This case involved an unsuspected massive oesophageal rupture following sclerotherapy and inflation of the Sengstaken-Blakemore tube. It is an unusual case, as massive rupture occurred in the thoracic part of the oesophagus, whereas oesophageal rupture usually involves the lower oesophagus.[2] Tube insertion was easy and there was no associated retching or vomiting as in the above mentioned case.[2] Factors precipitating oesophageal rupture in this case could have included sclerotherapy and repeated endoscopy, contributing to the weakening of the oesophageal wall which was subsequently ruptured by inflation of the gastric balloon in the oesophagus. The Sengstaken-Blakemore tube was inserted and the gastric balloon inflated without confirming the position with chest radiographs.

Inflation of the gastric balloon in the oesophagus is one of the factors leading to oesophageal rupture, and it has been suggested that the position of the Sengstaken-Blakemore tube should be checked with a chest radiograph before the balloon is inflated.[3]

In this case, a large rupture of the oesophagus into the right mediastinum, with the resulting lung compression by the gastric balloon of the Sengstaken-Blakemore tube, was not suspected, as the clinical features were thought to be due to ongoing haemorrhage. The diagnosis of the oesophageal rupture became obvious only on the basis of the chest *x* ray which was done several hours after inflation of the gastric balloon.

This case illustrates an unusual fatal complication of sclerotherapy and oesophageal tamponade with the Sengstaken-Blakemore tube. It shows the importance of radiography in checking the position of the tube before and after inflation of the gastric balloon, to ensure that the balloon is not inflated in the oesophagus. Timely use of chest radiographs will not only prevent accidental inflation of the gastric balloon in the oesophagus but will also detect dislocation of the balloon proximally to the oesophagus.

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Heterotopic bone formation within a missile track

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Abstract

A case is presented which is thought to be the first described example of heterotopic ossification occurring within the path of a bullet. Although the information was not available from prior medical records, the bullet presumably passed though bone or periosteum, thereby seeding the permanent cavity and facilitating ossification within the surrounding muscle and soft tissue.

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Key terms: heterotopic ossification; bullet wound

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Heterotopic ossification following blunt or operative trauma has been well described in published reports. The development of ectopic lamellar bone was recognised over a century ago when Binnie noted calcium deposition and stroma within muscular tissue.[1] Myositis ossificans, or ectopic bone formation originating in muscle, represents the most common type of heterotopic ossification. It typically occurs in an active person and may follow a single blunt force to an extremity.[2] Ossified haematomas have also been described.[3] Heterotopic ossification may also occur in areas exposed to repeated trauma, such as the ischial area in horseback riders or in the shoulder in field marksmen. There are various clinical situations, each with specific aetiologies, which have led to ectopic bone formation, and although the pathogenesis is uncertain, the entity is well described.[4–7] The following case represents an unusual cause of pathologic bone formation – from penetrating trauma to the lower extremity.

Case report

While crossing a street, a 28 year old black male was struck on the left hip/flank by an automobile that was making a right hand turn. The patient was brought to the Loyola University Medical Center trauma unit by local paramedics. He arrived on a stabilising backboard and wearing a cervical collar. The patient denied loss of consciousness and was alert and well oriented. He was haemodynamically stable and afebrile. He complained most significantly of left upper, inner thigh pain. The patient held his left lower extremity with the knee in near complete flexion and his hip partially abducted and fully flexed.

On physical examination he was noted to have a palpable hard mass beneath the skin of

