine artery**

This is the terminal nasal branch of the external carotid artery and may be tied as follows: the ethmoid labyrinth is exenterated and the anterior wall of the sphenoid sinus is visualized. The mucosa is elevated from the anterior-inferior wall of the sphenoid sinus and a silk or cotton ligature is inserted through the extreme lateral position so as to include the sphenopalatine artery as it enters the nose from its foramen. The ligature carrier and tier, as described by **Ferris-Smith,** is used for this purpose.

6. **Anterior ethmoidal artery**

This artery is exposed through a fronto-ethmoidal approach. The periosteum is elevated posteriorly until the artery is exposed. A small steel brain clamp can be used to stop bleeding or placement of a ligature about the artery with the Ferris-Smith carrier and tier. Of course, a combination of 4 or 5 and 6 may be used. Silverblatt advocates tying off the anterior ethmoid artery as described above and if bleeding persists, tying off the sphenopalatine as described in 5.

L'EPISTAXIS

1. L'epistaxis pose un problème réel et compliqué, principalement chez les personnes agées et chez les tout jeunes enfants.
2. Les malformations traumatiques du nez doivent être corrigées d'une façon physiologique.
3. Dans les cas de rhinite atrophique et de nez large, celui-ci doit être rétréci afin d'améliorer sa physiologie et d'empêcher l'assèchement des muqueuses.
4. Le milieu physique ambiant (p.e. l'humidité, la température, etc.) doit être amélioré afin d'obtenir un meilleur fonctionnement du nez malade.

5. Le tamponnement doit être laissé assez longtemps en place, 5 à 10 jours, et être enlevé graduellement.
6. Le tamponnement antérieur et, si nécessaire, le tamponnement postérieur doivent être utilisés pour des hémorragies moyennes ou importantes.
7. Dans les cas d'epistaxis continues, abondantes et récidivantes il faut ligaturer.
8. Les techniques de choix sont:
   a) Ligature de l'artère ethmoïdale antérieure et, si l'hémorragie persiste,
   b) Ligature de l'artère sphénopalatine.

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