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Management of the Nasal Obstruction in Children

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Review Article

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Abstract: Nasal obstruction (NO) is defined as a single or bilateral nasal breathing disorder, recent or old, permanent or intermittent. It is a frequent problem in pediatrics and underestimated because of the absence of complaint in young children or unknown when the complaint is unilateral [1]. Although the majority of causes of ON belong to the infectious pathology, one must know to think of a syndrome malformative or tumoral [2]. The ON can cause significant troubles both locally and generally [1]. It is necessary to objectify the cause quickly especially in the newborn because of the vital consequences that this obstruction can cause [1].
Keywords: nasal obstruction, children, nasal endoscopic, CT, MRI.

INTRODUCTION

Physiopathological reminder

The nose has the function of heating, filtering and humidifying the inspired air.

In the newborn, the anatomic conditions (larynx high located, length of the veil which closes the oropharynx) do not allow, outside the cries, a mouth breathing [3] and nasal breathing is the only physiological during the first 3 weeks of life [2].

In the older child, the bilateral No, especially if it is progressive, will often be neglected and it will be its local, regional or general repercussions that should be related to the obstructive phenomenon.

- Locally: No causes impaired mucociliary function preventing the removal of filtered particles and infectious agents from which stasis and infection [2].
- At the regional level: nasal hypoventilation leads to poor aeration of the middle ear via the Eustachian tube and sinuses. Oral breathing causes snoring, dryness and long-term oral growth disorders of the middle third of the face with open bite and dental articular, a narrow palate and ogival or adenoid facies [1].
- Finally on the general level NO can lead to growth disorders due to chronic respiratory insufficiency or even the constitution of a chronic pulmonary heart, appetite disorders by diminishing of smell and taste with consequent added weight loss [1, 2], behavioral disturbances caused by disturbed sleep and daytime tiredness, the practice of sport is sometimes severely handicapped [2].

Recognize the Nasal Obstruction

In the newborn and the infant

The diagnosis is clinical in the face of respiratory distress with apneas and cyanosis, which regresses when the infant breathes through the mouth or starts crying. These signs worsen during the meal with bottle or breast.

On inspection, this dyspnea has a mandibular draw. Incomplete NO is responsible for noisy nasal breathing [4].

The improvement is immediate after placement of an oropharyngeal cannula.

In children

Because of the absence of immediate vital risk, the NO is quite often neglected in this age group. The functional signs are all the more important as the NO is bilateral and rapid installation [2].

In acute periods, the child will complain of a difficult blowing, nasal breathing difficulty with sniffing, headaches, phonatory disorders with closed rhinolalia.

When NO becomes chronic, the symptoms listed are especially those secondary to NO such as: snoring, rhinorrhea, epistaxis, growth disorders, facial dysmorphism, dacryocystitis, sneezing [1, 2].

Physical examination

Oriented to the objective confirmation of the NO and locate the level of the obstacle.

- Objective the residual nasal flow is done using the cotton test which is appreciated the movement, or by the study of condensation deposited on a metal tongue depressor or a mirror placed under the nostrils. Catheterization of the nasal cavity by a suction catheter is not always reliable.
- Inspect the nasal pyramid: size, deformation, deviation.
- To study the nostril morphology: volume, inspiratory collapse of the nasal valve improved or not by traction outside the nasolabial fold (Cottle maneuver).
- Anterior rhinoscopy: supplemented by a flexible fibroscopy which allows after aspiration of secretions, an accurate analysis of the nasal fossae, choanes and cavum, even in the newborn. At the bigger child the use of rigid optics is possible.
- To study the oral cavity: palatal and lingual tonsil volume, palatal shape, sometimes ogival, narrow and deep, appreciation of the dental articulate (classes II and III are considered by some as a long-term consequence of the NO). Incisory open bite would be associated with adenoid hypertrophy.
- Otoscopy with search for signs of tympanic retraction, chronic otitis media, serous otitis and sero-mucosa and impedance and even audiometry tests.

