

MINIREVIEW

CAUSES OF STRIDOR IN NEWBORNS

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ABSTRACT

Noisy breathing is a common presenting symptom among newborns to primary care and the clinician must be able to differentiate the different types of noisy breathing such as stridor, stertor, snoring and wheezing. Inspiratory stridor is one of the most important clinical findings in newborns and it requires fast and adequate evaluation of the newborn in order to determine the underlying etiology, because some of the pathologies that lead to stridor in newborns can be life threatening, depending on the severity of the airway obstruction and the presence or absence of associated symptoms as respiratory distress or feeding issues. It indicates the obstruction of the larynx, glottis or subglottic area. In the newborn period laryngomalacia is the most common cause of inspiratory stridor. This type of stridor worsens with agitation, after feeding and in supine positioning. A newborn that presents at the hospital with stridor can be managed conservatively or by surgery depending on the severity and the underlying pathology.

Keywords: neonatal stridor, laryngomalacia, larynx, glottis.

RÉSUMÉ

Les causes du stridor chez les nouveau-nés

La respiration bruyante est un symptôme courant chez les nouveau-nés aux soins primaires et le clinicien doit être capable de différencier les différents types de respiration bruyante comme le stridor, le stertor, le ronflement et la respiration sifflante. Le stridor inspiratoire est l'un des résultats cliniques les plus importants chez les nouveau-nés et nécessite une évaluation rapide et adéquate du nouveau-né afin de déterminer l'étiologie sous-jacente, car certaines des pathologies qui entraînent le stridor chez le nouveau-né peuvent mettre en danger la vie du nouveau-né par rapport à l'obstruction des voies respiratoires et de la présence ou de l'absence de symptômes associés comme la détresse respiratoire ou les problèmes d'alimentation. Il indique l'obstruction du larynx, de la glotte ou de la zone sous-glottique. Chez les nouveau-nés, la laryngomalacie est la cause la plus fréquente du stridor inspiratoire. Ce type de stridor s'aggrave avec l'agitation, après l'alimentation et en position couchée. Un nouveau-né qui se présente à l'hôpital avec un stridor peut être géré de manière conservatrice ou chirurgicale en fonction de la gravité et de la pathologie sous-jacente.

Mots-clés: stridor néonatal, laryngomalacie, larynx, glotte.

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INTRODUCTION

Noisy breathing is a common presenting symptom among newborns to primary care and the clinician must be able to differentiate the different types of noisy breathing such as stridor, stertor, snoring and wheezing.¹ Respiratory distress is common and affects up to 7% of all term newborns and is increasing with prematurity. There are some risk factors that increase the likelihood of neonatal respiratory disease such as prematurity, meconium stained amniotic fluid, oligohydramnios or structural larynx or lung abnormalities.² Respiratory distress associates tachypnea (more than 60 breaths per minute), nasal flaring, chest retraction and grunting. Tachypnea can be a compensatory mechanism for hypercapnia, hypoxemia or acidosis making it a common but unspecific finding.³

Inspiratory stridor is one of the most important clinical findings in newborns and it requires fast and adequate evaluation of the newborn in order to determine the underlying etiology, because some of the pathologies that lead to stridor in newborns can be life threatening, depending on the severity of the airway obstruction and on the presence or absence of associated symptoms as respiratory distress or feeding issues. It indicates the obstruction of the larynx, glottis or subglottic area.⁴ Stertor is a sonorous snoring sound heard over extra-thoracic airways and indicates nasopharyngeal obstruction. Nasal flaring is a compensatory symptom that increases the upper airway diameter and reduces resistance and work of breathing. Retractions are evident by using the accessory muscles in the neck, rib cage, sternum and abdomen and it occurs when lung compliance is poor or airway resistance is high. Grunting is an expiratory sound caused by sudden closure of the glottis during expiration.⁵ The most commonly encountered causes are laryngomalacia, acute laryngitis, acute tracheobronchitis, retropharyngeal and parapharyngeal abscesses and foreign body aspiration. Only after excluding these causes we can think on the exclusion of the rare causes of stridor in newborn like genetic diseases of rare oral or laryngeal masses as tumors of the pharynx or larynx, dermoid cyst or thornwald cyst.⁶

Inspiratory stridor is defined as an abnormal, high pitched respiratory sound resulting from turbulent air flow during inspiration when a partial obstruction of the supra-glottic or glottis airway is present.⁷ In the newborn period, laryngomalacia is the most common cause of inspiratory stridor. This type of stridor worsens with agitation, after feeding and in supine positioning and can be very stressful for the parent.

