The Use Of Radiopaque Markers in Examinations for Foreign Bodies

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I have no affiliation, financial or otherwise, with a pharmaceutical, medical device, or communications organization.
Introduction/Background

- Radiopaque markers have long been used to delineate the site of a penetrating wound, and have been shown to help localize foreign bodies or identified associated injury.¹

- Penetrating injury can be a significant cause of morbidity and mortality in the acute setting.

- Small, missed foreign bodies may result in infection or chronic pain.
Advantages With CT

- In many cases, internal trajectory of a deeply penetrating wound is difficult to follow on CT, but it has been demonstrated that the use of wound markers has elucidated the path of bullets in gunshot cases.\(^2\)

- Delineation of the trajectory of penetrating wounds is important not only to assess for internal injury, but allows for planning of surgical approaches.\(^2\)
Advantages With Radiography

- Important in initial assessment, where depth of penetration, and internal trajectory and injuries, are difficult to assess by physical exam.²

- Multiple methods have been devised to confidently localize the path of a penetrating foreign body on plain radiography.²,³

- Plain radiographs are routinely obtained as part of the initial management in penetrating injury cases.
Advantages With Radiography

- Entry wound markers also improve the accuracy of often poorly-recorded trauma documentation.
- This can have medicolegal implications.
Disadvantages?

- Very few!

- Fear markers might be left on patients prior to CT or MRI studies.

- Otherwise, the materials needed are not expensive, and the time loss involved is negligible.
No definitive requirement in the protocols for the use of landmarks in penetrating trauma/foreign body studies; inclusion of a marker has been a decision up to the emergency department, the technologist, or by specific request of the radiologist or resident.
Aim Of The Audit

■ To assess the frequency of radiopaque marker placement in foreign body or penetrating injury cases (x-ray or CT) by imaging technologists in our radiology department at the University of Alberta Hospital.
Methods

- Foreign body/penetrating injury cases were gathered prospectively over a period of two months. The studies were examined for the presence of any form of a radiopaque marker.

- Ingested foreign body cases were excluded.

- Serial examinations on the same case were considered.
Standard

- Target: 95% of cases examined should contain a radiopaque entry point marker.

- Given the relatively few disadvantages of using markers, a high target percentage was selected.
Results/Data

- A total of 36 studies (26 radiographs, 10 CT studies) were collected.

- A variety of types of studies: Chest, MSK, Neuro, Peds, with a variety of injuries: stabbings, gunshot wounds, glass, nails

- Only 4 contained an entry wound marker (target not met)
The four cases that contained a marker: three radiographs for nails or glass, and a single CT chest for a stabbing.

Eleven studies for stabbings and seven for gun shot wounds had no markers.

4 CT studies for gun shot wounds had no markers
Recommendations

- The action plan is primarily educational, including discussing the results of this audit with technologists and the technologist education lead.

- The availability and visibility of markers in the department will be addressed: markers should be easily accessible and readily available, unlike they are now.
Recommendations

- A repeat audit is being performed, with temporary standardized procedures in place for its duration. These address:
  - What types of cases should require a marker
  - Positioning of markers
  - Removal of markers

- The results will again be examined, and if the interventions are successful, a permanent change to protocols will be proposed.
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