The lateral soft tissue neck X-ray in accident and emergency medicine

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SUMMARY

Five patients with upper aerodigestive tract pathology seen acutely in the Accident and Emergency department at St Mary's Hospital, London are presented.

The value of the lateral soft tissue neck X-ray in their diagnosis is discussed.

INTRODUCTION

We have recently seen five patients presenting to the Accident and Emergency department with upper aerodigestive tract pathology in whom study of the lateral soft tissue neck X-ray helped to establish a diagnosis. We feel that this particularly simple radiological examination is underused and thought it of value to discuss its pertinence in these cases.

The most useful radiological view of the laryngopharynx is the lateral soft tissue X-ray.

A normal lateral soft tissue X-ray is shown in Figure 1. Note the air in the upper respiratory passages outlining the valleculae and laryngotracheal cavities. Soft tissue structures such as the soft palate, tongue base and epiglottis are silhouetted against this background. The hyoid bone and, if ossified, the thyroid and cricoid cartilages can usually be seen clearly. The depth of the prevertebral shadow increases slightly from C₁ to C₆ where it blends with the thicker soft tissues of the cricopharyngeus. As a rule of thumb, the prevertebral thickness as demonstrated radiologically should be less than the width of the cervical vertebra lying behind it.

Ossification of the laryngeal cartilages is uncommon before the age of 30 years and is seen most frequently in the postero-inferior aspect of the thyroid cartilage, extending antero-superiorly. Ossification of the arytenoid cartilages may be mistaken for a foreign body as may ossification of the tritaceous cartilages which lie postero-superiorly in the thyrohyoid ligaments (Phelps, 1987).

Fig. 1. Normal lateral soft tissue neck X-ray.

Fig. 2. Widened prevertebral shadow due in this case to a retropharyngeal abscess (arrows).

CASE REPORTS

Case 1

A 52-year-old male presented with a 24 h history of hoarseness and sore throat with dyspnoea for 12 h. He was febrile and tachypnoeic with marked inspiratory stridor.

Lateral neck X-ray (Fig. 3) showed marked supraglottic swelling involving the epiglottis and aryepiglottic folds. A diagnosis of supraglottitis with possible underlying malignancy was made.

He underwent tracheostomy followed by direct laryngoscopy which confirmed gross oedema of the supraglottis, with an infected supraglottic tumour.

Case 2

A 47-year-old male presented with a 48 h history of progressive sore throat giving rise to total dysphagia. His voice had become muffled but not hoarse.

Examination showed him to be pyrexial with a respiratory rate of 18 per min. There was no stridor. Careful indirect laryngoscopy revealed a very inflamed and oedematous epiglottis obscuring the true vocal cords.

Lateral neck X-ray (Fig. 4) showed a swollen epiglottis with loss of the normal crisp outline, the 'thumbprint sign'. There was also soft tissue swelling of the prevertebral region. The airway below the epiglottis was of normal diameter.

A diagnosis of adult epiglottitis was made and this settled with intravenous

Fig. 3. Supraglottic swelling.

Fig. 4. Adult epiglottitis — arrow indicates swollen epiglottis.

chloramphenicol and metronidazole.

Case 3

A 56-year-old female presented 4 h after eating cod. During the meal she felt a bone stick in her throat. Examination of the oral cavity and indirect laryngoscopy were normal.

Lateral neck X-ray confirmed the presence of a fish bone at the level of the 5th and 6th cervical vertebrae, behind the larynx (Fig. 5). At pharyngoscopy the bone was found embedded in the post cricoid region and removed.

Case 4

An 89-year-old female was referred with a history total dysphagia for 36 h after eating chicken. She was spitting out her saliva. She was pyrexial and tender on the left side of her neck with signs of surgical emphysema in that area.

Lateral neck X-ray (Fig. 6) showed an opaque sharp foreign body in the upper oesophageal area (C₇) with a widened prevertebral shadow. The dark areas in the prevertebral region represent free gas which extends up to the skull base.

Under general anaesthesia a chicken bone was removed from the left piriform fossa. The parapharyngeal and retropharyngeal spaces were opened via an external approach. No pus was found but the tissues were grossly oedematous and inflamed.