Additional tests

- Multiallergic screening test PHADIATOP type and skin tests (Prick test)
- Sweat test if suspected of cystic fibrosis (pathological if> 60mmol / l)
- Analysis of ciliary beat and ultra-structural analysis of eyelashes (if suspected of primary ciliary dyskinesia)
- Weight determination of serum Ig and titration of vaccine-derived antibodies (if suspected of immune deficiency)
- Nasal cytology (eosinophils) if non-allergic rhinitis
- Serum iron if recurrent ENT infections
- Serology of the Ebstein-Barr virus, when a tumor of the cavum is suspected
- Acoustic rhinometry (minimally invasive, rapid examination, can be performed in maternity)
- Active anterior rhinomanometry, in children over 8 years of age, makes it possible to quantify NO and to specify its mucosal or cartilaginous nature
- Respiratory functional exploration
- X-ray of the face (limited place)
- CT of the sinuses which is the key examination in a chronic NO
- MRI is requested in 2nd intention (extension of a tumoral process with soft parts)
- Exploration of gastro-oesophageal reflux in case of persistent rhinitis. Etiologies and treatment:

Nasal obstruction in newborns and infants

Bilateral NO at this age requires emergency restoration of airway freedom by a Mayo cannula or nasopharyngeal tube if possible. When it is insufficient, it is necessary to resort to an oro-tracheal intubation, following a tracheotomy. Nutrition is ensured by gastroesophageal gavage.

Secondarily we will seek an etiology to take charge of it as quickly as possible [1, 2].

1. Chess atresia [4]:

- It is the obliteration of the posterior part of the nasal fossae.
- Rare (less than 1/5000 births)
- Usually unilateral (in 60 to 70% of cases)
- Diagnosis: mirror test, acoustic rhinometry, nasofibroscopy, CT
- In 50% of cases it is associated with other congenital anomalies (cardiac, genital, inner ear or ophthalmic)
- Surgical repealing (endonasal route)

2. Bilateral congenital hypoplasia of piriform orifices [2-4]:

- It must be evoked in the presence of anterior stenosis of the nasal fossae.
- Hinder the speculum examination and prevent the passage of the nasal fibroscopic.
- CT: narrowing of the anterior third of the nasal fossae
- Look for abnormalities located on the midline (no upper lip brake with single tooth bud at the upper median incisors.
- MRI: Pituitary malformations or corpus callosum are described.
- Treatment: local treatment (vasoconstrictor, corticosteroids and calibration) If failure: surgical boring sub-labial.

3. Imperforation of the lacrimal ducts:

- Bilateral in a third of cases.
- Clinic = NO + dacryocystitis
- Endoscopy: cystic, bluish formation, under the anterior part of the inferior cornet
- CT: cystic appearance with dilation of the nasolacrimal duct
- Treatment: endonasal marsupialization

4. Tumors of nasal fossae [2, 3]:

- Tumors of nervous origin: gliomas, meningoceles and meningoencephaloceles.
  o These are benign tumors

o Corresponding to the outcome in the nasal cavity of an evagination of the meninges and possibly of brain tissue
o Clinic: NO + clear rhinorrhea, sometimes meningitis
o Endoscopy: mass within the polypoid middle horn with synchronous pulse beats (meningocele or meningoencephalocele)
o Biopsy or puncture are contraindicated
o CT: bone dehiscence at the level of the lame plate of the ethmoid
o MRI: search for prolapse of endocranial structures in the nasal cavity
o Treatment: endonasal surgery (if limited volume) or neurosurgical high way

- Dysembryoplastic tumors: dermoid cysts and teratomas
o Develop at the level of the superior or lateral wall of the cavum
o Clinic: respiratory distress (NO + oropharyngeal obstruction)
o Treatment: complete excision
o Surveillance: clinico-biological (alpha-fetoprotein assay)

5. Pathology of the nasal septum:

Deformations or displacements of the nasal septum can be at the origin of an NO. Displacements are usually attributed to a traumatic origin during childbirth. The septal reduction maneuver should be done very quickly in the first days after delivery.

6. Rhinitis

- Primary bacterial rhinitis: correspond to maternal-fetal infections. It is often associated with purulent conjunctival discharge. The most common germs are streptococci, staphylococci and rarely gonococci.
- Iatrogenic rhinitis: often caused by systematic nasal catheterization at birth. Thus following a normal delivery, a vigorous newborn can be placed on his mother and does not necessarily need an endonasal suction. On the other hand, it is imperative to unclog children sleeping or born in a meconium amniotic fluid.
- Finally, the exploration and treatment of gastroesophageal reflux should be considered in the presence of persistent obstructive rhinitis.

