

Subcutaneous emphysema of the neck in infancy: under-recognized presentation of child abuse

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Abstract

Two cases of subcutaneous emphysema of the neck as a result of abuse in infancy are presented to add to the variety of findings associated with the maltreatment of infants. Pharyngeal perforations as a result of abuse are rare. These cases are presented as a reminder to the attending clinician that although most cases of subcutaneous emphysema may resolve without any complications a detailed examination for the cause should be performed and the history carefully verified.

Key words: Child abuse; Subcutaneous Emphysema; Neck

Introduction

Subcutaneous emphysema of the neck is an uncommon clinical sign in infancy. It may result either from an air-leak from the respiratory or gastrointestinal tract, or rarely from infection with a gas-forming organism. Its presence should alert the physician to the possibility of traumatic injury to the pharynx, larynx, trachea or oesophagus, either accidental or non-accidental. Each year in England and Wales, 40 000 children are the subject of a case conference for suspected physical abuse.¹

The commonest site for perforation is the pharynx due to the anatomical weakness of the hypopharyngeal-oesophageal junction. Laceration of the oropharyngeal wall may induce dissection of air into the planes of the soft tissue of the neck and the mediastinum, following the three compartments formed by the cervical fascias. Gravity and intermittent negative intrathoracic pressure favour further propagation of gas into the mediastinum.²

Failure to consider physical abuse in an infant with swelling of the neck from subcutaneous emphysema could have serious implications. Evidence indicates that abused children experience serious long-term effects and carry the legacy of their abuse into adult life.^{3,4} This is a report of two infants with airway compromise resulting from this condition, in whom the diagnosis of child abuse was made late in the course of the illness.

Case reports

Case 1

A 10-month-old boy presented to his local hospital with neck swelling and respiratory distress. He was initially treated for suspected anaphylaxis with intramuscular epinephrine, intravenous steroids, antihistamines and salbutamol nebulizers. His general practitioner had prescribed flucloxacillin the previous day for an impetiginous lesion on his upper lip. By the next day, he had become tachycardic and pyrexial, with increased neck swelling and drooling. No stridor was

noted. He was reluctant to move his neck, holding it in a hyper-extended position. A diagnosis of epiglottitis was considered, and he was transferred to the operating theatre for direct laryngoscopy under general anaesthesia. The epiglottis was not inflamed and the child was intubated with an appropriately sized endotracheal tube. He was referred for paediatric intensive care following concerns regarding extubation, in view of the possibility of tracheal compression from his generalized neck swelling.

Further clinical examination revealed crepitus over the neck, indicative of surgical emphysema. Review of the post-intubation chest radiograph showed evidence of pneumomediastinum (Figure 1). Three small ecchymoses,

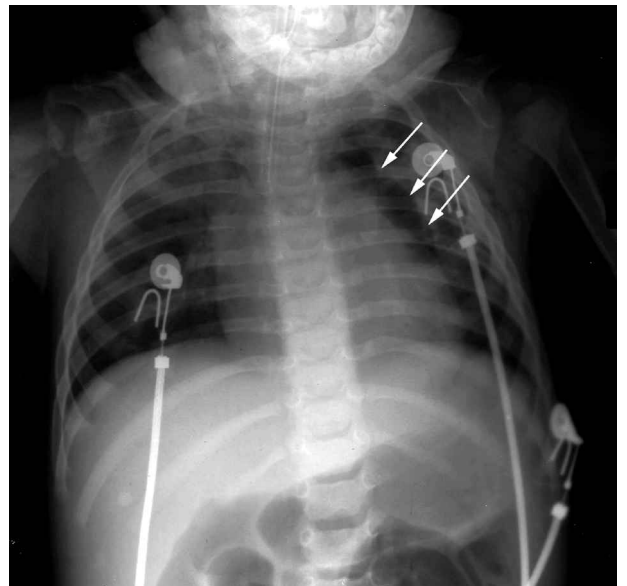


FIG. 1

Chest X-ray showing mediastinal air-leak (highlighted by arrows).

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suggestive of finger marks, were also noted on the trunk. No other injuries were evident. The child was transferred to a specialist unit where a microlaryngobronchoscopy and pharyngoscopy were performed. Pharyngoscopy revealed a 2-cm perforation of the right hypopharyngeal wall at the piriform fossa and a separate abrasion below the right tonsil. Considering that the child was non-ambulant, this injury was suggestive of a blunt object being forcibly thrust into the oropharynx. Non-accidental injury was strongly considered and child protection procedures were initiated.

