Contents

Case 1

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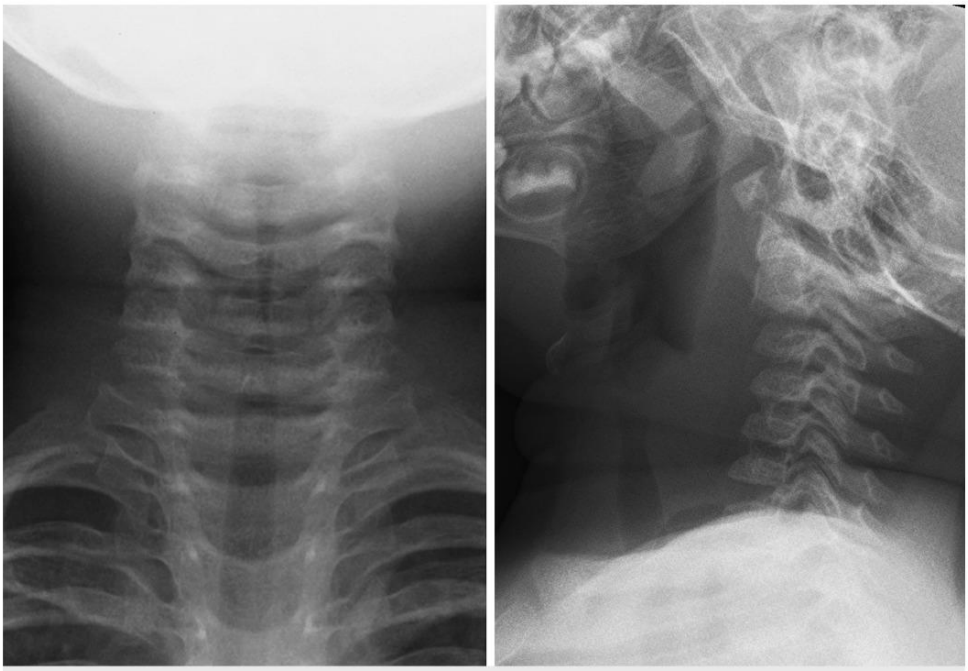

a b

Fig. 1.1 Frontal view of the neck reveals subglottic tracheal narrowing with loss of normal shouldering of the airway, referred to as the "steeple sign" **(a)**. The lateral view demonstrates overdistention of the hypopharynx and subglottic narrowing; there is mild pseudothickening of prevertebral soft tissues and pseudosubluxation at C2–C3 **(b)**.

Clinical Presentation

A 15-month-old with stridor (▶ Fig. 1.1).

Key Imaging Finding

Narrowing of the airway.

Top Three Differential Diagnoses

- **Croup (laryngotracheobronchitis).** Croup is the most common cause of upper airway obstruction in children between 6 months and 3 years of age, with peak incidence around 1 year. The radiographic hallmark is symmetrical subglottic airway narrowing manifested by loss of normal shouldering of the upper airway on the frontal projection, referred to as the "steeple" sign. The lateral view commonly demonstrates overdistention of the hypopharynx, as well as narrowing of the subglottic airway.
- **Epiglottitis.** This potentially life-threatening disease affects older patients than those with croup. When the diagnosis is suspected, a provider capable of managing the child's airway should be immediately available during imaging. The radiographic hallmark is epiglottic enlargement (thumb sign) on the lateral view, as well as thick aryepiglottic folds. Epiglottitis may mimic croup on a frontal view.
- **Retropharyngeal abscess.** Space-occupying processes in the prevertebral and retropharyngeal soft tissues may exert mass effect on the airway, causing dyspnea and stridor. The differential diagnosis of widened prevertebral soft tissues includes abscess, hemorrhage, lymphadenopathy, and pseudothickening. If physiological pseudothickening is suspected, a repeat inspiratory exam with the neck fully extended or airway fluoroscopy may resolve the dilemma.

Additional Differential Diagnoses

- **Bacterial tracheitis.** Bacterial tracheitis is characterized by exudative plaques that adhere to the tracheal wall. Because of their flat, longitudinal configuration, they may be seen only on one view. Asymmetrical subglottic airway narrowing may resemble the radiographic appearance of croup. However, patients with bacterial tracheitis are typically older (6–10 years old) and more toxic. Adherent mucus in the airway mimics the plaques of bacterial tracheitis but should clear on repeat examination after coughing.
- **Aspirated foreign body.** Both aspirated and ingested foreign bodies may cause an abnormal airway contour on radiographs, and both may present with dyspnea and stridor. It is easy to determine the location of disk-shaped radiopaque foreign bodies (such as coins) on a frontal neck radiograph. Those in the trachea align in the sagittal plane, since the cartilaginous rings of the trachea are incomplete posteriorly, whereas those in the esophagus align in the coronal plane. Radiographic diagnosis of the more common radiolucent foreign bodies is problematic. Direct visualization is the next step in evaluation.
- **Hemangioma.** Hemangiomas tend to cause variably asymmetrical airway narrowing and are commonly detected before the age of 1 year. When subglottic, the patient's symptoms may mimic other more common etiologies of stridor. Radiographs show asymmetrical mass effect narrowing the airway.

Diagnosis

Croup.

✓ Pearls

- Croup is most common in children under 3 years of age; the "steeple" sign is seen on frontal radiographs.
- Lateral X-ray of epiglottitis shows epiglottic thickening (thumb sign) and thickened aryepiglottic folds.
- Retropharyngeal abscess demonstrates prevertebral soft-tissue swelling.
- Foreign body aspiration must always be considered in a child with stridor.

Suggested Readings

John SD, Swischuk LE. Stridor and upper airway obstruction in infants and children. Radiographics. 1992; 12(4):625–643, discussion 644

Yedururi S, Guillerman RP, Chung T, et al. Multimodality imaging of tracheobronchial disorders in children. Radiographics. 2008; 28(3):e29

Case 2

Rebecca Stein-Wexler

Fig. 2.1 Oblique lateral image from esophagram shows contrast filling the esophagus and trachea along with an oblique channel extending from the anterior wall of the esophagus to the posterior wall of the upper thoracic trachea **(a)**. Frontal projection shows contrast aspirated into the tracheobronchial tree **(b)**.

Clinical Presentation

A 4-year-old child who coughs while feeding (▶ Fig. 2.1).