Neonatal tumors of the oropharynx are rare and estimated to occur once in every 12500-27500

livebirths.⁸ From these the most common ones are teratomas. These are neoplasms deriving from more than one primitive embryonic layers and represent one third of all neonatal tumors with a higher prevalence in the sacrococcygeal region, in the head and neck region occurring about 10 percent of them.⁹ In some cases stridor can be provoked by a respiratory infection, these infections being very common in infants. Most children have six to eight episodes of respiratory infections in one year and 57 to 89 % of them were reported to have a viral etiology. When stridor and wheezing are related to a viral infection, the most frequently identified agents are the following: human metapneumovirus (hMPV), human adenovirus (hAD), respiratory syncytial virus (RSV), human rhinovirus (hRV), human bocavirus (hBoV), influenza virus (IF), parainfluenza virus (PIF), and human coronavirus.¹⁰

Methods of investigating the neonatal stridor

It is important to use a detailed history, physical examination and laboratory and radiographic findings in determining a proper diagnosis. A detailed history can reveal risk factors associated with neonatal stridor such as C-section, late preterm delivery, gestational diabetes, maternal sedation, fetal distress, maternal group B streptococcus carrier, male infant, renal dysplasia, diaphragmatic hernia, neuromuscular disorders.¹¹

On admission, the new born should be investigated with the following:

- Body temperature.
- Heart rate, oxygen saturation levels and blood pressure.
- Measuring of lengths, head circumference and thorax circumference.
- Heart sounds.
- Respiratory rate, any physical signs of stridor such as intercostal, suprasternal, supraclavicular retractions.
- Chest X-ray – can identify diaphragmatic paralysis, congenital pulmonary malformations, pneumothorax, and mediastinal masses.
- Laboratory testing – pays attention to metabolic disorders or sepsis. Hypoglycemia, hypomagnesemia may lead to an impaired oxygen transportation to the peripheral tissues. Hypomagnesemia may lead to hypotonia, depressed respiratory drive, and apnea.
- Echocardiography – most congenital heart diseases present with cyanosis, tachypnea, or respiratory distress from cardiac failure.
- Routine ultrasound of the brain.
- Electroencephalogram.
- Flexible endoscopy – if this shows any sign of mucous protrusion then a mediastinal ultrasound

and an X ray swallow examination should be performed. If these investigations show any anomalies then a MRI of the region should be performed.

Flexible endoscopy is an important technique which should be performed in all cases of stridor in newborn. It provides a dynamic, real-time visualization of the upper airway and it can show the abnormalities of the mucosa or the motility of the larynx and can prevent complete airway obstruction and a potentially fatal outcome.¹²

Treatment

A newborn that presents at the hospital with stridor can be managed conservatively or by surgery depending on the severity and the underlying pathology. As the most frequent cause is laryngomalacia the majority of patients is managed conservatively with reevaluations every month or as frequent as there are major changes in the child's symptomatology.¹³

If the laryngomalacia is severe the newborn can require surgical intervention. The most used surgical technique is supraglottoplasty which is still a controversial technique in the current literature. The type of the laryngomalacia determines the type of the supraglottoplasty: type 1 – removing redundant supra-arytenoid tissue, type 2 – incision in the shortened aryepiglottic tissue and type 3 epiglottoplasty. In general, laryngomalacia is mild and self-limiting and for this reason the majority of children can be supervised by general care physicians.¹⁴

The symptoms are usually solved in 2-25 months. Sometimes tracheostomy is necessary to secure the airway. The endoscopy techniques help us assess the larynx correctly and avoid unnecessary tracheostomy.¹⁵

CONCLUSION

The etiologies of stridor in newborn are various and may be acute or chronic, congenital or acquired, intrathoracic or extra-thoracic. There is no statistic that states the incidence of stridor in general pediatric population. It is thought that the increase in premature neonates survival due to better intensive care more lesions that would have been lethal previously are seen nowadays.

Stridor should be considered a very important symptom and should be carefully examined starting with a detailed history taking and clinical evaluation which helps the clinician to assess the severity of the illness and to decide on what kind of treatment is necessary.

Studies show that the prevalence of congenital stridor is higher than of the infectious or the tumoral one. The low rate of infectious stridor nowadays is due to efficient antibiotic therapy and to the current childhood immunization program that leads to lower rates of epiglottitis or retropharyngeal abscesses.

The most common cause of congenital stridor in newborns is laryngomalacia and the majority of these patients is managed conservatively. When surgery is necessary this is due to recurrent severe respiratory distress and failure to thrive. Flexible endoscopy is the golden standard in diagnosing the cause of the stridor.

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