

# Direct coronal and axial ct scan in the localisation of foreign bodies in the neck — case reports

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## Summary

Two cases of longstanding foreign bodies in the larynx and lower laryngo-pharynx were accurately localised by direct coronal<sup>3</sup> and limited axial CT scans of the neck. The relationship of the foreign bodies with the surrounding structures and associated changes are demonstrated clearly.

*Key words:* Foreign body, x-rays, computed tomography, direct coronal scan, axial scan, localisation.

## Introduction

The foreign bodies that had penetrated and embedded into the soft tissues of the neck may be shown by plane x-rays but may not be visualised by oesophagoscopy or laryngoscopy. These foreign bodies need to be removed surgically.

A special direct coronal and limited axial CT scanning of the neck will demonstrate very accurately the location of the foreign body and more important its relation to other surrounding vital structures.

The direct coronal CT scanning had been documented by Anderson and Koehler in 1979,<sup>1</sup> van Waesand Zonneveld<sup>2</sup> and Edmund Arozoo in 1988.<sup>3</sup> This is a very useful simple technique which overcomes the need for multiple fine axial scans and thus reducing the radiation dose to patient considerably. Edmund Arozoo<sup>3</sup> demonstrated the cervical spine and soft tissue structures of the neck very clearly in the coronal plain.

## Case Reports

**Case 1:** S.D., a 34-year-old Indian female, was referred to the University Hospital in April 1990 for foreign body in the larynx, pain in the throat on turning the head, speaking and swallowing, along with hoarseness of voice after swallowing a fish bone in August 1989.

The plain x-ray film showed a faint foreign body in the region of the larynx. An indirect and direct laryngoscopy showed granulation tissue in the right pyriform fossa but a foreign body could not be visualised.

At this stage, the patient was referred for CT scanning for localisation of the foreign body.

After intravenous contrast medium direct coronal scans,<sup>3</sup> 3 mm consecutive sections were carried out from anterior part of the cervical spine to anterior to the larynx and trachea. A limited axial scan was done at the level of the foreign body. The foreign body was accurately localised in the right pyriform fossa. Soft tissue swelling surrounding the foreign body, distortion of the right vocal cords and ventricle, displacement of the laryngeal vestibule and the trachea are well demonstrated (Figs. 1, 2, 3).

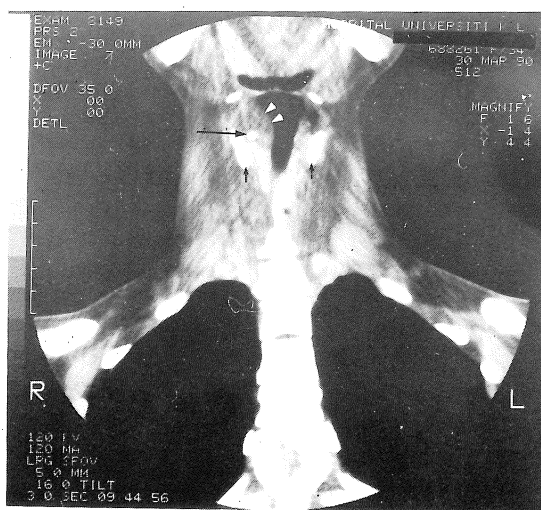
The patient underwent an exploratory surgery and 2.5 cm fish bone was removed from the right pyriform fossa.

**Case 2:** L.A.L., a 55-year-old Chinese female was admitted for swallowing a fish bone about two weeks ago and continued to have pain in the throat aggravated by swallowing and turning the head.

A plain x-ray showed a faint radiopaque foreign body at the level of 4th and 5th cervical vertebrae. An indirect laryngoscopy and an oesophagoscopy failed to visualise the foreign body. At this juncture, the patient was referred for CT scan to localise the foreign body.

By a similar CT technique and intravenous contrast as that of Case No. 1, a linear foreign body was demonstrated at the level of the 4th and 5th cervical vertebrae. It was embedded in the prevertebral soft tissue on the right side and straddling the midline. The nasogastric tube indicates the lower laryngo-pharynx and helps in the localisation of the foreign body. There was a soft tissue swelling mainly in the right side lower laryngo-pharynx and distorted the laryngeal vestibule on the right postero-lateral aspect (Figs. 4, 5, 6).

