

Signs and Symptoms in Pediatric Otorhinolaryngology

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Otorhinolaryngological Signs and Symptoms in Neonates

The methodology to follow with a suspected otorhinolaryngological disorder is to perform an adequate neonatal investigation of signs and symptoms, in which the most important information is provided by the mother, the gynecologist-obstetrician and the pediatrician. The condition of the newborn must be assessed between 60 to 120 seconds and 5 minutes after birth. Evaluation of the newborn is different from that of older children, not only in the examination of the central nervous system (CNS), but also of the ears, nose and throat.

Physical signs

. **Respiratory Distress:** In a newborn that does not cry and has difficult breathing, in addition to displaying cyanosis or pallor of the skin with concomitant inability to inhale air into its lungs, bilateral choanal stenosis should be considered. If the condition does not improve, one should suspect of laryngeal congenital pathology. Those are important pathologies that should be looked for in differential diagnosis.

. **Jaundice:** This symptom is frequently present at birth, typically disappearing in few days; however, in the premature infant, hypoxia and medications, which compete with the mechanisms of transport and elimination of bilirubin, produce elevated levels (>20 mg/dL), resulting in hyperbilirubinemia. The resulting condition is known as *Kernicterus* and its sequelae is sensorineural hearing loss, among others.

. **Facial Palsy:** The newborn that presents with absence of naso-oral fold and other folds in the face, lagophthalmos, absence of blinking, and deviation of the labial commissure towards the unaffected side, is diagnosed as having facial palsy. This condition is generally caused by forceps and facial nerve compression against the sacrum. If the injury is not complete, favorable evolution with total recovery is very often seen in approximately three weeks.

Physical examination

It must occur immediately prior to transferring the newborn from the obstetric operating room, in order to detect congenital malformations - such as choanal atresia, subglottic stenosis, esophageal atresia, tracheoesophageal fistula, etc- that could endanger the life of the newborn.

The auricle (pinna) or ear presents in variable forms and configurations and it is related to hereditary factors as well as to degree of maturity. Meticulous observation is critical to the detection of congenital malformations such as low height of implantation, size - large (macrotia) and small (microtia), complete absence (anotia), accessory auricles and congenital fistulas. They may be accompanied by other congenital abnormalities such as renal agenesis (large and soft, mispositioned ear). Significant alterations of the ears are frequently associated with absence of the external auditory canal (EAC).

Newborns have narrow EAC and owing to its cartilaginous nature, it becomes easily collapsible, making its examination difficult, which demands patience and experience for adequate exploration. Previous immobilization of the newborn and examination with adequate light source and small diameter of the otoscopy speculum should be performed concurrent with movements of the ear backwards and slightly downwards with the purpose of straightening the EAC, enabling visualization of the tympanic membrane (TM). The characteristics of the TM will be directly related with the neonates breathing at birth: if the newborn has presented respiratory difficulty, the TM will be grayish in color and not transparent; otherwise, the newborn will present retracted TM with slight transparency and diffuse brightness.

When the nose is examined, it is normally small due to the limited development of the bony pyramid, giving the appearance of hypertelorism. The base of the nose is wide and the nostrils are generally narrow and, therefore, they are easily obstructed, resulting in respiratory insufficiency.

Examination requires adequate light source and small nasal or ear speculum. After immobilization, nasal vestibule of the newborn is examined first, raising the nostril with the thumb to evaluate medial and lateral walls, floors and roofs as to permeability, the presence of pink mucous or retention of secretion on the floor of one of the nostrils, which indicates the presence of unilateral choanal atresia. Examination and aspirations of secretion should be done very delicately; despite such caution, edema, bleeding and congestion of the nasal mucosa may cause new problems or aggravate the preexisting ones. The nose is also the site of congenital malformations such as choanal atresia. The permeability of the nostrils may be investigated using nasofibroscopy (flexible or rigid), or with contrasted X-ray or computed tomography (CT) scan, in order to confirm the congenital alteration. Once the infant has learnt to breathe through the mouth with the support of McGovern cannula, the surgical correction should be immediately performed. The nasal pyramid can become deformed by intrauterine pressures, moving laterally to the bony and cartilaginous regions, as well as to the nasal septum; if the alteration is significant, simple maneuvers in the nasal pyramid and septum should be performed.

