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NON RADIO OPAQUE FOREIGN BODIES IN ORTHOPAEDIC PRACTICE

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Abstract

Orthopaedic surgeons often remove foreign bodies from the extremities. If the foreign body is radio-opaque, it can be located using conventional radiographs or fluoroscopy. However if the foreign body is a radiolucent object, it may not be detected by radiograph leading to serious complications. The aim of this paper is to discuss the role of US in detection of non radio-opaque foreign body in addition to the presentation and nature of the foreign body.

Twenty patients with penetrating injuries to the extremities were treated from January-December 2008 at Samawa General 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 which were done at the department of radiology in Samawa General Hospital.

The lower limb was affected in 14 cases (70%) while the upper limb in 6 cases (30%). presenting symptoms were; pain (16 cases) followed by swelling (3 cases), limping and discharging sinus (one case). No foreign bodies were detected by radiography in this study. On the other hand, US detect and localize foreign body in each case. Fifteen patients had history of failed previous interventions for removing foreign bodies.

In conclusion, Non radio-opaque foreign bodies are common in children and adults most often presenting as penetrating injury to the extremities. Failure to remove it may lead to serious complications and malpractice lawsuits. US has emerged as the study of choice for detection of radiolucent foreign bodies.

Introduction

Orthopaedic Surgeons often remove foreign bodies from the extremities. Foreign bodies were classified according to radiographic appearance as radio-opaque or non radio-opaque, or chemical nature as organic or inorganic. If the foreign body is radio-opaque, it can be located using conventional radiographs or fluoro-scopy. However if the foreign body is radiolucent object (wood, plastic, thorn or glasses) it may not be detected by radiograph leading to serious complications and malpractice lawsuit[1,2]. In this study high resolution, real time ultrasound (US) used for detection and localization of non radio-opaque foreign bodies. The presentations, nature of foreign bodies in addition to the role of US are discussed.

Patients and Methods

Twenty patients with penetrating injuries to the extremities were treated from January-December 2008 at Samawa General 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, radio-graphy (except one case-pregnant female) and US, which were done at department of radiology in Samawa General Hospital.

Our attempts of foreign bodies' removal were done under various modalities of anaesthesia (local infiltration. nerve block and general anesthesia).

Results

Table 1 showed that patient's age was 4-50 years (average 22.7). The lower limb was affected in 14 cases (9 in foot, ankle, leg, knee, thigh & gluteal region one case for each) while the upper limb in 6 cases (all in the hand). The foreign bodies were palpable only in7 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 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 dressor in 3 cases. Common injurious foreign bodies were found to be date–palm spine in 9 cases, followed by wood splinter in 5 cases and piece of glasses in 3 cases.

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. Beside, they may also lead to malpractice lawsuits[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 of all 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 ultrasonagraphy which detected foreign bodies in all the cases. High resolution, high frequency transducer US (7.5-10 mega hertz) is sensitive and specific for the detection of non radio-opaque 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 haematoma or air trapped in soft tissue[6]. In this study 3 cases of false-positive was found and we think they were resulted from scar tissue of previous intervention.

Patient suspicion that foreign body may present must be taken seriously[7]. In our study 16 case were with such suspicion. Foreign bodies were found 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.

Table I: Details of Patients included in this study

No.	Age	Sex	Site	Palpable F.B	Presenting Symptom	Previous Intervention	History Since Injury
1	27	F	L.L	Yes	Pain	+ve	2 days
2	28	M	U.L	Yes	Pain	+ve	25 days
3	50	M	U.L	Yes	Swelling	-ve	10 days
4	16	M	L.L	No	Pain	+ve	14 days
5	20	F	L.L	No	Pain	+ve	5 years
6	30	M	L.L	No	Pain	+ve	1.5 year
7	18	F	U.L	No	Pain	+ve	3 month
8	21	M	L.L	No	Pain	+ve	3 days
9	7	M	L.L	Yes	Pain	-ve	1 day
10	18	M	L.L	No	Pain	-ve	10 days
11	4	M	L.L	No	Swelling	-ve	14 days
12	20	F	U.L	Yes	Pain	+ve	6 month
13	36	M	L.L	No	Pain	+ve	2 days
14	21	M	L.L	No	Swelling	-ve	1 month
15	26	F	L.L	No	Pain	+ve	2 days
16	45	F	U.L	No	Pain	+ve	6 days
17	20	F	L.L	Yes	Pain	+ve	10 years
18	13	F	U.L	Yes	Pain	+ve	14 days
19	30	F	L.L	No	Pain	+ve	4 days
20	4	M	L.L	No	Limbing +Sinus	+ve	45 days

No.	Nature of F.B if remembered	Pt. suspicion	X-ray detection	US detection	Result of our intervention	Anesthesia
1	Date Palm Spine	+ve	In all cases X-ray not detected foreign body	US detected and localize foreign bodies in all cases	+ve Date Palm Spine	L.A
2	Glass	+ve			+ve Glass	L.A
3	Date Palm Spine	+ve			+ve Date Palm Spine	Digital N Block
4	Glass	-ve			-ve no FB (fibrosis)	G.A
5	Date Palm Spine	+ve			-ve no FB (fibrosis)	L.A
6	Not remembered	-ve			-ve no FB (fibrosis)	G.A
7	Glass	+ve			+ve Glass	S.A
8	Date Palm Spine	+ve			+ve Date Palm Spine	L.A
9	Wood splinter	+ve			+ve (Wood)	L.A
10	Date Palm Spine	+ve			+ve Date Palm Spine	G.A
11	Date Palm Spine	?			+ve Date Palm Spine	G.A
12	Glass	+ve			+ve Glass	G.A
13	Wood	+ve			+ve (Wood)	G.A
14	Date Palm Spine	+ve			+ve Date Palm Spine	L.A
15	Date Palm Spine	+ve			+ve Date Palm Spine	L.A
16	Wood splinter	+ve			+ve (Wood)	L.A
17	Wood splinter	+ve			+ve (Wood)	L.A
18	Date Palm Spine	+ve			+ve Date Palm Spine	L.A
19	Date Palm Spine	+ve			+ve Date Palm Spine	L.A
20	?	?	Not done Preg.		+ve (Wood)	L.A

The temptation to remove the non radio-opaque foreign body by simply pulling it out of the wound must be resisted because this may leave a small fragment behind which lead to serious complications and increase patient morbidity[7]. In our study 7 out of 15 cases who had previous failed intervention had such habit for removing foreign body. While removing non radio-opaque 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 of 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].

In conclusion, non radio-opaque foreign bodies are common in children and adults most often presenting as penetrating injury to the extremities. If not removed completely may cause serious complications. Failure to diagnose it has emerged as a common cause of malpractice lawsuits. 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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