Fig. 5. Fishbone at the level of C5–C6 arrow.

Fig. 6. Chicken bone impacted at the level of C7 (black arrow) with free retropharyngeal gas (white

Case 5

A 52-year-old Algerian female presented with a history of progressive dyspnoea which had worsened markedly over the previous 4 days. She had been diagnosed

initially as an asthmatic and treated with a Salbutamol inhaler, to no avail.

She had marked expiratory stridor with respiratory distress. Indirect laryngoscopy revealed narrowing of the subglottic airway. This was confirmed on lateral neck X-ray which showed a smooth swelling anteriorly in the subglottis, narrowing the airway at that point (Fig. 7).

A tracheostomy was performed and biopsy of the swelling revealed rhinoscleroma.

DISCUSSION

The cases cited demonstrate the value of the lateral soft tissue neck X-ray in establishing the diagnosis in patients presenting acutely with airway obstruction or an impacted foreign body in the upper aerodigestive tract. Careful evaluation of the history coupled with accurate clinical and radiological appraisal should allow the Casualty Officer to decide which patients require referral for an otolaryngological opinion.

The neck should be examined for tenderness, crepitus or surgical emphysema which implies perforation of the viscus in which the bone has impacted.

In a review of 2394 cases of upper aerodigestive tract foreign bodies, Nandi & Ong (1978) found that fish and chicken bones constituted the commonest foreign body in adults whereas in children, ingested coins took first place. They noted that

Fig. 7. Anterior subglottic swelling (arrow).

just over 75% of impactions occurred at cricopharyngeus or in the cervical oesophagus with the majority of remaining cases showing impaction in the oropharynx and hypopharynx. However in our experience the majority of fish bones impact in the tonsil or tongue base.

Airway obstruction presents with varying degrees of urgency. A patient in extremis requires immediate securing of the airway. Intubation or tracheostomy take precedence after which appropriate radiology can be undertaken if necessary. In moderate airway obstruction X-rays may be taken to help with reaching a diagnosis but if the radiology department is some distance from the accident room then the risk of airway obstruction either in transit or in the Radiology department should be borne in mind.

Adult epiglottitis, although an increasingly reported cause of airway obstruction, is less common than its paediatric counterpart (Tverteras *et al.*, 1987). In adult epiglottitis, sore throat, absolute dysphagia and a 'plummy' voice normally occur prior to respiratory embarrassment, whereas in children airway embarrassment is normally a presenting sign. In an adult the epiglottis may be visualized most safely by inserting a fine nasendoscope through the nasal fossa and visualizing the epiglottis from the post-nasal space. If there are signs of impending airway obstruction early nasotracheal intubation or tracheostomy, if the former measure fails, should be performed. If the patient does not have sufficient respiratory embarrassment to require an alternative airway they should be admitted and closely observed.

Tverteras & Kristensen (1987) reported upon 19 cases of adult epiglottitis. Throat swabs were taken from 13 of these. Five swabs grew *B haemolytic streptococci*, and two grew *haemophilus influenzae*, the other six showed normal flora. Sixteen of their patients were treated with antibiotics (ampicillin and chloramphenicol) and observation and three required an alternative airway.

As noted in Figure 4, the generalized supraglottic and epiglottic swelling is a characteristic finding on X-ray. It should be remembered however that when acute epiglottitis is suspected in a child, examination of the oropharynx, with a tongue depressor should not be undertaken because there is a serious risk of complete and fatal airway obstruction due to a precipitous increase in supraglottic oedema or closure of the laryngeal inlet by the epiglottis itself. Management hinges on calm reassurance and minimal distress to the child (and parents) as well as the use of appropriate antibiotics and close vigilance of the airway.

CONCLUSION

The lateral soft tissue neck X-ray is a cheap, straightforward and highly useful radiological procedure when dealing with patients who present acutely with pathology of the upper aerodigestive tract. Casualty Officers should be familiar with interpreting this type of X-ray and we would reiterate that if the history and examination suggest impaction of a foreign body then a 'negative' X-ray should not deter the Casualty Officer from referring for an otolaryngological opinion.

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