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Review

Nasal obstruction in children

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ABSTRACT

Nasal obstruction is a very frequent symptom in children, with numerous etiologies. Clinical diagnosis is straightforward, but general impact and rare etiologies should be explored for. Complementary examinations are guided by diagnostic orientation. Although not usually a severe condition, nasal obstruction may be life-threatening in neonates and infants. An exhaustive list of etiologies is impossible and would not be useful, but it is worth distinguishing infantile nasal obstruction and nasal obstruction in older children, as causes differ greatly. This is the topic of the present update.

1. Introduction

Nasal obstruction is a very frequent symptom in children and a frequent cause of ENT consultation. While older children can express and describe their discomfort, for infants it is the family that has to be interviewed. The interview should particularly determine day- and night-time symptoms (obstruction, rhinorrhea, epistaxis, snoring, etc.), assess duration and impact (on function, growth, feeding and sleep), and look for associated signs (fever, cough, weight-loss, etc.).

Physical examination should be as complete as possible and also systematically comprises flexible endoscopy; this is now feasible in almost all children, including neonates, with the development of small-caliber endoscopes.

Imaging is not systematic and is reserved to certain cases according to the etiologic orientation emerging from interview and clinical examination. Likewise, other examinations, such a acoustic rhinometry or rhinomanometry, should not be systematic, and may be difficult to perform in children.

Etiology is too varied to be easily listed. However, nasal obstruction in neonates and under 2-year-olds is worth distinguishing from that of older children, up to adolescence when the pathology becomes adult-form. Neonates, in particular, breathe exclusively through the nose until the age of about 3 months; severe obstruction at that age thus has great clinical impact and may, as in choanal atresia, even be life-threatening if not treated in the first instants of extra-uterine life. The present article sets forth the main causes of nasal obstruction in children according to frequency, severity and specific presenting symptoms, categorizing them as nasal obstruction in young versus older children.

2. Nasal obstruction in neonates and infants

Until 3 months of age, neonates have exclusively nasal respiration [1]. Any obstruction therefore leads to varying difficulty: at meal times or at rest only, or so severe as to be life-threatening. Primary care is straightforward: removing the obstacle and fitting a Mayo or Guédel cannula. But this can only be a temporary solution: the cannula is unstable and poorly tolerated even by infants, as it prevents normal feeding and may cause painful hemorrhagic ulceration of the lips and base of the tongue; it should not be maintained longer than 24 hours. Alternative treatment should meanwhile be quickly initiated.

2.1. Neonatal rhinitis

Neonatal rhinitis by definition concerns under 3-year-olds, without underlying pathology. Symptomatology ranges from simple intermittent obstruction to respiratory distress requiring hospital admission. Etiology is unknown, but may be multifactor: viral, inflammatory, vascular, drug-related, traumatic, etc. [2]. Clinical examination finds bilateral congestive nasal mucosa, but with bilaterally conserved permeability, thereby ruling out choanal atresia. Medical treatment is enough to bring relief in the vast majority of cases: physiological saline rinse or, temporarily, with hypotonic saline. Adrenaline solution may be used for a few days: usually, 1 mg adrenaline in 10 ml physiological saline. Medical treatment for gastro-esophageal reflux (posture, thickened milk, proton pump inhibitors) is systematic, although reflux involvement is usually hard to demonstrate. Prognosis is excellent. In case of persistence,

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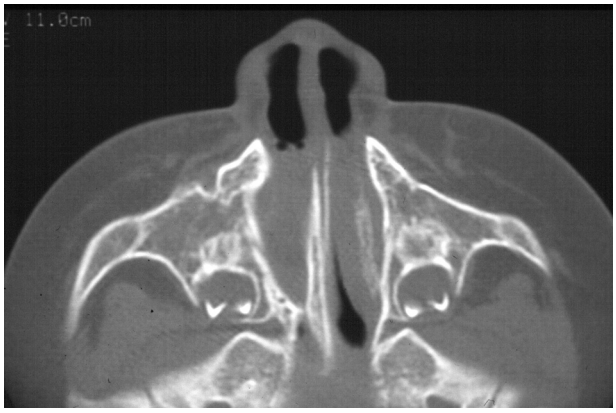

Fig. 1. Facial CT, bone window, axial slice: infant; right choanal atresia.

recurrence or clinical doubt, underlying deformity should imperatively be looked for.

2.2. Trauma

Obstetric trauma may induce sometimes severe septal deviation in neonates. In general, however, this is well tolerated with rapidly favorable progression due to the plasticity of tissue at this age. Reduction surgery is almost never indicated, except for complete dislocation of the septum with the base totally detached from the columella.

