

Fish bone as a foreign body

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Abstract

Fish bones are one of the most common foreign bodies in the upper aero-digestive tract. The use of plain X-ray in identifying fish bones has questionable value. We believe that the knowledge of the type of the fish ingested improves the diagnostic value of the neck X-rays. This study was designed to evaluate the relative radio-densities of the bones of commonly eaten fish in the UK. Twenty-three species of fish were studied and their bones were grouped into three depending upon their radio-densities. This information is expected to be useful in identifying fish bones while reading plain radiography.

Key words: Foreign Bodies; Fish Products; Radiography

Introduction

A fish bone in the upper aerodigestive tract is a commonly encountered emergency in otolaryngology. The commonest site for a fish bone to impact is the base of the tongue followed by the palatine tonsils, vallecula and pyriform sinus. Occasionally fish bones slip through and lodge in the oesophagus and are not easy to detect and remove. This can lead to fatal complications such as a para or retropharyngeal abscess, mediastinitis, lung abscess and oesophago-aortic fistula.¹ Follow-up of patients presenting with a sharp pain in their throat after eating fish demonstrates a fish bone only in 21 per cent.² However, in view of the potentially fatal complications in patients with an impacted fish bone, it is imperative that a diagnosis is made as soon as possible.

A plain X-ray is the commonest investigation performed in cases presenting with suspected foreign body impaction. Although some investigators have mentioned the efficacy of computed tomography (CT) in the diagnosis of foreign bodies in the upper aero-digestive tract,³ a plain X-ray is often the only initial investigation performed to arrive at the diagnosis. The detectability of fish bones by standard radiography depends on the type of the fish ingested. Hence information regarding the ingested fish is a valuable aid for improving the diagnostic value of lateral soft tissue neck X-rays. As a preliminary step to the present study, a survey was sent out to assess whether junior doctors working in otolaryngology departments are aware of this information. Junior doctors in the otolaryngology departments of 30 hospitals in England and Wales were contacted by telephone. All doctors were asked the following two questions:

- (1) Do you perform an X-ray of the lateral neck when a patient presents with a fish bone as a foreign body?
- (2) Does your hospital have a guideline to show the radio-opacity of different fish bones?

In all the 30 hospitals plain X-ray neck were performed when patients presented with a fish bone as a foreign body. However in 28 hospitals no enquiry regarding the nature of ingested fish was made as there was no information

available regarding the differing radiodensities of various fish bones. In two hospitals some form of guidelines did exist. We felt that the information regarding the radio-density of different fish bones is helpful in reading plain X-rays, when the diagnosis of a fish bone as a foreign body is in question.

Method

Twenty-three commonly eaten species of fish in the UK were selected for the study. Enquiries were made at fish counters in the supermarket as well as at fish mongers in the market to find out the most commonly sold species of fish in UK. Bones of different sizes were collected from a number of cooked fish from each species. Each species' bones were grouped together, labelled and arranged on a piece of cardboard together with a chicken bone, which was kept as the control. These were then X-rayed. According to the degree of radio-opacity of these bones in relation to the chicken bone the bones were divided into three groups i.e. highly radio-opaque, moderately radio-opaque, and minimally radio-opaque. X-rays were interpreted by a radiologist. A guideline was developed as in Table I, to display in

TABLE I
DEGREE OF RADIO-OPACITY OF FISH BONES

Highly radio-opaque	Moderately radio-opaque	Minimally radio-opaque
Salmon	Trout	Herring
Cod	Bream	Sardine
Mullet	Pomfret	Mackerel
Sole	Plaice	Sprat
Megrime	Scad	Hake
Tilapia	Sword fish	
Haddock	Monk fish	
Bass		
Red fish		
Durad		
Gurnard		
Chicken bone as control		

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otolaryngology and casualty departments to help junior doctors in interpreting neck X-rays of patients presenting with a fish bone as a foreign body.

Discussion

Several studies have been done to assess the efficacy of X-rays in the diagnosis of fish-bone impaction. While many authors strongly recommend the routine use of X-rays, Evans *et al.*⁴ condemn routine radiography for suspected impacted fish bones. We have noticed that it is the current practice in UK to get a plain X-ray for all patients presenting with a fish bone as a foreign body.

The radio-opacity of fish bones are affected by a number of factors such as the size of the bones, calcium content of the bones and the salinity of the water in which they grow.⁵ Sea fish bones in general contain more calcium than fresh water fish. Larger fish obviously will have bigger bones, which are likely to be more radio-opaque. Other factors such as superimposed structures, the presence of air and soft tissue swelling around the suspected foreign body can influence the interpretation of these films. Even then a general idea about the radio-opacity of fish bone is a useful aid in the reading of X-rays.

Haglund *et al.*⁶ has shown the high diagnostic accuracy of radiographic examination in patients presenting with a fish bone as a foreign body. The sensitivity can be increased by proper clinical correlation combined with the knowledge of the relative radio-opacity of the fish bones ingested. If the X-ray does not show any fish bones and if it is known that the bones of the fish swallowed are likely to be radio-opaque, then it is safe to observe the patient and not to proceed to oesophagoscopy provided the clinical symptoms and signs are favourable. If the bones of the fish are likely to be radiolucent, then a negative X-ray does not rule out the possibility of a foreign body. The contents of Table I showing the relative radio-opacity of fish bones may be helpful as a guide while interpreting plain X-rays in suspected cases.

- **Fish bones are one of the most common foreign bodies in the upper aero-digestive tract**
- **This study evaluates the relative radiodensities of the bones of the fish most commonly encountered in the UK**
- **This information is of use in identifying fish bones on plain X-ray**

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