The child was successfully extubated post-operatively, and managed conservatively with broad-spectrum intravenous antibiotics and nasogastric feeding for seven days.

Case 2

A six-month old boy was seen by his general practitioner late at night for noisy breathing and was referred to the local paediatric unit for assessment. The parents said he had been fed in the evening and had cried continuously since, associated with difficulty in breathing. In the Casualty department, he was found to have a swollen face and neck and was treated with nebulized adrenaline and intravenous hydrocortisone for suspected anaphylaxis. His respiratory distress worsened on the paediatric Ward and he needed further nebulizers. On re-examination, crepitus was noticed in the neck. Chest radiograph confirmed gross surgical emphysema and pneumomediastinum. He was subsequently intubated and transferred for intensive care to the regional referral centre. Two small bruises over the neck and other bruising on the arm and wrist were also noticed and the possibility of non-accidental injury was considered.

Computerized tomography (CT) of the neck revealed extensive surgical emphysema and laryngeal oedema. A skeletal survey was abnormal with evidence of bony fractures. Microlaryngobronchoscopy was performed because of a high index of suspicion of pharyngeal tear. The procedure did not show any abnormality, however it was delayed until extubation 10 days later. Nevertheless, child protection procedures were initiated.

Contrast swallows are not performed as a routine in our department and microlaryngobronchoscopy is considered as the initial diagnostic investigation.

Discussion

Child abuse has an estimated incidence of 2.5 per cent in the USA, and is considered to be on the increase.⁵ Child abuse frequently presents with cutaneous or skeletal manifestations. It can also masquerade as a variety of clinical conditions, including visceral injuries.⁶ In the absence of confirmatory tests, a high index of suspicion is crucial to make a diagnosis that has implications not just for the child in question, but also for the siblings and other family members. While the vigilant physician might consider the diagnosis in common clinical scenarios, it is imperative that uncommon presentations also ring alarm bells and prompt further action.

Although a variety of otorhinolaryngological manifestations of child abuse have been highlighted,^{7,8} subcutaneous emphysema of the neck resulting from airway or oesophageal injury is uncommon.^{9,10} In a recently described series of 300 children referred for alleged physical abuse, only two children had pharyngeal injury and surgical emphysema.⁶

Making a clinical diagnosis of subcutaneous emphysema is difficult, especially in infants due to the presence of a relatively short neck, and the diagnosis may be easily missed as illustrated by our cases. This unusual physical

finding may be attributed to frequent coughing, extreme Valsava or excessive crying. In an infant with unexplained neck swelling, signs suggestive of trauma include (1) stridor in the absence of a coryzal setting (2) respiratory difficulty resulting from tracheal compression or (3) a combination of feed refusal, drooling, vomiting or haematemesis. Careful palpation of the neck would identify crepitus in the subcutaneous tissues. Other signs of air-leak (pneumomediastinum, pneumopericardium and pneumothorax) may be demonstrated on either an antero-posterior chest or lateral neck radiograph. As in any other case of suspected child abuse, additional information in the form of bruising in the absence of a documented bleeding diathesis, retinal bleeding or old fractures needs to be carefully sought.

- **Two cases of child abuse presenting with subcutaneous emphysema are described in this paper**
- **Pharyngeal injury with child abuse has been reported previously but is rare**
- **These cases highlight the need to be vigilant and to consider the diagnosis when examining children with surgical emphysema**

Confirmation of the site of injury requires direct laryngoscopic or endoscopic examination under anaesthesia. Most cases can be managed conservatively with broad spectrum antibiotics, adequate nutrition given parenterally or by a nasogastric tube passed under direct vision. Complications include retropharyngeal abscess, mediastinitis, cardiac tamponade, vascular injuries and respiratory failure, which indicate a need for surgical intervention.

The diagnosis of child abuse remains a difficult one to make for primary care physicians and paediatricians alike. A high index of suspicion, fortified by an awareness of important, yet uncommon, presenting features is mandatory, especially in infants. This article seeks to underscore the importance of recognizing subcutaneous emphysema presenting as neck swelling and considering the possibility of child physical abuse in such a situation.

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