Role of Plain Xray Soft Tissue Neck Lateral View in the diagnosis of Cervical Esophageal Foreign Bodies

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Abstract

Objective: To assess the role of x-ray soft tissue neck lateral view in patients presenting with cervical esophageal foreign bodies.
Materials and Methods: A prospective study, in patients with suspected foreign bodies in the esophagus, was conducted in ENT department, TUTH, April 2004 to July 2008. All patients underwent x-ray soft tissue neck lateral view at the time of presentation. Findings of hypopharyngoscopy/ upper esophagoscopy were analysed using Chi Square (□2) and different signs were compared by Z test of proportion.
Results: Out of 230 patients, 51.3% were children. There were 84.4% patients with positive finding on x- ray. Soft signs were seen in 16.1% while foreign body was visualized in 53.9% patients. Foreign body along with soft sign was visualized in 14.3% patients.
Conclusion: Overall sensitivity of x-ray soft tissue neck was 84.4% in diagnosing foreign body esophagus. Plain x-ray soft tissue neck lateral view is a cheap, easy and non invasive investigation to identify foreign body esophagus.

INTRODUCTION

Foreign body ingestion is a common problem in both children and adults.[1,2,3,4] It carries significant morbidity and mortality.[5] Proper history and physical examination are important in diagnosing foreign body. Plain radiographs are routinely used in the diagnosis of upper airway foreign bodies, although their usefulness remains debatable.[6] In our series, x-ray soft tissue neck lateral view and antero-posterior views were commonly used in diagnosis of foreign body esophagus. But lateral view has gained more importance than antero-posterior view as this view can differentiate foreign bodies in esophagus from tracheo-bronchial region. The management also differs by the location of foreign body in different parts of esophagus.

X-ray can detect foreign body if it is radio opaque or sometimes we may see soft signs like widened prevertebral shadow, loss of lordosis, gas shadow. So far, even after extensive literature search, no study focusing of x-ray soft tissue neck lateral view in the diagnosis of foreign body esophagus could not be found. So, this study is first of its kind in the literature. This study was done to assess the role of plain x-ray soft tissue neck lateral view in diagnosing esophageal foreign body.

MATERIALS AND METHODS

A prospective study was conducted in the department of ENT and Head and Neck surgery, TU Teaching Hospital, Kathmandu, Nepal from April 2004 to July 2008.Patients admitted with provisional diagnosis of foreign body esophagus were enrolled. All patients underwent x-ray soft tissue neck lateral view at the time of presentation. Findings of x-ray were compared with per operative finding during hypopharyngoscopy or upper esophagoscopy using Chi Square (χ^2) and different signs were compared by Z test of proportion. Informed consent from the patients was taken for this study and ethical committee approval was taken.

RESULTS

There were 247 patients suspected of foreign body esophagus during study period out of which foreign bodies were present in 230 patients. There was no foreign body in 17 patients. In those patients having foreign body, 142 were male and 88 Female. More than 50% were children (≤12 year's age).The age ranges from 9 months to 74 years. Foreign body was removed in all patients with rigid esophagoscopy/ hypopharyngoscopy. Most common foreign body in children was coin (65.2%) followed by meat bone (14.0%) while in adults meat bone account to 76.7% and

meat bolus up to 12.5%. Thus meat item made 89.3%of total foreign body in adults. (Table-1)

Figure 1

Table 1: Types of Foreign bodies found

SN	Foreign Bodies	Children	Adult	Total	Percentage
1	Meat Bone	17	86	103	44.8%
2	Coin	77	3	80	34.8%
3	Meat Bolus	0	14	14	6.1%
4	Metallic Foreign body	11	2	13	5.6%
5	Vegetative Foreign body	5	1	6	2.6%
6	Battery	5	0	5	2.2%
7	Denture	0	5	5	2.2%
8	Electric Foreign body	3	1	4	1.7%
	Total	118	112	230	100%

On x-ray soft tissue neck, 84.4% had positive radiological findings. Radio opacity of foreign body was seen only in 53.9% patients that were mainly of coin and meat bone, whereas soft signs were seen in 16.0% patients (Table -2). Meat bone was the most common foreign body that showed both these signs. Thirteen patients had no signs of foreign body in x-ray of soft tissue neck but in other x-rays such as chest x-ray or x-ray Abdomen, it was seen. Coin accounted for more than 90% of such foreign body. No sign of foreign body in x-ray soft tissue neck or in other x-rays was found in 23 patients although they had in esophagus/ hypopharynx foreign body, which was later removed by diagnostic esophagoscopy.

Figure 2

Table 2: Different Foreign bodies compared with radiological findings

SN	Radiological finding	Foreign bodies								Total Percentage
		Meat Bone	Coin	Meat bolus	Metallic Foreign body	Vegetative Foreign body	Battery	Denture	Electric Foreign body	
1	Radio opacity	45	68	0	7	0	1	1	2	124 (53.9%)
2	Soft signs	18	0	10	0	4	2	2	1	37 (16.1%)
3	Opacity + Soft signs	23	0	0	6	0	2	1	1	33 (14.4%)
4	No signs	17	0	4	0	2	0	0	0	23 (10.0%)
5	Foreign body beyond neck	0	12	0	0	0	0	1	0	13 (5.6%)
Total		103	80	14	13	6	5	5	4	230 (100.0%)

Overall sensitivity of x-ray soft tissue neck was 84.4% in diagnosing foreign body esophagus (Table-3). Radio opacity sign was more useful in coin (sensitivity 85.0%) and meat bone (sensitivity 43.7%). Soft signs were more useful in meat bolus (sensitivity 71.4%) and vegetative foreign bo dy (Sensitivity 66.6%) (Table-3).

