



ENDGAMES

CASE REVIEW

A puzzling airway problem

R C Costello *ear, nose, and throat registrar*¹, C R Whittet *medical student*², S T Browning *ear, nose, and throat consultant*¹

¹Ear, Nose, and Throat Department, Singleton Hospital, Swansea SA2 8QA, UK; ²Medical School, Cardiff University, Cardiff, UK

A fit and well 11 month old girl who was living with her single mother and 3 year old brother presented to the emergency department with acute shortness of breath and cough. Her mother had not witnessed any episodes of foreign body inhalation. A diagnosis of bronchiolitis was made and the child was discharged after oxygen therapy and observation. One week later she presented with the same symptoms and signs. Chest radiography was performed and was reported as normal. Again she was diagnosed and treated for bronchiolitis and made a complete recovery.

Six weeks after the initial presentation she re-presented with a two day history of increasing shortness of breath, cough, and stridor. Signs of respiratory distress were noted, and chest auscultation identified bilateral wheeze and transmitted upper airway noises. Her symptoms improved with salbutamol and adrenaline nebulisers, but an apparent stridor remained. A repeat chest radiograph during this time was also normal.

She was admitted and treated with nebulisers, oxygen, and steroids. Her symptoms improved but did not resolve completely. An ear, nose, and throat nasoendoscopic examination showed a normal epiglottis, but no clear laryngeal views were obtained. Again the mother denied any witnessed aspiration of a foreign body but reported that her two children sometimes played together unsupervised.

Questions

1. What is your working differential diagnosis?
2. Would you expect radiological imaging to provide definitive proof of the diagnosis?
3. How would you investigate this patient further?
4. What are the complications of this presentation?

Answers

1. What is your working differential diagnosis?

Answer

Inhalation of a foreign body into the larynx, trachea, or bronchus. Recurrent cough, stridor, and failure of symptom resolution suggest that she does not have bronchiolitis.

Discussion

Many normal children have recurrent episodes of chest infection. However, three clearly identified pathological causes—asthma, postinfective cough, and an inhaled foreign body—can present as recurrent cough in children.¹

Patients with inhaled foreign bodies can present acutely, particularly if the inhalation was witnessed. However, in cases of non-witnessed inhalation the foreign body can be present for some time before signs and symptoms become apparent.

Patients with tracheobronchial foreign bodies present with a clear history of ingestion between 38% and 70% of the time.^{2 3} Witnessed choking events are the most important event to ask about when considering foreign body aspiration in children.³

It has been suggested that inhaled foreign bodies can present with a triad of symptoms—wheezing, coughing, and decreased breath sounds.^{4 5} This triad is more common (47%) in late diagnoses than in early diagnoses (31%), with late diagnosis classified as diagnosis after 24 hours of ingestion and early classified as within 24 hours.

Foreign body inhalation can have a catastrophic outcome, and it can be difficult to diagnose because it may mimic common paediatric diseases, such as asthma. A clearly documented history, and a thorough examination of the oropharynx, neck, and chest, are therefore vital. The attending doctor should always consider the possibility of foreign body inhalation, even in the absence of a history of choking.

2. Would you expect radiological imaging to provide definitive proof of the diagnosis?

Answer

No, in one study of 115 paediatric patients with definitive foreign body aspiration, 18% had normal chest radiographs, 21% had radio-opaque foreign bodies on chest radiography, and 48% had air trapping or hyperexpansion.⁶

Discussion

Chest radiography can be useful, particularly if the object is radio-opaque, but the results can appear completely normal, even in the presence of a foreign body. In a study of 115 paediatric patients with definitive foreign body aspiration (confirmed on bronchoscopy), 18% had normal chest radiographs, 21% had radio-opaque foreign bodies seen on chest radiography, and 48% had air trapping or hyperexpansion.⁶

3. How would you investigate this patient further?

Answer

In paediatric patients who are deteriorating and have no clear clinical diagnosis, the larynx and tracheobronchial tree should be directly examined in theatre by a paediatric ear, nose, and throat specialist. Any foreign body can be identified and removed at laryngoscopy and bronchoscopy.

Discussion

In patients with recurrent presentations of cough, stridor, and respiratory distress, microlaryngoscopy and bronchoscopy under general anaesthesia are recommended to make a diagnosis. The larynx appears normal in the figure, but an impacted plastic foreign body can be seen in the subglottic trachea. The extensive surrounding granulations significantly reduce the subglottic airway and are consistent with longstanding impaction. Rigid bronchoscopy allows diagnosis and treatment, in the form of removal of foreign bodies.



Image taken at bronchoscopy showing a foreign body in the subglottis

Some authors suggest performing computed tomography of the neck and chest in patients with suspected aspiration of a foreign body. However, this investigation is used for diagnosis only, and patients need to undergo direct examination later. Most patients who present with possible foreign body aspiration are children or babies. Because of the risks associated with exposure to radiation and possible sedation in these patients, we do not use computed tomography to diagnose foreign body aspiration in our unit.

4. What are the complications of this presentation?

Answer

Acutely the patient may present with asphyxia or death. Common complications include pneumonia, atelectasis, temperature spikes, haemoptysis, and the need for repeated bronchoscopic procedures.

Discussion

Complications can arise from the aspiration event itself, delayed diagnosis, or treatment. The most catastrophic immediate complication is complete obstruction of the airway, resulting in asphyxia and death. Attempts can be made to dislodge impacted foreign bodies, the most common of which is the Heimlich manoeuvre.

If the foreign body does not completely obstruct the airway the patient can present with several complications, such as pneumonia or atelectasis.^{7 8} Pneumothorax, pneumomediastinum, and lung abscesses can also develop as a result of the potential ball valve effect of the obstruction.^{9 10} Airway restriction secondary to the development of localised granulation tissue forming around the impacted foreign body is another possibility.

Complications of treatment include potential risks from general anaesthesia; trauma to the teeth, lips, and gums; and failure to remove the object during rigid bronchoscopy, which may necessitate a cardiothoracic procedure.

Patient outcome

Our patient underwent microlaryngoscopy with rigid bronchoscopy, at which time a foreign body was located in the subglottis. A small amount of localised granulation was seen when the foreign body was removed with forceps. After the procedure she was awoken and returned to the paediatric ward for 24 hours of observation. During this time she had no further episodes of cough, stridor, or desaturations. She was discharged the next day.

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