In this case the vocal cords, ventricles and the trachea are normal compared to Case No. 1. This patient also had an exploratory surgery and a 2 cm fish bone was removed.



**Fig. 1** Direct coronal section.

The foreign body (long black arrow) is medial to the right thyroid cartilage (small black arrow). The soft tissue swelling in the right pyriform fossa bulges and compresses the laryngeal vestibule (white arrow heads).

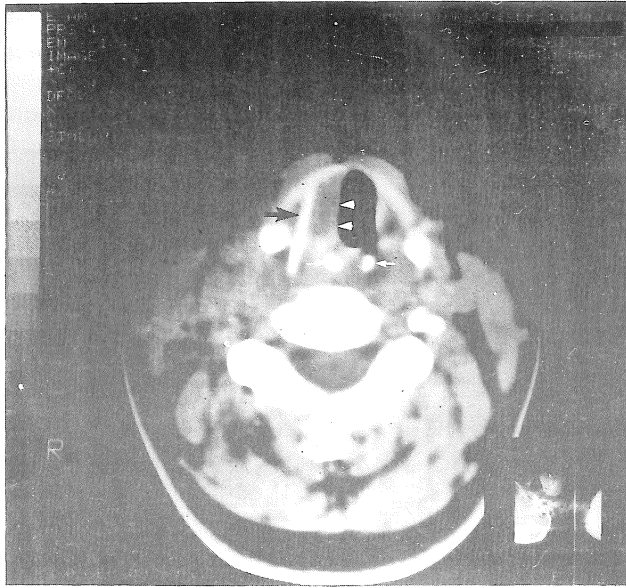


Fig. 2 Direct coronal section. The foreign body (long black arrow) is seen supero-medial aspect of right thyroid cartilage. The right true and false vocal cords, and the ventricle are obliterated (single white arrow head) compared to the left (two white arrow heads and a black arrow). This accounts for the patient's hoarseness of the voice.

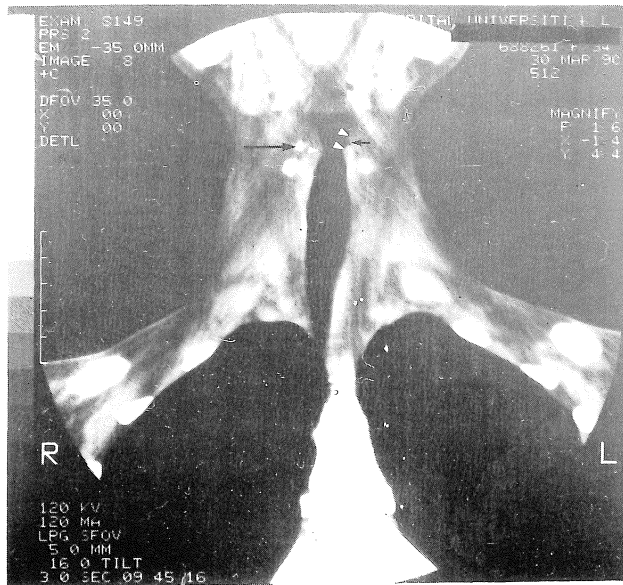
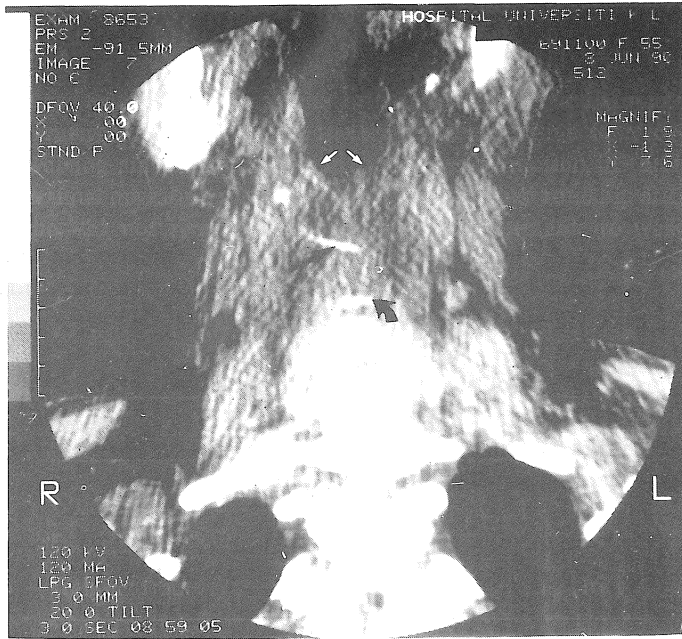
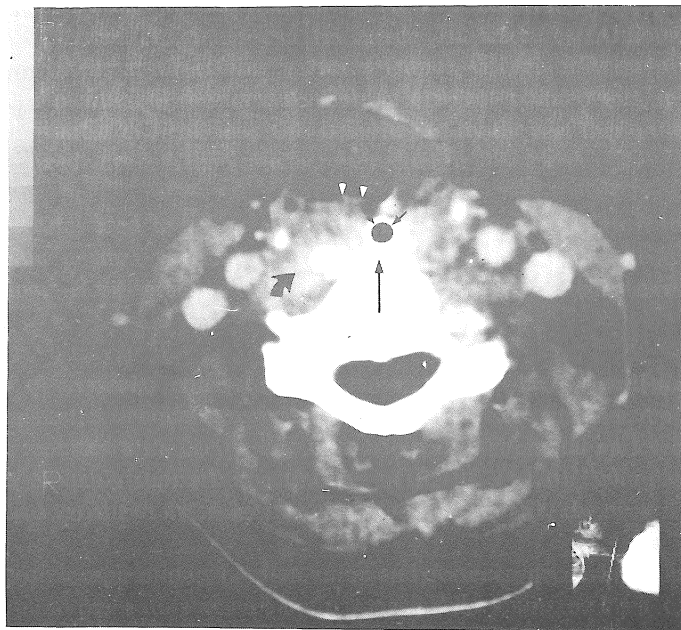


