

## Radiolucent foreign bodies in the extremities

Jasim Hasan Imarah\*

### Abstract

Orthopedic Surgeons often remove foreign bodies in the extremities. If the foreign body is radiopaque, it can be located using conventional radiographs or fluoroscopy. However, if the foreign body is radiolucent object, it may not be detected leading to serious complications. The aim of this paper is to discuss the role of US in detection of radiolucent foreign body in addition to the presentation and nature of the foreign body. Twenty patients with penetrating injuries in the extremities were treated during 2011 at AL-Husain Teaching Hospital. They were 11 male and 9 female, their ages ranged between 4 to 50 years (average 22.7). All patients were evaluated by detailed history, clinical examination, radiography and US. X-ray and US were done in department of radiology in our Hospital. The lower limb was affected in 14 cases (70%) while the upper limb in 6 cases (30%). presenting symptom was pain (16cases), followed by swelling (3cases), limping and discharging sinus (one case). No foreign bodies were detected by radiography in this study while on the other hand US was detect and localize foreign body in each case. Fifteen patients had history of failed previous interventions for removing foreign bodies. In conclusion; radiolucent foreign bodies are common in children and adults most often presenting as penetrating injury of the extremities. Failure to remove it may lead to serious complications and malpractice lawsuit. US has emerged as the study of choice for detection of radiolucent foreign bodies.

**Keywords:** Extremities; Radiolucent; Foreign Bodies; Ultrasonography

\*<sup>1</sup>Department of Surgery, Collage of Medicine, Al-Muthanna University, Iraq  
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### Introduction

Orthopedic Surgeons often remove foreign bodies in the extremities. Foreign bodies were classified in different ways like radio opaque or radiolucent, organic or inorganic ...etc. If the foreign body is radiopaque, it can be located using conventional radiographs or fluoroscopy. However; if the foreign body is radiolucent object (wood, plastic, thorn or glasses), it may not be detected leading to serious complications and malpractice lawsuit [1,2]. In this study

high resolution, real time US used for detection and localization radiolucent foreign bodies. The presentations, nature of foreign bodies in addition to the role of US are discuss.

#### Patients and Methods

Twenty patients with penetrating injuries in the extremities were treated during 2011 at AL-Husain Teaching Hospital. They were 11 male and 9 female, their ages ranged between 4 to 50 years (average 22.7). Of the 20 patients, fifteen had failed previous intervention for removal. Common injurious

foreign bodies were found to be date-palm spine in 9 cases, followed by wood splinter in 5 cases, glasses in 3 cases and the remaining three cases no foreign bodies were found. All patients were evaluated by detailed history, clinical examination, radiography (except one case-pregnant female) and US. X-ray and US were done in department of radiology in AL-Husain Teaching Hospital. Our attempts of foreign bodies removal were done under various modalities of anesthesia (local infiltration. Nerve block and G.A)

#### Results

Table 1 showed that patients age was 4-50 years (average 22.7). The lower limb was affected in 14 cases (70%) while the upper limb in 6 cases (30%). The foreign bodies were palpable only in 7 cases. The leading presenting symptom was pain (16 cases), followed by swelling (3 cases), limping and

discharging sinus (one case). The time since injury up to our intervention was variable from one day to 10 years. Sixteen patients (80%) were insisted on the presence of foreign body when asked about their suspicion while 2 patients had no such suspicion and the remaining two were children. No foreign bodies were detected by radiography in this study while on the other hand US was detect and localize foreign body in each case. In three patients, we didn't find foreign bodies during our intervention, from whom only one patient had positive suspicion about the presence of foreign body. Fifteen patients had history of failed previous interventions for removing foreign bodies, these interventions were done by patient or family at home in 8 cases, by doctors in 4 cases and by dresser in 3 cases.

No.	Age	Sex	Site	Palpable F.B	Presenting Symptom	Previous Intervention	History Since Injury	Nature of F.B if remembered	Pt. suspicion	X-ray detection	Us detection	Result of our intervention	Anesthesia	
1	27	F	L. L	Yes	Pain	+ve	2 days	Date Palm Spine	+ve	In all cases X-ray not detected foreign body	US detected and localize foreign bodies in all cases	+ve	L.A	
2	28	M	U. L	Yes	Pain	+ve	25 days	Glass	+ve			+ve	L.A	
3	50	M	U. L	Yes	Swelling	-ve	10 days	Date Palm Spine	+ve			+ve	Digital N Block	
4	16	M	L. L	No	Pain	+ve	14 days	Glass	-ve			-ve no FB (fibrosis)	G.A	
5	20	F	L. L	No	Pain	+ve	5 years	Date Palm Spine	+ve			-ve no FB (fibrosis)	L.A	
6	30	M	L. L	No	Pain	+ve	1.5 year	Not remembered	-ve			-ve no FB (fibrosis)	G.A	
7	18	F	U. L	No	Pain	+ve	3 month	Glass	+ve			+ve	S.A	
8	21	M	L. L	No	Pain	+ve	3 days	Date Palm Spine	+ve			+ve	L.A	
9	7	M	L. L	Yes	Pain	-ve	1 day	Wood splinter	+ve			Not done	+ve (Wood)	L.A
10	18	M	L. L	No	Pain	-ve	10 days	Date Palm Spine	+ve			Preg.	+ve	G.A

