Med. J. Cairo Univ., Vol. 62, No. 3, September (Suppl.): 265 - 268, 1994.

616-07

Role of Ultrasound in the Detection of Non-Radioopaque Foreign Bodies

AHMED M. OUF, M. D.; SALAH EL DIN KORYEM, M. D.;
MOHAMED. F. ABD EL MOOTY, M. D. and
IBRAHIM M. GHONIEM, M. D.

The Radiology Department, Faculty of Medicine, Al-Azhar University.

Abstract

Twenty five consective ultrasounds in patients harbouring non-radiopaque foreign body was made to establish the value of this procedure. Ultrasound detected 21 of 22 foreign bodies found at operation. Three false positive examinations were also performed.

Introduction

THE detection and localization of non-radiopaque foreign bodies in soft tissues is a recurring problem in Accident and Emergency Department, frequently resulting in unfruitful exploratory procedures.

The role of ultrasound for investigation of such patient and to establish its senstivity, specifity and predivctive value is clarified in this study.

Material and Methods

25 patients, aged 16-78 years were refferred from accident and emergency departments with clinical suspecion of a non-radiopaque foreign body, between August 1991 and May 1993. All patients had done soft tissue radiographs of the desired area and proved to be useless.

Ultrasound was performed at all cases using a real time, 3.75 MHz, sector

scanner. All ultrasounds were done hy the same radiologists.

Results

Ultrasounds (US) detected foreign body in 21 patients (84%) all underwent operation where foreign hodies were found and removed. Sizes varied from few mm to few cm. It failed to distinguish one case. Three more cases failed to be distinguished surgically and thus three false positive examinations were done.

Ultrasound findings:

In all cases the foreign body demonstrated was a bright hyperechoic foci and was best imaged with the scan plane parallel to the long axis of the foreign body, an acoustic shadow was seen in 52% of all cases.

Wood produced an acoustic shadow in 10 out of 18 cases (55%).

Table (1): Analysis of Positive Ultrasound Findings Confirmed at Operation.

Nature of F. B.	No. of cases	acoustic shadow	Artifact
Wood	18	10	0
Gause	5	2	0
Glass	2	0	1
Total	25		

A lost operative gause produced acoustic shadow in 2 out of 5 cases (40%).

A hyperechoic tail artefact was found in a glass foreign body out of 2 cases.

The nature of foreign bodies and their US appearance are summerised in table 1.

Discussion

This study has shown that high resolution ultrasound is a reliable method for detecting and localising position of F. B. in tissues and extermities. However, the examination is operator dependant and considerable time is sometimes required.

All foreign bodies were visualized as bright hyperechoic foci, in agreement with previous reports [1]. The acoustic shadow has also been reported in experimental models [2]. In our study the quality of acoustic shadow varied, being more obvious when the long axis of F. B. is parallel to the scan plane and lies within focal zone of the transducer.

Sometimes hypoechoic area surrounding the foreign body has been documented [3] and probably represents inflammatory tissue or pus. F.B. producing this appearance usually had been presentable by longer period of time.

The hyperechoic tail artefact seen in the patient with glass foreign body is thought to be due to reverbations inside the dense echogenic material and has been reported with metal objects and glass objects.

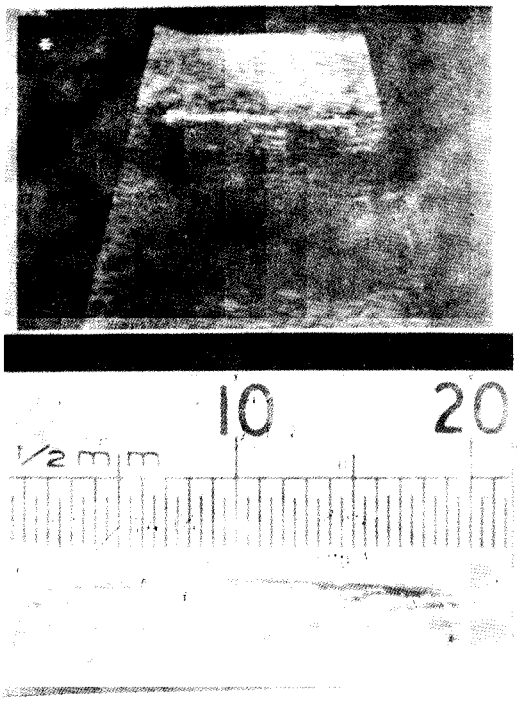

Fig. (1): (a) 1.9 cm bright echogenic area with acoustic shadow.
(b) Wooden splinter found after exploration.

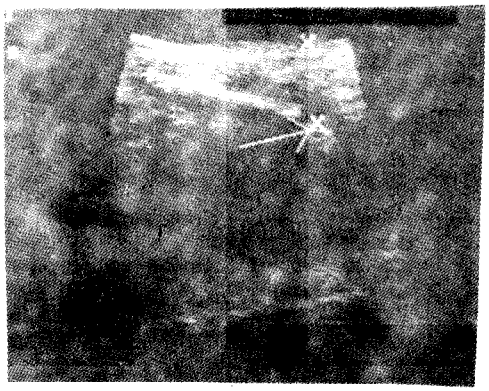

Fig. (3): 8cm linear bright echogenic area with surrounding hypoechoic area representing inflammatory tissue. No acoustic shadow.

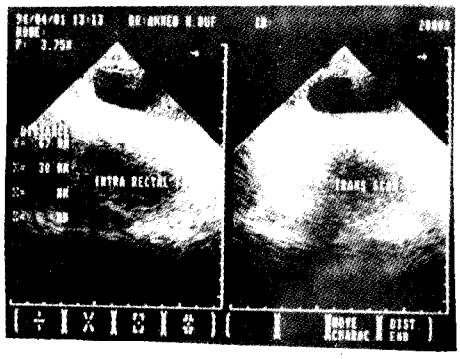

Fig. (2): A bright hyperechoic gause with broad acoustic shadow, behind anterior wall of rectum, distracted from anal orifice.

Fig. (4): 2mm bright echogenic focus (arrow) in the sole of foot with reverbation artefact due to glass fragment.

The importance of US as a diagnostic tool is highlighted by the fact that patients were referred only when there was a strong clinical suspecion of nonradio-opaque F. B. Since they frequently cause severe inflammatory reaction, their recognition and removal is important.

Although metal and glass objects may be radio-opaque still US has a useful role as it can be used to describe the exact location of F. B. This reduces operative time and post operative morbidity [4] .

Conclusion:

High resolution ultrasound is a valuable aid in the detection and localisation of non-radio-opaque foreign bodies with a high senstivity and specificity. It should be performed prior to surgical exploration. The typical sonographic appearances of foreign bodies were discussed, surrounding hypoechoic area suggests evidence of inflammation.

References

1. FORNAGE, B. D. and SCHERNBERG. E. L.: Sonographic diagnosis of F. B. Am. J. Roentgenol., 141, 65-67, 1986.

2. FORNAGE, B. D. and SCHERNBERG. E. L.: Sonographic pre-operative localisation of F. B. J. Ultrasound Med., 6, 217-219, 1987.

3. ANDERSON, A. M., NEWMEYER II, W. L.: Diagnosis and treatment of reained F. B. in extremities. Am. J. Surg., 144, 63-67, 1989.

4. GOODING, G. A. W., HARDIMAN T., SUMERS M.: Sonography of hand and foot in F. B. detection J. Ultrasound Med., 6, 411-447, 1987.