Examination of the mouth requires patience due to the difficulty in lowering the tongue to observe the pharynx; for this reason, we should take advantage of crying for the inspection. The examination must begin from the outside and move inwards, beginning with the lips, gums and gingivoblabial sulcus. On the floor of the mouth we may find tumors, such as ranula. The presence of sialorrhea suggests esophageal atresia. Cleft palate associated or not with cleft lip will prevent facial growth and development, as well as impair suction and swallowing functions, subjecting the child to weight loss, bronchoaspiration and respiratory tract infections. Children with bifid uvula may have hidden cleft and, in this case, a

nasofibroscopy should be carried out to confirm or not the pathology.

When examining the face, the jaw - which may be small (micrognathia) as in Pierre Robin's Syndrome, should also be observed.

Otorhinolaryngological Signs and Symptoms in Children

EAR

Physical signs

. **Otorrhea:** Middle ear secretions exit through a TM perforation. It may be watery, mucoid, purulent or blackish (in mycosis by *Aspergillus niger*).

. **Otorrhagia:** Associated with otorrhea of varied color, it is due to spontaneous perforation of the TM.

. **Absence of the post-auricular sulcus:** In antritis or mastoiditis, the presence or persistence of the external petrosquamous fissure or extensive pneumatization of the mastoids. It may be associated with hyperemia of the skin, heat and fluctuation.

. **Increase in helix volume:** Due to abscess in a pre-auricular fistula; it may be con-gested, hard or fluctuating.

. **Increase in volume of one of the walls of the EAC:** it may be due to abscess in the hair follicle, which is very painful upon examination.

. **Occlusion of the EAC by meliceris crust:** In diffuse external otitis caused by *Staphylococcus aureus*.

. **Dark clotted secretion:** It occludes the ear canal and is compatible with mycosis (*Aspergillus niger*).

. **Facial palsy:** A complication of acute otitis media (AOM) with cholesteatoma or chronic otitis media (COM) or the genesis of tuberculous otomastoiditis.

. **Conjunctivitis:** May be associated with AOM, often by non-typable *H. influenzae*.

Symptomatology

. **Ear Pain: Otalgia** (or pulling of the ear in the young infant). It is the most common symptom in children with AOM. In children, it may be manifested as irritability, nocturnal crying, insomnia, lateral motion of the head or rejection of the maternal breast. Dystrophic children may, in addition, present anorexia, vomiting or diarrhea. This condition may also be due to inflammation or infection of the EAC.

. **Hypoacusia:** The hearing loss will primarily be suspected by parents or teachers.

Physical examination

First the auricle (pinna) and ear canal are examined, later the painful areas such as the antral zone, the zone of the tip of mastoid and the tragus are palpated. These will determine if hyperesthesia is present. Acute pain upon tragus palpation indicates circumscribed or diffuse external otitis. Traction of the auricle is also included.

Aspects concerning the otoscopic examination

The suitable position of the patient for this examination depends on the child's age, level of cooperation, clinical context, and the preference of the examiner. In children, it is always preferable to examine them seated on mother's lap, pressed against her thorax and with the head supported. In order to examine the EAC, it is necessary to straighten and displace the ear back and upwards, and the tragus must be moved forwards in order not to obstruct the vision. It is also recommended to have speculum of different diameters to adapt to the EAC, which facilitates visualization of the ear canal and the TM and the identification of permeability, presence of earwax, epithelial scaling, secretions, foreign bodies, granulation tissue, tumors and congenital malformations.

The normal TM has a nacreous and transparent aspect and a triangle of light or Politzer. The examination is made beginning from the outside and moving inwards, identifying the malleus handle, the short process of malleus and anterior and posterior tympanomaleolar ligaments that limit the cavity - superiorly, the *pars flaccida* of Shrapnell, and inferiorly, the *pars tensa* of the membrane. In middle ear diseases, there are alterations of both color and form.

Functional examination

According to the age of the patient, that is ≤ 3 year-old, hearing loss should be tested with auditory brain stem response (ABR) and otoacoustic emissions; children older than three years are tested with audiometry and impedanciometry.

Radiological studies of the ear

They are critical for clinical otology. Conventional radiology serves to explore all the temporal bone and to determine the degree of pneumatization of the mastoid process and the petrous portion. By using this method, we may evaluate the size and extent of relatively large injuries which originate from adjacent structures to the temporal bone; however smaller pathological processes and the fine anatomy are not evident, making it necessary further CT scan or Magnetic Resonance Imaging (MRI).