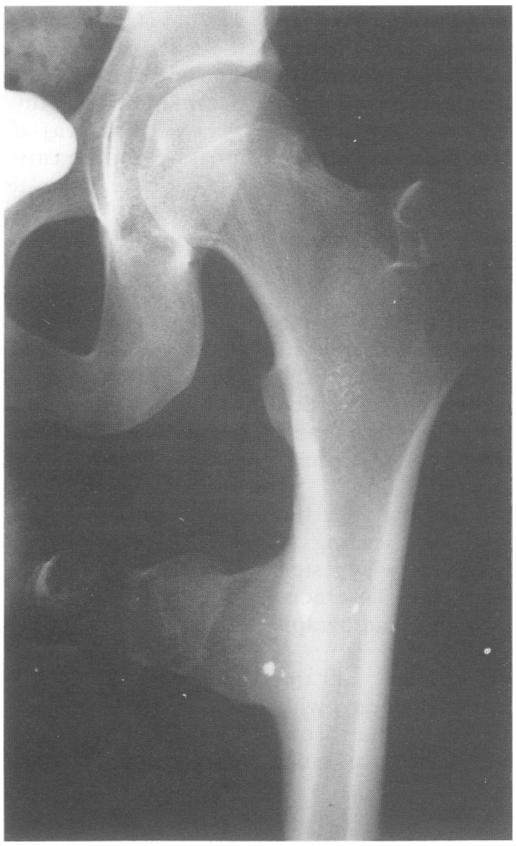

Figure 1 Anterior-posterior view of the acetabulum showing ossified missile track

Figure 2 Oblique view of the ossified missile track. Note fracture through the ectopic bone

the proximal, medial thigh near the groin that felt like bone. Extremity neurovascular examination was normal. With some difficulty secondary to discomfort the patient was able to straighten his left leg. Following this manoeuvre the hard mass would roll beneath the skin and disappear into thigh muscle mass, only to reappear with hip and knee flexion. The patient stated that he had never felt the protuberance before.

Past history was significant in that he had had a gun shot wound to the left thigh nine years previously. The bullet had passed from the lateral aspect of the leg medially and exited the upper medial thigh to enter the scrotum.

Radiological evaluation of the tender pelvis and thigh region showed heterotopic calcium deposition along the bullet tract arising from and affixed to the proximal femur (figs 1 and 2). Fracture through the ectopic bone was seen on oblique views when the thigh was held in abduction. This may explain the acute onset of pain. No other skeletal abnormalities were identified. After thorough further evaluation the patient was given crutches and discharged to home from the emergency department with appropriate follow up.

Discussion

Idiopathic heterotopic ossification refers to the pathological formation of osseous tissue or true bone within extraskeletal tissue. Such pathological bone formation has been identified in old laparotomy scars[8] and within the subcutaneous tissues following median sternotomy.[9] Although rare, such occurrences are well recognised and have been documented previously in published reports. The most plausible theory to explain these phenomena involves injury to local skeletal structures, with seeding of periosteal or perichondrial cells into ectopic tissue planes. Another possible explanation is that localised trauma induces metaplastic change of multipotent connective tissue cells into osteogenic cells which then lay down stroma and calcify.[8] Ectopic ossification has also been found to develop around the joints of immobile paraplegic patients,[10] following total hip arthroplasties,[11] within healed burn wounds,[12] and in areas of haematomas or where repeated soft tissue trauma has occurred.[13] It is important that a distinction be made between these benign ossifying entities and various malignancies which are associated with calcium deposition.

The case presented here represents, to our knowledge, the first case of heterotopic ossification occurring within the path of a bullet. Although the information was not available from previous medical records, presumably the bullet passed though bone or periosteum, thereby seeding the permanent cavity and facilitating ossification within the surrounding muscle and soft tissue.

