



Nasal Obstruction in Childhood

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Nasal obstruction is one of the most frequent complaints seen in the offices of pediatricians and otorhinolaryngologists. We list below the most common causes of this pathologic condition according to age-groups.

1-Newborns

1-1 Choanal atresia

Choanal atresia can be an isolated finding or it can be associated with other malformations. Its incidence is 1 case per 8000 (90% are osseous, and 10 % are membranous atresias). It can be uni- or bilateral. Unilateral atresia is not usually diagnosed at birth, as the child can breathe with one pervious nasal fossa without difficulty. Between 4 and 6 years of age, the abundant mucoid secretion bothers the child and is a fundamental factor in the diagnosis of unilateral atresia.

Bilateral atresia is more severe, as at birth the child does not know how to breathe through the mouth, a habit acquired only after some weeks of life. Diagnosis can be made at birth when in inserting an aspiration tube a point of resistance is encountered so that the tube does not progress. Episodes of apnea are important in the clinical history, and these episodes improve with orotracheal intubation or the use of an orthodontic pacifier. After aspiration of the secretions, the atresia can be seen upon examination with a rigid or flexible fiber endoscope. A contrast X-ray of the cavum profile is another examination that can help to make the diagnosis. A CT scan is an important complementary examination to define the pathologic condition and the type of atresia and to guide surgical planning.

1-2 Neurogenic tumors

1-2-1 Meningoencephalocele

A meningoencephalocele represents herniation of the meninges into the nasal fossa. It can be nasofrontal, nasoethmoidal, or naso-orbital. It can be characterized as being a pulsatile mass.

1-2-2 Nasal glioma

A nasal glioma represents herniation of neuroectodermal tissue of the brain into the nose or nasopharynx. Histologically, the tissue is identical to tissue of an encephalocele but does not have the intracranial connection and is characterized by being pale and non-pulsatile.

Diagnosis is made by clinical examination using anterior rhinoscopy and nasofibroscopy. A CT and an MRI can be helpful in determining the dimensions of the

tumor. Treatment is surgical, and can wait until the child is in better condition, as the tumor only rarely obstructs the nasal fossae.

1-2 Ectodermal tumors

The most frequent ectodermal tumors are: epidermoid cyst, epidermoid inclusion cyst, sebaceous cyst, cyst of the nasolacrimal duct, ethmoidal cyst, and papilloma. Diagnosis and treatment are the same as for neurogenic tumors, as mentioned above.

1-3 Mesodermal tumors

Mesodermal tumors are represented by the hemangiomas. Diagnosis is based on nasal obstruction when the child cries; it is generally unilateral and is followed by skin lesions. The treatment should be individualized and varies from corticoid therapy to embolization and the use of sclerosant substances.

1-4 Nasal fracture or luxation of the septum

These lesions can occur at the time of birth or during pregnancy, when the uterine wall, the presence of myomas, or even the fetus' hand can cause lesions on the nasal structures.

The distance between the nasal dorsum and the occipital bone is the same as between the mentum and the occipital bone (11cm). The cartilaginous portion of the septum, however, adds some 2 cm to the diameter of the fetus' head and is therefore susceptible to traumas in the birth canal. Presentation in the birth canal is most commonly (70% to 80%) LOA (left oblique anterior), and that entails the highest incidence of septal deviation. Most septal deviations are mild and are spontaneously corrected within 30 days after birth.

When birth was more traumatic, with facial presentation, use of forceps, or long periods before expulsion, it is necessary to examine the nasal cavities thoroughly. Several studies have shown that posterior deviations of the septum originate during the expulsion phase. Anterior deviations can be spontaneously corrected. Specialists, however, should evaluate a posterior deviation.

Diagnosis can be made by inspecting lateralization of the nose. There would be little resistance to palpation at the tip of the nose, due to fracture or luxation of the cartilage. Crepitation of the fracture can sometimes be felt. Anterior rhinoscopy and nasofibrosocopy show conditions in the nasal septum. Surgical reduction is the appropriate treatment.

1-5 Septal hematoma and abscess

These conditions can result from nasal trauma during the expulsion phase of birth.

Canty and Berkowitz indicate that 95% of children have nasal obstruction as a result of formation of a hematoma, and it can evolve to abscess of the nasal septum. When this diagnosis is made, the abscess should be drained as soon as possible in order to prevent destruction of cartilage with major nasal deformity and septic complications.

Nasal packing and antibiotic therapy complement the treatment.

1-6 Rhinitis

1-6-1 Rhinitis of the newborn

Rhinitis of the newborn is acquired during passage through the birth canal and can

be streptococcal, chlamydial, or gonococcal. Purulent rhinorrhea occurs in chlamydial rhinitis. In gonococcal rhinitis there is purulent rhinorrhea with streaks of blood, and this should be treated as soon as possible, as it can lead to sequelae such as synechiae and nasal stenosis.

1-6-2 Rhinitis in infants

Infants may present with staphylococcal and luetic or syphilitic types of rhinitis. Staphylococcal rhinitis results from nasal contact with the mother's skin or fissures in her nipple. Luetic rhinitis demonstrates sanguinolent serous secretion. These purulent types of rhinitis represent less than 10% of cases and when diagnosed should be treated to prevent spreading to the lower airways. Bacterioscopy and cultures are needed to make the diagnosis. Treatment involves nasal cleaning with saline and systemic antibiotics.