There are eight conventional X-ray incidences used to evaluate the temporal bone. Five of them are used to visualize the mastoid and the middle ear: Law, Schuller, Owen, Chausse III and Towne. For petrous pyramids and the inner ear: Transorbital, Stenvers and Basal.

The tomographic techniques provide us with very important data regarding the anatomy of the middle ear and the EAC. The value of this technique is crucial for evaluation, treatment and surgical correction of the congenital malformations of the ear. MRI is particularly useful in assessing the extent of vascular lesions, such as jugular glomus tumors, and in visualizing the acoustic nerve.

NASAL AND PARANASAL SINUSES

Nasal and paranasal sinus diseases have typical signs and symptoms (cough, nasal obstruction, rhinorrhea, sneezing, nasal itching, fever). Rhinitis and sinusitis generate similar symptoms, but of varying severity, depending on the different degrees of dysfunction and the participation of structures and neighboring and distant organs.

Physical signs

. **Rhinorrhea:** Discharge of abnormal quantity and variety of color nasosinusal mucous.

. **Bilateral hyaline rhinorrhea:** This is suggestive of allergy or vasomotor dysfunction or both. This kind of rhinorrhea appears after inhaling dust, pollen, smoke, etc. or upon consumption of very hot or cold drinks and foods, spices, as well as from alcohol and stress. It is explained by the factor that stimulates the autonomous nervous system and rhinorrhea, which emanates from the persistent parasympathetic action of local irritation. The rhinorrhea of the vasomotor rhinitis is generally little and persistent. It manifests with short duration alternating nasal obstruction, some sneezing and nasal itching. It appears with sudden changes of environmental temperature. In contrast, in allergic rhinitis, rhinorrhea is usually abundant, profuse and accompanied by bilateral nasal obstruction. Rhinorrhea may be mucous, transparent or viscous or varied in color - yellow and green, due to concomitant infection, or gray. Rhinorrhea and nasal obstruction are long lasting and are accompanied by paroxysms of sneezing, nasal itching and epiphora. There are also children who present pale or slightly bluish discoloration of the inferior eyelids, in the presence of personal or family history of allergy.

. **Rhinorrhea of the cerebrospinal fluid:** This kind of rhinorrhea is more transparent and less viscous than the ones described above, mixed with mucus or blood. It results from cranial trauma. In general, there is constant dripping that increases with elevated intracranial pressure. Rhinorrhea of the cerebrospinal fluid (CSF) is a suggestive symptom of fracture of the cribriform plate of the ethmoid and, in sporadic cases, it may be due to sinus fracture with craniosinusosal fissure. The prognosis is unfavorable in all cases due to the potential danger of meningitis.

. **Unilateral mucopurulent rhinorrhea:** In children, it suggests the presence of foreign body whenever it is persistent and for a few days, in addition to presenting unilateral nasal obstruction, foul odor, with erosions and meliceris crust in the nasal vestibule. Nasal polyps may also occur in children with mucoviscidosis (5 to 6 years of chronic nasal allergy). Nasal obstruction and mucopurulent rhinorrhea may be due to sinus tumor and its growth produces asymmetry by deforming the sinus walls. These cases in children are frequently due to rhabdomyosarcoma or sinus infiltration from a nasaangiofibroma.

. **Bilateral mucopurulent rhinorrhea:** This is a sign of nasosinusal infection caused by microorganisms (*Streptococcus sp*, *Staphylococcus sp* and *pneumococci*). It may be occasionally secondary to atrophic rhinitis, nasal diphtheria, nasal syphilis, nasaangiofibroma, malignant granuloma and tumors of any type.

Symptomatology

. **Nasal obstruction:** One of the most frequent and annoying symptom for children is nasal obstruction. It may be uni or bilateral, partial or total, sudden or progressive, and may be either isolate or accompanied by other nasal symptoms. If

the disease produces progressive nasal obstruction, mouth breath is often observed. The result of this obstruction is manifested by the so-called “adenoidal facies”.

. **Nasal obstruction due to rebound effect:** Due to the topical use of nasal vasoconstrictors for a prolonged period of time.