Figure 3

Table 3: Different Foreign bodies compared with radiological findings sensitivity

SN	Radiological finding	Foreign bodies								Percentage (%)
		Meat Bone	Coin	Meat bolus	Metallic Foreign body	Vegetative Foreign body	Battery	Denture	Electric Foreign body	
1	Radio opacity	43.7	85	0	53.8	0	20	20	50	53.9
2	Soft signs	17	0	71.4	0	66.6	40	40	25	16.1
3	Opacity+ Soft signs	22.3	0	0	46.15	0	40	20	25	14.4
Total sensitivity (%)		83.5	85	71.4	100.0	66.6	100.0	80	100.0	84.4

Using "Z" test for proportion and comparing radio opacity and soft signs, it was found that radio opacity was far more reliable sign than soft sign ($p<0.01$). Using χ^2 test and taking visualization of foreign body itself (radio opacity) as the confirmatory diagnostic finding the result is significant ($p<0.01$) suggesting that there is very good association between x-ray soft tissue neck and foreign body esophagus.

DISCUSSION

X-ray soft tissue neck is expected to remain as a routine investigation as it is highly specific, totally non invasive, well tolerated by patients, relatively cheap and can be done without delay. In our study there were 68.2% radiologically positive foreign bodies which were radio opaque. In radio opaque foreign body, x-ray soft tissue neck was useful in almost all of the patients.

While in non radio opaque foreign body, soft tissue signs were useful. It was seen in 70.0% of radiolucent foreign body ingested. Sensitivity of all these signs put together account to 90.0% which is indicative of its extreme usefulness.

Though x-ray soft tissue neck is one of the valuable investigations, it is not always helpful. In Singapore, lateral neck x-rays have been useful in fish bone impactions and particularly in cervical oesophageal foreign bodies.[7] There were 21.45% patients with normal x-ray soft tissue neck, although among them 36 (67.9%) had foreign body that was removed by rigid esophagoscopy.

Karnawal et al study[8] revealed that lateral soft tissue neck x-rays were considered useful in all 21 patients with radioopaque foreign bodies, including those of negative x-rays, as no acute ENT intervention would be necessary for those patients. Their study showed that lateral soft tissue x-rays were considered useful in the management of 32 patients (51.6%) which is lower than our study.[8] This is due to the fact that their study includes upper aerodigestive

system also. In our study, soft signs such as widened prevertebral shadow, loss of lordosis were seen only in 16.1%. Foreign body was visualized only in 53.9% patients. Foreign body along with soft sign was visualized in 14.3% patients. However, in this recent study overall sensitivity of x-ray soft tissue neck was 84.4% in diagnosing foreign body esophagus. Comparing radio opacity and soft signs, it was found that radio opacity was far more reliable sign than soft sign ($p<0.01$). There is very good association between x-ray soft tissue neck and foreign body esophagus ($p<0.01$).

Knowledge of normal radiographic anatomy is essential. Assessment of lateral soft tissue neck x-rays should include looking at the pharyngo-laryngo-oesophageal structure itself as well as at adjacent soft tissue structures.[8] Though study done in Singapore had mentioned that neither the clinical symptoms nor the neck x-rays were of real help in predicting the presence of a foreign body.[7] But our study showed a different result and revealed that radiology is most useful investigation in diagnosing foreign body esophagus. Nevertheless, lateral neck x-ray is expected to remain as a routine investigation as it is highly specific, totally non-invasive, and well tolerated by patients, relatively cheap and can be done without delay.

However, in the study carried out by Karnawal et al study[8], it revealed that lateral soft tissue neck x-rays were not useful. Five patients in their series[8] with absolute dysphagia had normal x-rays nevertheless required urgent oesophagoscopy and removal of food bolus. Unfortunately, the high numbers of positive findings missed by junior doctors meant that this potential usefulness was not fully realized at the time the x-rays were taken.[8] This suggests that proper knowledge is essential for interpretation of radiological findings. More than esophageal foreign bodies, the role of plain radiographs in patients with airway foreign body remains debatable. Silva et al suggested that routine use of plain radiographs in cases of airway foreign bodies is neither efficient nor cost effective, quoting a sensitivity of 73 and 45% percent, respectively.[9] Walner et al found that antero-posterior and lateral radiographs had a high sensitivity ([10]0 percent) and specificity (100 percent) for airway foreign bodies, when compared with bronchoscopic findings.[10] But our experiences revealed that radiology is more useful in esophageal foreign bodies than bronchial foreign bodies.

Though history and examination are important methods to diagnose foreign body, x-ray soft tissue neck lateral view should be routinely done in hospitals to diagnose foreign body. Most of the foreign bodies are radiologically opaque but when it is absent then soft signs are useful. The more the duration of foreign body in esophagus the more the soft signs we will find, and in such cases fever, odynophagia is also complained. But we should keep in mind that negative radiology will not always ruled out foreign body. If by history and clinical examination foreign body is suspected in esophagus then irrespective of x-ray finding flexible endoscopy or rigid esophagoscopy have to be done.

CONCLUSION

Overall sensitivity of x-ray soft tissue neck was 84.4% in diagnosing foreign body esophagus. Radio-opacity was far more reliable sign than soft sign. There is very good association between x-ray soft tissue neck and foreign body esophagus. X-ray soft tissue neck lateral view is routinely done in all suspected foreign body esophagus. It is cheap, easily available and non invasive investigation that gives us clue to diagnose in majority of cases. However we have to keep in mind that negative radiology will not always ruled out the possibility of foreign body. Clinical judgment is very important in such cases.

CORRESPONDENCE TO

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