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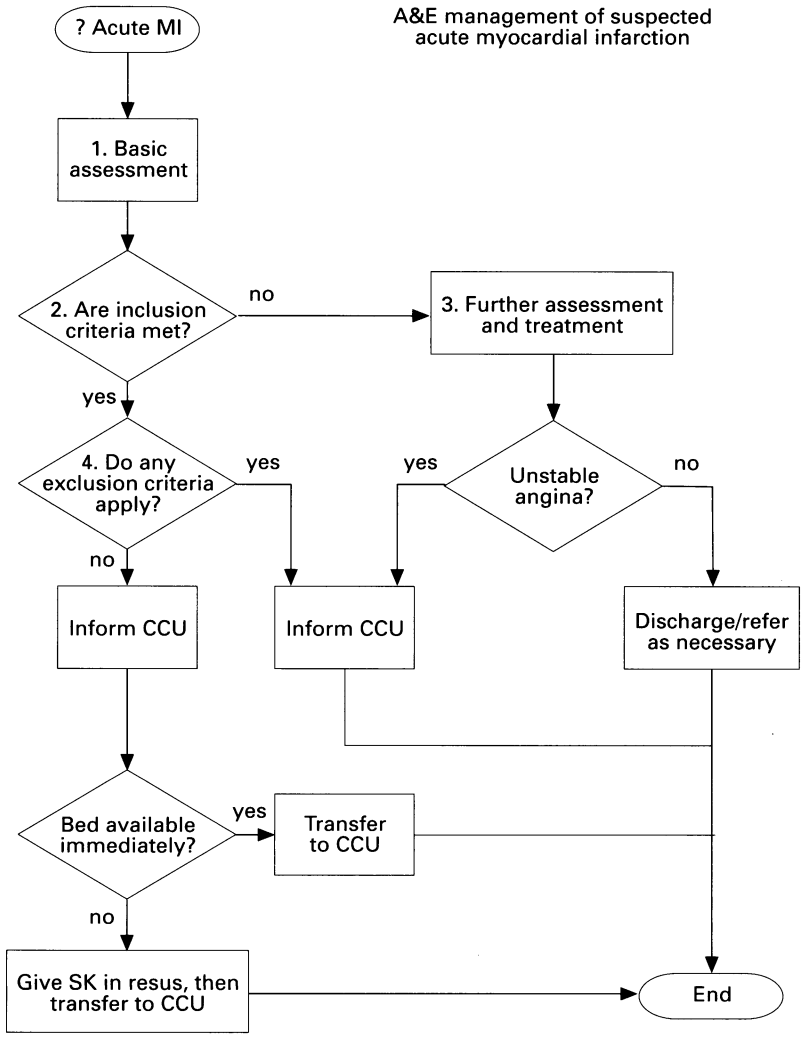
LETTERS TO THE EDITOR

Thrombolysis in accident and emergency

EDITOR,—There now convincing data showing the benefit of thrombolytic treatment in acute myocardial infarction, and that benefit declines if this treatment is delayed.[1] There are, as Zoltie discussed,[2] problems identifying in accident and emergency (A&E) patients likely to benefit from thrombolysis and ensuring it is not delayed.

Audit revealed undesirable delays in thrombolysis in this hospital (despite a "fast track" referral system to cardiology) due to the very high bed occupancy rate in the coronary care unit. One approach to expediting thrombolysis is for A&E doctors to initiate it.[3] Before starting such a system we felt it important to establish whether the doctors' diagnostic accuracy was sufficient to allow safe and effective use of thrombolysis. We report the findings of a study that addressed this.

An algorithm was developed by cardiology and A&E (figure). Its aim was to encourage early thrombolysis in cases where benefit was most likely, but to encourage referral in less clear cut situations. The algorithm was distributed (with explanation and discussion) to A&E staff, who then used it in a "dry run". Patients with suspected myocardial infarction were referred to cardiology in the usual way, but the A&E doctor stated whether they felt thrombolysis was indicated. The diagnostic accuracy of A&E was assessed using subsequent management by cardiology as the gold standard.



Management of suspected acute myocardial infarction in accident and emergency.

Management of patients with suspected myocardial infarction in A&E

		Eligibility for thrombolysis		
		Yes	*No*	*Total*
CCU	Yes	10	3	13
	No	0	24	24
	Total	10	27	37

CCU, coronary care unit.

Complete data were available for 37 patients (table). The level of agreement between the two specialties was high ($\kappa = 0{\cdot}81$). The overall accuracy of A&E was 92% (95% confidence interval 78% to 98%), the sensitivity was 77% (46% to 95%), and the specificity was 100% (86% to 100%).

These data suggest that A&E doctors can identify patients requiring thrombolysis. It is planned to start A&E thrombolysis in this hospital, coupled with regular audit of diagnostic accuracy. While these results cannot necessarily be extrapolated, other units might find carrying such audit helpful, to ensure accuracy and safety if they already use thrombolysis, and to prompt changes if they do not.

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Teaching advanced life support skills

EDITOR,—We read with interest the recent paper by Hall *et al*[1] concerning the teaching of advanced life support skills.

We have conducted similar courses for four years, under the auspices of the North West Thames Audit Group. This comprises the