

## REVIEW ARTICLE

# Nasal Endoscopy its Importance in Diagnosing Sinonasal Diseases and Post-Operative Follow Up.

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The purpose of reviewing the technique and concept of nasal endoscopy is to introduce and popularise this excellent modality in our set up which can be used as a diagnostic tool in patients with sinonasal symptoms. Endoscopic Sinus Surgery (ESS) is getting popular since last 25 years, the indications for which are increasing day by day. The common conditions for which Endoscopic Sinus surgery gives good results are chronic sinusitis, recurrent acute sinusitis, nasal polyposis, fungal infection, fronto-ethmoidal Mucocele, repair of blow out fracture of orbit, dacrocystorhinotomy, choanal atresia, repair of CSF leak, management of epistaxis, septal and turbinate surgery. Nasal endoscopy is now being increasingly used for post operative follow up of ESS cases. It facilitates better post op care and also results in good prognosis.

**Key Words:** Nasal Endoscopy, Diagnostic tool, Post operative follow up

Diagnostic nasal and Sinus endoscopy was first used by Hirschmann in 1901<sup>1</sup>. Later Reichert 1902, Valentin 1903, Sargnon 1908 used the same technique for minor surgical procedures. After the introduction of HOPKINS rod-based telescopes, the diagnostic and the surgical capabilities of the instrument were considerably enhanced<sup>1</sup>.

Wigend 1981, Stammberger from Austria and Kennedy from USA (1985) are credited for the recent enthusiastic interests in the use of endoscopy for diagnosis and surgery of Sinonasal diseases. The Endoscopic examination of the nose is pre-requisite for the Functional Endoscopic Sinus Surgery (FESS)<sup>2</sup>. Now a days post of follow up is a routine for the successful outcome of the initial surgical technique<sup>3</sup>.

Surgical treatment of chronic sinusitis in the recent past has been based on the concept that the diseased mucosa should be radically removed to enable new healthy mucosa to grow in its place. In cases of chronic sinusitis the most commonly affected maxillary sinus was operated by Caldwell-Luc's operation. However, this procedure fails to give the desired long term relief from symptoms. Messerklinger's work on sinus mucosa and mucociliary transport has shown that the pathology is not primarily in the larger sinuses but is secondary to impaired drainage caused by disease in the ethmoidal air cells blocking their natural ostia in the middle meatus. This block leads to stagnation of secretions and hence persistent infection resulting in a vicious circle causing mucosal swelling. If the diseased sinus is unblocked surgically by the removal of diseased ethmoidal air cells, normal drainage and ventilation of the sinus is re-established and the diseased mucosa reverts back to normal. There is no need to remove all the diseased mucosa as was formerly believed<sup>4,5</sup>.

### Endoscopic Anatomy

The region of the middle meatus with the anterior and middle ethmoids has been termed as the osteomeatal complex by Nauman. The sagittal view of the lateral nasal wall shows three well recognized prominences namely the superior, middle and inferior turbinates with their underlying meatuses. In the middle meatus the frontal sinus, anterior group of ethmoidal cells and the maxillary sinus drain. Under the middle turbinate there is hook shape uncinate process behind which lies a semilunar groove, called the hiatus semilunaris. Bulla ethmoidalis lies behind the groove and forms a bulge. The ethmoid infundibulum is the anterior and lateral extension of the hiatus semilunaris. Its postero-inferior end leads into maxillary ostium and its anterosuperior end leads into the frontal recess where the frontonasal recess opens.

Agger nasi ridge overlies the anterior most ethmoidal cells. The part of the lateral nasal wall anterior and posterior to the maxillary sinus ostium consists of a double layer of mucosa with no intervening bone. These are termed as the anterior and posterior fontanelles. The bulla ethmoidalis is the most constant ethmoidal cell and along with its surrounding cells constitutes the middle ethmoidal cells. These are bounded superiorly by the ethmoidal roof. The anterior and posterior ethmoidal arteries traverse the ethmoidal roof in the coronal plane from the orbit to the nose. They are important landmarks as they denote the upper limit of the dissection. Laterally, middle ethmoidal cells are related to the lacrimal bone and the lamina papyracea of the ethmoidal bone forming the medial orbital wall, which is very thin and delicate and may also be accidentally perforated during dissection.

Posteriorly the middle ethmoidal cells are bounded by a bony partition called ground lamella or basal lamella

which corresponds the bony attachment of the posterior end of the middle turbinate. Posterior to the basal lamella lie the posterior ethmoidal cells which are related superiorly to the dura, postero-inferiorly to the sphenoid sinus and laterally to the orbital apex and the optic nerve. Posterior ethmoidal cells vary from one to seven in numbers and usually open by one orifice in the superior meatus.

The sphenoid sinus vary in shape and size. The anterior wall of the sphenoid sinus is approximately 7 cm from the anterior nasal spine. The lateral wall of the sphenoid sinus is related to optic nerve. More posteriorly and inferiorly, the lateral wall of the sphenoid sinus is related to the internal carotid artery<sup>6</sup>.

#### Method of examination

After conventional examination the patients are explained the details of the procedure. The examination is performed with the patient in sitting position. The nose is prepared by spraying a mixture of 4% xylocaine and 0.1% xylometazoline. In a few cases cotton pledget are kept in the nose for few minutes. Patient should be watched carefully during the period for unexpected sensitivity reaction. The telescope, best suited for endoscopic diagnosis are.

- 1 0° direction of view 4.0 mm diameter
- 2 30° direction of view, 4.0 mm diameter

Before commencing the examination the patient is instructed to raise his finger whenever he/she feels pain or sneeze coming on. This signal allows the examiner to withdraw the endoscope and any other instruments quickly from the nose so that trauma can be avoided.