Nasal obstruction in children and adolescents:

1. Inflammatory pathology of the nasal fossae
at. Rhinopharyngitis

- Corresponds to the inflammation of the adenoids at the level of the nasopharynx with nasal involvement.
- Acute rhinopharyngitis is the first reason for consultation in children between 6 months and 7 years.
- Clinic: oral, noisy and nocturnal breathing, fever rarely above 38.5 ° C, anterior and posterior muco-purulent rhinorrhea, discrete redness of the pharyngeal mucosa and bilateral inflammatory and painful cervical lymphadenopathy.
- Nasopharyngitis can become chronic
- Treatment :

o washing the nasal cavity with saline or sterile seawater. This washing is followed by an effective blowing of the child that will know how to teach him the most early (at the very least the use of the baby fly is recommended)

o Adenoidectomy, which involves the removal of three quarters of the adenoids. There is no lower age limit for performing adenoidectomy.

b. Rhinitis

- Allergic rhinitis:

o Inflammatory nasal mucosa with clear anterior rhinorrhea, sneezing in salve, pruritus and bilateral ON

o It is the research in the clinical history of atopy (atopic personal or family field), of a notion of time or space (behavior of the child in its environment) which will guide the allergic assessment with tests. skin to target eviction measures and guide possible desensitization.

o Treatment: eviction measures, prescription of oral antihistamines combined with local corticosteroid therapy. Treatment of contributing factors: fight against passive smoking, excision of adenoids and learning to bloat. Sometimes lower volume of lower turbinates (turbinoplasty)

- Non-allergic rhinitis:

o Rhinitis by neuro-vegetative dysfunction:

- Child over 12 years old
- Clinic: NO intermittent and toggle
- Examination: hypertrophy of lower turbinates
- Treatment: local corticotherapy and turbinoplasty.

o NARES (Non Allergic Rhinitis Eosinophilic Syndrome):

- Clinic: nasal obstruction + anosmia
- Negative allergic balance but hypereosinophilia in nasal secretions
- Treatment: nasal corticotherapy

o nasosinus polyposis (NSP):

- oedematous degeneration of the sinus mucosa
- The polyps come from the ethmoid and occupy the nasal fossae
- Clinic:

• isolated NSP (non-syndromic)
• NSP associated with general illness (syndromic NSP) such as cystic fibrosis, Widal disease or eyelash abnormality.
• NO + anosmia with frequent nocturnal cough and bronchial hyperreactivity

- All polyposis of the child involves performing a sweat test and a bronchial assessment in search of bronchial hyperresponsiveness or stigmata of ciliary dysfunction (ciliary sampling, search for a situs inversus or dilation of the bronchi). An intolerance to aspirin will be sought. Moreover, the discovery of a perennial chronic diffuse rhinosinusitis enamelled with episodes of superinfections in a child must make evoke 3 etiologies: a cystic fibrosis, an immunodeficiency or a primitive ciliary dyskinesia [5].
- Radiology: CT
- Treatment: local corticosteroids ± ATB if superinfection ± short course corticosteroids. If failure: ethmoidectomy

The Tumoral Pathology

The tumors most commonly encountered are in descending order: benign tumors, congenital tumors and malignant tumors. Congenital tumors rather rare in the big child were mentioned in the previous chapter.

Clinic: NO progressive, rhinorrhea or mucous mucous purulent or sero-bloody. Sometimes tearing, nasal deformity or palate. Abnormal tooth mobility, oculomotor disorders, trismus, nerve damage, exophthalmia, cranial nerve involvement (VI, V and VII)

Imaging: CT or MRI

Management: biopsy for histological confirmation and then treatment: surgery ± radiotherapy ± chemotherapy

- Benign tumors:
  o Intra-nasal hemangioma
  o Antro-choanal polyp
  o Spheno-choanal polyp
  o Mucocele
  o Tumor related to teething
  o Bone tumor
  o Cystic tumor of the cavum
  o Cavi angiofibroma

- Malignant tumors
  o Undifferentiated nasopharyngeal carcinoma
  o Rhabdomyosarcomas and lymphomas

Foreign bodies

- Reason for pediatric consultation relatively frequent
- Clinic: often NO unilateral + mucopurulent rhinorrhea foul
- Management: extraction, if the child is opposed to the examination it is useless to insist on the risk of traumatizing the nasal fossae and to transform the FN CE into laryngotracheo-bronchial CE. In case of failure: extraction under general anesthesia.

CONCLUSION

The newborn has mandatory nasal breathing and neonatal ON can be a life-saving emergency as it may lead to asphyxia. In children, any sign suggestive of NO should lead to the realization of fibroscopy of the nasal fossa.

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