

Empty Nose Syndrome - A Case Report

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Empty nose syndrome (ENS) is a term introduced by Kern and Moore in 1994, for a nose that has been physiologically handicapped by excessive surgical removal of the turbinates, is oftentimes a poorly understood iatrogenic condition. We present a case report of one such patient - highlighting the different surgical interventions performed to relieve his symptoms and the significance of preservation of turbinates during nasal surgeries.

Keywords: Empty Nose Syndrome; Turbinectomy; Nasal Obstruction; Crusts; Neuropathic Pain; Atrophic Mucosa**Case Report**

A 33-year-old male, from a middle eastern country, a relatively hot and dry place, presented to us with symptoms of nasal block of ten years' duration. He also complained of headache, localized to forehead and pain inside the nose, both the symptoms being of intermittent nature. He had had 3 nasal surgeries in the past, at a local hospital, to relieve his symptoms. His last surgery was five years before his visit to our hospital. His personal history was insignificant, and the patient did not indulge in recreational drug use.

His nasal examination during the patient's first visit to our hospital, revealed thick purulent discharge with crusts filling both the nasal cavities. Diagnostic nasal endoscopy, at that time, revealed atrophic mucosa with large nasal cavities with redundant turbinates, along with excessive greenish crusts with mucopurulent discharge. Radiograph of paranasal sinuses revealed haziness in both the maxillary sinuses and computed tomography of paranasal sinuses showed signs of characteristically empty nasal cavities

with atrophic inferior turbinate on the right side and absent inferior turbinate on the left side with redundant middle turbinates. Apart from marginally high levels of serum cholesterol, his blood work was unremarkable.

A provisional diagnosis of Empty Nose Syndrome was made at that point in time and the patient was administered antibiotics and long-term steroid nasal sprays along with periodic nasal crust removal. Conservative management did not provide relief to the patient; consequently, a surgical line of treatment was decided upon. A bilateral Young's operation was performed on him, with the goal of promoting healing of nasal mucosa and eventual resolution of nasal obstruction. Patient was relieved of his nasal symptoms following the surgery and was asymptomatic for one and a half years, until he underwent reopening of the Young's operation, at a local hospital in his home country. His symptoms of bilateral nasal block, right side slightly more appreciable than left side, resurfaced following the latest surgery.

On examination during his second visit to our hospital, approximately two years after his first visit, his right nasal cavity was stenosed and there was evidence of pus in the left middle meatus. The latest computed tomography of paranasal sinuses showed relatively clear paranasal sinuses, absent inferior turbinate on the left side with right redundant inferior turbinate and atrophic middle and superior turbinates. He was operated upon for a right nasal recanalization, to address the stenosed nasal cavity, and this was done with the help of a silastic sheet. His post-operative period was uneventful, and the patient has remained asymptomatic since the recanalization procedure with regular at-home nasal alkaline douching.

Discussion

Empty nose syndrome (ENS) is used to describe a vexing spectrum of various symptoms, encountered by patients who have had previous aggressive nasal surgery to remove the turbinates. Some of the symptoms are chronic nasal dryness, paradoxical obstruction, and neuropathic pain [1]. Chronic dryness within the nose can lead to chronic inflammation and atrophy of the nasal mucosa, thus the overlap with a known entity called Secondary Atrophic Rhinitis. Paradoxical obstruction might be because of poor airflow feedback due to atrophic mucosa or metaplasia or due to abnormal aerodynamics secondary to loss of turbinates [2]. As nasal mucosal surface contains numerous receptors for airflow, temperature, and chemo-sensation; any mucosa damaging procedure, is capable of depriving the nose of all the aforementioned functions. Neuropathic pain results from exposure of peripheral sensory nerves during the nasal procedures, the recovery of which can take a long time; this pain can be perceived in the regions of pharynx, Eustachian tube, larynx, and even trachea or bronchi. Patients with ENS tend to be easily fatigable and do not have a great quality of life.

ENS can be classed according to the turbinate resected during the previous nasal surgery - inferior (ENS - IT), middle (ENS - MT), both (ENS - both), and fourthly, a subtype in which, essentially the turbinates are normal. The pathophysiology of this entity remains poorly understood, though many pathological processes have been hypothesized in the past. It is known that turbinates are crucial for humidification, heat exchange, air filtering, and airflow control. Excessive destruction of these physiologically vital structures is bound to have a derogatory effect on the nasal cycle and, in turn, the physiology of the paranasal sinuses. Other pathological processes that have been incriminated are atrophy of the nerve bundles, endarteritis, and metaplasia of the nasal mucosa following atrophy. In patients with average-sized turbinates, the etiology may be damage to the internal nasal valve upon removal of the anterior part of inferior turbinate. All these processes decrease the nasal resistance, thereby reducing the suction power of the lungs. Hence, the patient finds it difficult to respire adequately, even in everyday situations [3].

Extensive nasal surgeries which damage the nasal mucosa severely have been implicated in the pathogenesis of ENS. Partial turbinate resection procedures involving the head excision more than the tail are more destructive and can lead to the development of ENS [1]. There have not been many studies looking into the incidence of ENS. Still, a survey of subjects who had undergone total

Figures 1: Computed tomography in axial and coronal sections during the second visit to the hospital, showing empty nasal cavities, redundant middle turbinates and remnant of right inferior turbinate and absent left inferior turbinate.

inferior turbinectomy found a 22.2% rate of atrophy - very possibly, representing ENS [4]. Mucosal damage with out-fracturing of the inferior turbinate is much lesser when compared to other methods which are thought to be safer, including Coblation and Submucosal radiofrequency, but require more post-operative cleaning sessions because of the excessive crust formation indicating mucosal damage, according to Dr. Houser, from Cleveland, Ohio [1].

Diagnosis is mainly clinical; diagnostic nasal endoscopy and imaging can be used to confirm the same. The prognosis is not very favorable because the symptoms only seem to worsen with the progression of the disease despite many available treatment options. This might be due to the further damage to the remaining normal nasal mucosa over the years.

Non-surgical treatment options include nasal irrigation, steroid sprays, a cool mist humidifier, and improving general health to reduce disease deterioration. Surgical treatment involves narrowing of the nasal cavity- either by bulking up the partially resected turbinates with biological implants like Teflon, Hydroxyapatite, Gortex, Fibrin, Glue, bone, etc. or by creating neo-turbinates. Houser described the technique of submucosal implant of the acellular dermis, the site of which he based on the "cotton test", which was devised by him [1]. Young's operation can be done to close the nasal cavities to allow the nasal mucosa to recuperate from the damage due to the disease process.

Conclusion

It is essential for the surgeons to know the physiological importance of the turbinates and nasal mucosa before considering a turbinate surgery to prevent the development of ENS. Nasal surgeries should be as conservative as possible; overzealous resection of turbinates will only worsen the patient's symptoms further. ENS is one of the most cumbersome conditions for otorhinolaryngologists to manage, but fortunately, it is scarce, and most surgical patients do not develop ENS. Mucosa-sparing procedures without aggressive use of microdebrider or laser or radiofrequency are some of the vital precautionary measures against the development of ENS. Turbinate surgery should be considered only when medical treatment for nasal obstruction has failed and should be as conservative as possible. Finally, ENS is a loss of functional sensation to airflow, not merely a loss of mechanical volume, as quoted by Houser [1].

Bibliography

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