2.3. Dysgenesis

Many childhood facial deformities may induce nasal obstruction. The most frequent is choanal atresia, with estimated incidence around 1/5000 births, bilateral in 30% of cases. When unilateral, it may show few or no symptoms; when bilateral, it causes respiratory distress as of the first instants of life. Once the airways are brought under control, by a Mayo or Guédel cannula or intubation, it is impossible to pass an aspiration probe through the nasal cavities and aspiration withdraws clear thick mucus. CT provides definitive diagnosis (Fig. 1). Complementary assessment should explore for CHARGE syndrome; only cardiac echo is essential ahead of surgery [3]. Treatment is endoscopic and neonatal in bilateral forms and, so far as possible, delayed to the age of about 18–24 months in unilateral forms, for reasons of surgical comfort [4].

Nasolacrimal duct cyst is caused by lacrimal duct imperforation, leading to a small cyst filled with fluid. When obstruction is in the inferior part, the cyst bulges into the nasal cavity under the inferior turbinate bone, and may be obstructive (Fig. 2). Bilateral deformity may induce severely symptomatic obstruction in neonates. Treatment consists in endoscopic marsupialization by cold instruments or laser. There is no recurrence [5].

2.4. Nasal meningocele

Nasal meningocele comprises meningocele as such (meningeal hernia through the base of the skull into the nasal cavities, containing only cerebrospinal fluid [CSF]), meningoencephalocele, containing non-functional cerebral parenchyma, and glioma, ectopic glial tissue, with at most a fibrous cord communicating toward the base of the skull and therefore without CSF. Diagnosis in neonates and infants may be suggested by generally unilateral nasal obstruction with pinkish non-inflammatory, sometimes pulsatile tumefaction on endoscopy. There may be spontaneous CSF leakage, but this is not usual. CT and MRI provide diagnosis (Fig. 3). Biopsy, obviously, is not indicated. The child should be vaccinated against

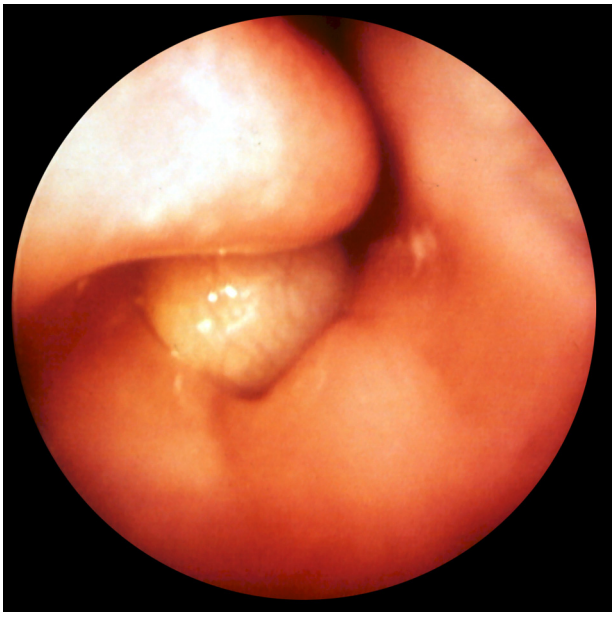

Fig. 2. Right nasal cavity, endoscopic view; nasolacrimal cyst under right inferior turbinate bone.

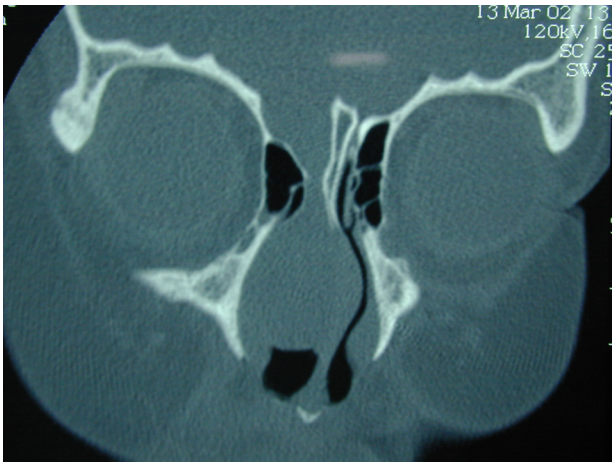

Fig. 3. Facial CT, bone window, frontal slice: infant; large congenital right nasal meningocele of ethmoid origin. Good visualization of enlargement and ethmoid roof defect without bone lysis.

pneumococcus as soon as possible. The deformity is managed surgically, which can often be endoscopic [6]. It consists in resecting the herniated meninx after sectioning it at the neck, then repairing the base of the skull by cartilage and mucosal graft to restore meningeal impermeability. Very large hernia, secondary to large skull base defect, may require a combined ENT and neurosurgical approach.

2.5. Embryonal tumor

Embryonal tumor, or teratoma, locations vary, principally involving the rhinopharynx and soft palate in the head and neck region (Fig. 4). These tumors are of very variable volume, and are mainly discovered during antenatal examination. Most are mature and benign, but the specimens must be fully analyzed by the pathologist to screen for immature malignancy. Complete surgical resection is systematically mandatory. Biological surveillance by α fetoprotein and β HCG assay, which will always have been performed preoperatively, may be useful for deep locations in