2- Childhood

2-1 Adenoid hypertrophy

Adenoid hypertrophy is the most frequent cause of nasal obstruction in this age-group, as its maximum development occurs between three and five years of age. It tends to decrease during puberty and is atrophied in adulthood. Nasal obstruction, mouth breathing, salivation, nocturnal snoring, and apnea are important clinical signs. In radiographs and nasofibroscope the mass is seen to cause partial or total obstruction of the cavum. Surgery is indicated in cases of major obstruction.

2-2 Tonsillar hypertrophy

In some cases, hypertrophy can reach the upper poles of the palatine tonsils in the midline, obstructing the upper portion of the oropharynx. Diagnosis is defined when oropharyngoscopy shows the right and left upper poles meeting in the midline. The treatment is surgical.

2-3 Deviation of the nasal septum

A large number of children have nasal obstruction caused by a deviated septum, the incidence being between 6% and 8%. The most common causes in this age-group are sports and birth trauma, and also suffering falls at home. When the deviation is anterior, diagnosis is made by simple inspection. If the deviation is posterior, anterior rhinoscopy or nasofibroscope can evaluate its dimensions.

When the deviation is partial and is not causing full obstruction of the nasal fossae, treatment can be delayed until the patient is 18 years old, at which age the nose has reached full growth. However, when the deviation is total and blocks the fossae, a conservative septoplasty can be performed. In our experience, this type of surgery brings benefits without interfering with normal nasal development.

2-4 Septal hematoma and abscess

Diagnosis and treatment are similar to those for newborns.

2-5 Nasal fracture

Nasal fractures are very common in childhood, when sports, fights, and accidents are frequent. Diagnosis is made by a history of trauma, edema near the eye, and crepitation upon palpation of the nasal bones, indicating the presence of a fracture. An X-ray can help in diagnosis. Edema will be present within a few hours, and a re-evaluation is necessary a week later, when the swelling is disappearing. Open surgery can be performed in the first six hours, or seven days after the trauma.

2-6 Foreign bodies

Children have the habit of putting foreign bodies in the nose (**Figure 1**). Diagnosis is made by the presence of a foreign body triggering a purulent and fetid rhinorrhea that is unilateral and obstructs the nostril. Removal is done using instruments appropriate for each type of foreign body. Spontaneous elimination can be tried, or the foreign body can be anteriorized using nasal vasoconstrictors,



Figure 1. Foreign body in the nose

asking the patient to force an expiration or closing the contralateral nostril with the finger. Sometimes this procedure makes the removal easier. Inappropriate procedures may cause abundant bleeding and psychological trauma to the child, preventing the removal being performed in the physician's office. More difficult children can receive general anesthesia in an appropriate surgical center.

2-7 Infectious processes

Vestibular rhinitis is the most common cause of nasal infections. The vestibule is the zone of the nose that has hairs, and infections in this region are common

in children who have a habit of placing a finger inside the nose. Diagnosis is based on pain that evolves to swelling of the wing of the nose, fever, and nasal obstruction. Treatment includes therapy using a broad-spectrum antibiotic, warm gauze pads and, when necessary, drainage of the abscess.

2-8 Allergic rhinopathy

Allergic rhinopathy will be described later. An important factor is that rhinitis can occur in younger children, caused by food allergies such as to cow's milk, cereals, and egg whites. Vasomotor rhinitis is rare in small children, as is non-allergic eosinophilic rhinitis.

2-9 Acquired nasopharyngeal stenosis

Giannoni and colleagues described cases of severe nasal obstruction after surgical tonsillectomy and adenoidectomy performed using lasers. This procedure caused intense fibrosis, and several surgeries were needed to reconstruct the nasopharyngeal cavity.

3- Puberty

3-1 Juvenile angiofibroma

Juvenile angiofibroma will be described later.

3-2 Nasal polyps

Nasal polyps are frequent in this age-bracket. Diagnosis is based on finding a progressive nasal obstruction, and anterior and posterior rhinoscopies will show the presence of a polyp obstructing the nasal fossa (**Figure 2**). A solitary Killian polyp is sometimes found in the rhinopharynx. Treatment based on corticoids can lead to regression of the polyp, but that can be temporary, and the alternative is surgical treatment.

3-3 Drug-induced rhinitis

Drug-induced rhinitis (**Figure 2**) is a pathologic condition that evolves from allergic or vasomotor rhinitis. The excessive use of topical nasal vasoconstrictors



Figure 2. Nasal polyp

leads to irreversible hypertrophy of the turbinates. If the obstruction no longer regresses with the use of vasoconstrictors, and there is constant hypertrophy of the turbinates, these are signs that suggest the presence of this pathologic condition and confirm the diagnosis. The treatment is to slowly decrease the use of nasal drops, progressively diluting the substances with the use of oral vasoconstrictors. Some cases evolve to hypertrophic rhinitis, that is, they no longer regress with clinical treatment, and surgical resection of the turbinates (turbinectomy) becomes necessary.

3-4 Septal deviation

The incidence of deviation of the nasal septum increases in this age-group. The diagnosis and treatment have been mentioned above.

Conclusion

Besides the respiratory discomfort, nasal obstruction can also lead to complications. Facial deformities are notorious and very important in a child's development. Sleep apnea syndrome, deformities of the chest, and increase in the cardiac region (*cor pulmonale*) are frequently described in scientific papers. It is important to keep in mind how uncomfortable nasal obstruction is and that there are mild or severe consequences that can be avoided if correctly diagnosed and treated without delay.

Recommended readings

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