Before use, the endoscope must be dipped in Cidex for 10 minutes for disinfection and the tip of the endoscope is dipped in Povidone\_Iodine to prevent fogging of the lense.

While introducing the endoscope the examiner must take care to avoid injury to the mucous membrane throughout the entire procedure. Excessive secretion can easily be removed by suction.

The endoscopic examination of the nose should be performed in a systematic manner. The first look provides a general survey and orientation within the nose. Using 0 degree telescope the examiner should first look in the direction of the inferior meatus, and evaluate the inferior turbinate. The septum, nasopharynx, eustachian tube, posterior choana and fossa of Rosenmuller. The appearance, color and state of the nasal mucous membrane should also be noted. For the second step the 30° telescope is guided past the middle turbinate to the upper edge of the choana and from here upward into the sphenoidal recess. The superior turbinate and possibly a supreme turbinate with their corresponding nasal meatus are visible. The sphenoidal sinus ostium can

be seen in certain cases, depending upon the pathology present.

The third step leads the telescope into the middle meatus itself. The middle turbinate is carefully pushed medially with an elevator and one can identify the uncinat process, the hiatus semilunaris, the ethmoidal bulla. In an antero superior direction a view of the frontal recess is achieved. The maxillary sinus ostium is normally hidden in the ethmoidal infundibulum and is not visible even with the telescope, often one finds accessory ostia in the posterior and more rarely in the anterior fontanelles. Some time one can look through these into the maxillary sinus itself. When pulling back the telescope a look can then be taken into the olfactory fissure<sup>7</sup>.

Numerous anatomical variations can complicate the anatomy of the lateral nasal wall and the condition of the osteometal complex. Differentiation between an anatomical variation as a coincidental finding and as a causal factor for sinusitis can be very difficult in individual cases.

#### Anatomical Variations And Pathological Findings

1. The septal deviation, spurs, ridges causes potential narrowing of all nasal meatuses.
2. Agger nasi cells depending on degree of pneumatization can cause constriction of the frontal recess, or disease of the lacrimal system.
3. Uncinate process if laterally curved can contact with the lamina papyraria if curved medially and towards the front may look like doubled middle turbinate.
4. Middle turbinate if pneumatized called concha bullosa and cause blockage of the ostium.
5. Medially rotated middle turbinate (Paradoxical middle turbinate).
6. Accessory ostium.
7. Sphenoid sinus ostium blockage.

These anatomical variations may be responsible for recurrent acute or chronic sinusitis<sup>8</sup>. The incidence of some of these variations are as follows<sup>9</sup>:

- Concha Bullusa 30%
- Paradoxical middle turbinate 8-17%
- Pneumatized uncinat process 0.4-0.5%
- Agar Nasi cells 90%
- Haller cells 10%
- Onodi cell 4-12%

The pathology commonly found are nasal polypi. It is an inflammatory condition leading to polypoidal mucosa of the nose and paranasal sinuses with characteristic endoscopic appearance. Ethmoidal mucocele. is a chronic expansile mucous filled cyst of the paranasal sinuses.

## Discussion

Nasal endoscopy is an important tool in the assessment of all the patients with sinonasal disease. Telescopic examination provides an excellent view of the anatomical variations and pathology of nose, paranasal sinuses and nasopharynx. Small lesions and anatomical variations which may be easily missed by routine nasal examination are clearly shown with the telescopic nasal endoscopy. Telescope also provides more accurate relationship between the intranasal structures and assist the endoscopist viewing the nose and related structure in multiple planes.

1. It gives clear view of the anatomy and pathology of the intranasal structures and nasopharynx.
2. It provides precise local site of the diseased area and help in confirming diagnosis.
3. It is helpful in evaluation of hyposmia/anosmia.
4. It is helpful for evaluation of suspected CSF leak.
5. It is a prerequisite for functional endoscopic sinus surgery.
6. It is very helpful in follow up of post operative cases.
7. It is an excellent teaching tool for residents and medical students.

In different studies where endoscopic examination was compared with conventional method it is concluded that 44% patient has nasal pathology which was not seen by traditional nasal examination. It is clear most of the lesion are exposed due to the illuminated view of the nasal cavity<sup>11</sup>.

Levin H L evaluated 150 patients with nasal and sinus complaints by both methods i.e. conventional anterior rhinoscopy and posterior rhinoscopic mirror examination with rigid endoscopic examination. Endoscopic revealed 58 patients (38.7%) of nasal pathology not seen by conventional anterior or posterior rhinoscopic examination. Pathology found included obstructed natural maxillary sinus ostia and several pathological disorders in the middle meatus like polypi, bent uncinat process, and hypertrophied bulla ethmoidalis<sup>12</sup>.

Role of endoscopic clearing of the operative site is very clear because it is not possible by any other way. During first post-op visit between 7 and 10 days the crust from operated site are removed. Suction of thick secretion and clots are done by viewing through endoscop. Second visit was done on 15 day after the first follow up. The possible complications have to look during this visit. Remnant/recurrence of polypi, if found, are removed

under local anaesthesia. Adhesions are usually found between middle turbinate and lateral nasal wall. These can be easily lysed at this stage. Removal of intra-nasal crusting is essential part of post-operative care of endoscopic sinus surgery<sup>13</sup>.

## Conclusion

Nasal Endoscopy is essential for diagnosis of patients with sino-nasal symptoms and post-operative care of ESS patients. The role of conventional nasal examination is to just have a global vies of the nose and should be followed by endoscopic examination for minor deatails

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