Fig. 3 Axial section at the upper end of the 5th cervical vertebrae. The entire foreign body (short black arrow) is located antero-posteriorly in the right pyriform fossa associated with a soft tissue swelling. The rima glottis is compressed by this mass (white arrow heads). Arytenoid cartilages (white small arrows).



**Fig. 4** Direct coronal section  
 The foreign body (long black arrow) is lying obliquely across the midline embedded in the prevertebral soft tissue at the level of upper 5th cervical vertebrae. The black curved arrow shows the 5th cervical vertebrae. The two small white arrows point the laryngo-pharynx.



**Fig. 5** Axial section at 5th cervical vertebra.  
 The foreign body (long black arrow) is lying across in the prevertebral tissue more towards the right.  
 The soft tissue swelling in the right side (curved arrow) is bulging into the laryngeal vestibule (white arrow heads).  
 The nasogastric tube (small black arrows) outlines the lower laryngopharynx and helps in the localisation of the foreign body.

## Discussion

Even though plain x-rays can demonstrate the location of the radiopaque foreign body they will not show the exact tissue plane and the surrounding vital structures as it will be demonstrated by CT coronal and axial scans.

With the availability of gantry tilt facilities and gantry aperture diameter not less than 70 cm, coronal and axial sections of neck can be done without any significant discomfort to the patients with foreign body in the neck. Edmund Arozoo<sup>3</sup> has described the technique very clearly.

One or two axis scans may be done by tilting the gantry in accordance with a careful study of the lateral scanogram and the lie of the foreign body. This will give a clearer image of the foreign body, compared to the reconstructed images from coronal sections. This is not necessary when the reconstructed images from the coronal sections axial scans are satisfactory

Intravenous contrast medium needs to be administered to show the proximity of the foreign body to the carotid arteries and internal jugular veins. If there is abscess formation the wall of the abscess will enhance with contrast. In the axial scans of the second case, the carotid arteries and the internal jugular veins are very well seen and situated away from the foreign body. However they are not well seen in the first case due to delay in the scanning. The status of the trachea, the larynx and the vertebra are also demonstrated in relation to the foreign body at that particular level in the axial scans.

As shown in the illustrations, the vocal apparatus, trachea, prevertebral soft tissue and the anterior aspect of the cervical vertebrae are best seen in coronal sections and any associated pathology could be detected easily. If the foreign body is in the coronal plane the entire foreign body will be seen as in the second case. If not, the foreign body can be seen in cross section and the exact position in relation to other anatomical structures, which will then facilitate surgery.

In conclusion, if the foreign body is not seen by direct or indirect laryngoscopy/oesophagoscopy, the investigation of choice is a direct coronal section with reconstruction or a direct coronal section with one or two axial scans.

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