. **Pain:** Pain from nasal origin is uncommon; thus, most nasosinusinal affections are not painful. We have only found nasal pain in children with nasal furunculosis or fissure in the nostrils. Pain can appear suddenly in internal manipulations, application of medicines and the inhalation of irritating substances. It may be accompanied by tearing, rhinorrhea and occasionally by sneezing, which quickly disappears once the cause stops. Fracture of the nasal bones and septum is accompanied by moderate pain.

In older children with acute sinusitis, there may be referred pain upon some craniofacial segments. It is not very intense and oppressive. Acute ethmoiditis produces pain in the internal angle of the eye, nasal root and periorbital region, etc. Moreover, in infections of the other paranasal sinuses, depending on the child's age, there may be pain of variable degree.

. **Sneezing:** An important symptom of vasomotor rhinitis and allergic rhinitis.

. **Olfactory alterations:** A significant number of nasal disorders can affect its function. As they are ambiguous and subjective, investigation of these alterations is normally difficult.

. **Anosmia:** A total loss of the sense of smell. It may be congenital or acquired. Children are rarely conscious of this disorder.

. **Nasal speech:** It occurs as a result of nasal obstruction due to different etiologies. It is more evident as the obstruction becomes more complete. Inflammation, edema of the mucosa and excessive mucus are frequent causes.

Physical Examination

The exam of the nose and paranasal sinuses begins with inspection, observing symmetry, skin characteristics (color, texture), alterations at the level of the paranasal sinuses (as inflammatory reactions, fistulous sinus or deformations caused by trauma or sinus tumors) and if there are congenital deformations or anomalies of development.

Palpation will provide information about the alterations that can occur after fracture of the nasal bones and paranasal sinuses. We explore the painful areas of the frontal, anterior ethmoidal and maxillary sinus, according to the child's age.

. **Anterior Rhinoscopy:** A nasal speculum is used. First, the nasal vestibule is inspected to see if there are dermatological injuries causing pain during the examination. The examiner raises upwards the nasal lobe and the ala nasi with the thumb of the left hand to introduce the nasal speculum, which should not go beyond the cutaneous wall. If the septal nasal mucosa is touched, it will cause pain and it may bleed. With one hand, the head may be moved to visualize the floor of the nasal fossa and external wall, emphasizing the turbinates and meatus, especially the middle meatus (there may be purulent secretion or polyps); we also inspect the roof of the nasal fossas, the internal wall, alterations of the nasal septum, and

especially the Kiesselbach's plexus.

. Posterior Rhinoscopy: It allows us to visualize the nasopharynx, which serves as the site of the adenoids and tumors. It is done through flexible nasopharyngoscope. Nasal and paranasal sinuses examinations are completed with conventional X-rays (Water, Cadwell, Hirtz), CT scan (axial, coronal) or MRI.

OROPHARYNX

The study of oropharynx has great clinical importance in cases of inflammatory processes and infections that affect the whole body; in addition, it is useful in cases of symptomatic manifestations of general diseases (blood alterations) and viral infectious diseases (common diseases during childhood).

Physical signs

In addition to observing the facies and the general status of the child, we should observe edema of the cervical region, mandible submental region angles, which may result in enlarged lymph nodes due to the infectious processes of the oropharynx. Facial congestion and glossy eyes may appear because of fever in acute processes and low-grade fever in chronic processes, followed by asthenia.

Symptomatology

. Pain: Basic symptoms of the pharyngeal pathology. It may result from swallowing (odynophagia) or be radiated to other neighboring regions (ear). In the pharynx, sensations of dryness, pruritus, foreign body in the throat, choking, etc. may occur. Functional symptoms such as disorders of swallowing (dysphagia), breathing and phonation may occur.

Physical examination

It is important to have good light source, to communicate appropriately and to explain how the examination happens. With a tongue depressor, the oral vestibule is explored: lips, gums, dental pieces, oral mucosa, floor of the mouth, tongue, palate, peritonsilar area, uvula, tonsils (size, color, free or occupied crypts with purulent or caseum exudate, pseudo-membranes, ulcers and tumors). The posterior and lateral walls of the pharynx often present hypertrophy, hyperemia and lymphoid follicles, and we may notice descending secretions from the paranasal sinuses and adenoids. There may also appear increases in volume by hematomas or retro or lateral pharyngeal abscesses. This examination must be completed with palpation of ganglia in the regions previously described. In acute tonsillitis, bacteriological study of the pharyngeal secretion is done to investigate Group A beta-hemolytic *Streptococcus pyogenes* (GAS).

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