11	4	M	L.L	No	Swelling	-ve	14 days	Date Palm Spine	?			+ve Date Palm Spine	G.A
12	20	F	U.L	Yes	Pain	+ve	6 month	Glass	+ve			+ve Glass	G.A
13	36	M	L.L	No	Pain	+ve	2 days	Wood	+ve			+ve (Wood)	G.A
14	21	M	L.L	No	Swelling	-ve	1 month	Date Palm Spine	+ve			+ve Date Palm Spine	L.A
15	26	F	L.L	No	Pain	+ve	2 days	Date Palm Spine	+ve			+ve Date Palm Spine	L.A
16	45	F	U.L	No	Pain	+ve	6 days	Wood splinter	+ve			+ve (Wood)	L.A
17	20	F	L.L	Yes	Pain	+ve	10 years	Wood splinter	+ve			+ve (Wood)	L.A
18	13	F	U.L	Yes	Pain	+ve	14 days	Date Palm Spine	+ve			+ve Date Palm Spine	L.A
19	30	F	L.L	No	Pain	+ve	4 days	Date Palm Spine	+ve			+ve Date Palm Spine	L.A
20	4	M	L.L	No	Limping +Sinus	+ve	45 days	?	?			+ve (Wood)	L.A

Table I details of Patients included in this study

## Discussion

The diagnosis of an embedded foreign body requires a high index of suspicion with thorough clinical examination and appropriate investigations. Undetected foreign bodies may cause inflammatory, allergic or infectious complication. Besides, they may also lead to malpractice suite [3]. Plain X-ray studies are clearly unreliable for radiolucent foreign bodies. Wood is one of the most common of them. One study showed that only 15% of wooden foreign bodies were visible on plain radiographs while another study showed missed the presence of soft tissue foreign bodies on initial radiographical examination in over one third cases [2, 4]. In this study no foreign body was detected by plain X-ray. US is the investigation of choice in patient with a strong suspicion of retained foreign body but not seen on plain radiograph [5]. In our study we use 7.5 MHz ultrasonography which detected foreign bodies in all cases. High resolution, high frequency transducer US (7.5-10 megahertz) is sensitive and specific for the detection of radiolucent foreign bodies in the soft tissues. Glibet et al. Used 10 MHz probe to examine suspected radiolucent foreign bodies in extremities and describe a sensitivity of 95% and specificity of 89% [1, 2]. Limitation of US evaluation for soft tissue foreign bodies include operator dependence in addition to false-positive findings which can potentially result from calcification, scar tissue, fresh hematoma or air trapped in soft tissue [6]. In this study 3 cases of false-positive was found and we think resulted from scar tissue of previous intervention. Patient suspicion that foreign body may present must be taken seriously [7]. In our study 16 case with such suspicion, we find foreign bodies in all

except one case while 2 patients had no suspicion and US report declare the presence of foreign body, but we didn't find it during our surgical exploration. The temptation to remove the radiolucent foreign body by simply pulling it out of the wound must resist because this may leave a small fragment behind which lead to serious complications and increase patient morbidity [7]. In our study of 15 case had previous failed intervention 7 of them had such habit for removing foreign body. While removing radiolucent foreign body ensure that nothing is left in the wound. The physician also must cautious in telling the patient that the foreign body is entirely removed. It may be preferable to tell the patient that all the visible foreign body has been removed, but there is always a chance that small pieces may be present that are undetectable at that time [7].

## Conclusion

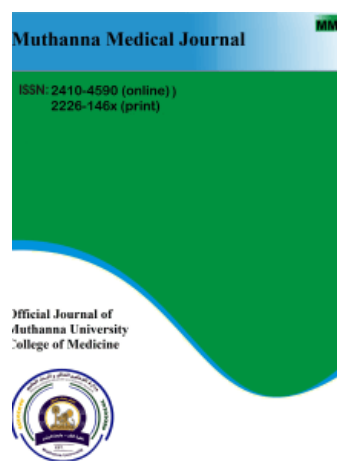
Radiolucent foreign bodies are common in children and adult most often presenting as penetrating injury of the extremities. If not removed completely may cause serious complications. Failure to diagnose it has emerged as a common cause of mal practice lawsuit. US is an inexpensive, portable and readily available modality for detection soft tissue radiolucent foreign body without the risk of ionizing radiation.

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Contact us

Postal Mail

Muthanna Medical School

Samawah

Tel: +964 (782) 542-5669

Office's business hours: Sunday-Thursady 9.00 am – 1.00 pm

Email: [yousif\\_ghaly@yahoo.com](mailto:yousif_ghaly@yahoo.com)