TESTING FOR TRACHEAL INFECTIONS IN CHILDREN

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Annotation

If your child has symptoms of tracheal diseases, you should consult an ENT doctor or pulmonologist. The doctor will examine the chest, listen to it, and take a medical history. The following tests may be prescribed for diagnosis: pharyngoscopy, rhinoscopy, allergy tests, and an X-ray of the nasal cavity.

Keywords: laryngotracheal edema, radiograph, telescopic tracheobronchoscopy, endoscop, polymerase chain reaction (PCR).

It is clear that the diagnosis of acute viral croup is chiefly based on clinical examination and does not necessitate laboratory testing. Following this evaluation, a number of additional tests may be used to confirm your diagnosis and stabilize child’s airway:

Three-Dimensional Chest CT Scan — We have developed a CT-scanning technique that enables us to see a three-dimensional view of the airway. This technique is effective in determining both the underlying cause and the extent of tracheal diseases.

Laryngoscopy — A flexible, narrow tube that has a tiny camera on the tip (called an endoscope) is inserted through the nose to examine the larynx and the upper portion of the airway. This can typically be performed in the doctor’s office under topical anesthesia.

Bronchoscopy — A rigid or flexible tube that has a tiny camera on the tip (called a bronchoscope) is inserted through the nose or mouth into the airway to examine the trachea and bronchi.

Biopsy — A small sample of tracheal or bronchial tissue is removed through a bronchoscope. A pathologist then examines the tissue under a microscope to establish a diagnosis.

If there is suspicion for a concurrent lower respiratory tract infection, white blood cell count with differential, as well as routine postero-anterior/lateral chest and neck

radiographs may be indicated. In viral croup, the white count is often at the high end of normal, and may be higher in approximately 50 % of hospitalized children. Administration of corticosteroids may cause leukocyte demargination, which can lead to spuriously elevated counts during the course of treatment. Plain film radiography often is utilized to evaluate laryngotracheal edema in croup, but has inconsistent results. The typical picture is that of narrowing of laryngeal air column in the subglottic segment, approximately for 5–10 mm below the level of the vocal cords, resulting from mucosal edema. This has been historically referred to as the steeple sign, but is observed only in 50 % of instances. This, coupled with reduced sensitivity for differentiating between viral croup, epiglottitis and bacterial tracheitis undermines the usefulness of routine radiographs for diagnosis.The best practice in these circumstances is to consider radiographs in those children in whom the clinical presentation is atypical and whose respiratory status is stable enough to undergo positioning prior to obtaining the films. Alveolar gas exchange is usually not affected by viral croup, unless there is concurrent presence of laryngotracheobronchitis, asthma or pulmonary insufficiency. Thus, pulse oximetry and respiratory rate have been shown to have poor correlation with clinical status or hypoxia due to artifacts. Evidently, the uncompromised standard is clinical observation with pulse oximetry as a useful adjunct in instances wherein the lower airway is also affected. In cases where operative control of the airway is required, telescopic tracheobronchoscopy, aided by the ventilating bronchoscope provides the gold standard for assessment of the airway in severe croup, or when alternate pathology, such as supraglottitis, is suspected. In the ambulatory setting, children who present with recurrent croup should be examined for concurrent abnormalities. Evaluated 30 children who were previously diagnosed with recurrent episodes of croup. A third of these children were found to have synchronous lesions such as subglottic stenosis, edema and cysts. In the same study, abnormal rigid endoscopic findings were more likely to be seen in children under the age of 3 years, highlighting the need for a higher index of suspicion and lower threshold for performing airway endoscopy in this age group. Microbiologic investigations to determine etiology are increasingly being performed due to the availability of molecular and standard virologic methods. These tests are usually not recommended for diagnosis in mild

cases of croup, but may be warranted in children hospitalized and/or requiring mechanical ventilation. Real-time polymerase chain reaction (RT-PCR) and viral cultures are also indicated with atypical courses of the infection, as described by reports of novel pathogenic strains for viral croup, e.g. coronavirus NL63 detected in samples isolated from Europe. An improved panel based on an RT-PCR assay has been developed for infl uenza A and B viruses, RSV and parainfluenza 1, 2, 3 and 4. According to one study, the application of PCR increases the sensitivity of respiratory viral diagnosis, with results being made available within 6h, thus increasing clinical relevance. With claimed sensitivity of 80 % and specificity approaching 100 %, several authors have increasingly validated their cost-effectiveness. As mentioned earlier, the routine use of these tests in mild croup is unsubstantiated. In children undergoing rigid endoscopy or endotracheal intubation for bacterial tracheitis and other serious airway infections, routine contact bacterial cultures and broncho-alveolar lavage with cultures may be obtained to facilitate culture-directed therapy.

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