(1) The simple technique and the lack of specific cardiothoracic instruments or expertise.

(2) The fact that spontaneous motor activity and evidence of cerebration may occur in these patients once cardiac output is restored.

(3) Patients should be triaged to this procedure as a large number of non-survivors will lead to a lack of confidence in the procedure—we should aim not to exclude any cardiac tamponades.

I agree with the authors that 30 minutes is a long time to be without cardiac output. The ideal of 10 minutes from time of arrest is certainly where we should aim but response times and lack of reliable timing of arrest in some circumstances may make this an unobtainable goal. Asystole is not a uniform predictor of death/disability but its presence is certainly associated with a significantly worse outcome and thoracotomy in this group will lead to a large number of non-survivors.[2] Evidence in this area is very limited. Initially evidence from the HEMS group said there was no value in prehospital thoracotomy,[3] this view point has now changed.[4] We must keep an open mind and continue to consider how penetrating injury is best managed.

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Use of emergency department ultrasound in the diagnosis and early management of femoral fractures

We describe two cases illustrating the use of bedside ultrasonography in the trauma room, to confirm femoral fracture, and to guide accurate placement of femoral nerve block.

Case 1

A 13 year old boy was brought to the emergency department (ED) by ambulance. He was undergoing leg lengthening surgery and had an external fixation device attached to his left femur. He had fallen onto his left knee at school, with subsequent pain and inability to bear weight. There was a tender swelling over the lateral supracondylar area of his left femur, with severe pain on minimal movement. Bedside ultrasonography in the ED was used to confirm the clinical suspicion of a distal femoral fracture. Ultrasonography was then used to image the anatomy of the femoral vessels in the left groin permitting identification of the correct location for placement of a femoral nerve block.

Case 2

A 39 year old female pedestrian was brought to the ED by ambulance having been struck by a car while crossing a road. She was alert and complained only of pain above her right knee. Her vital signs were stable. After major truncal injury had been excluded, including the use of focused assessment by sonography in trauma (FAST), ultrasound imaging was used to confirm a distal femoral fracture (fig 1). The patient complained of severe pain despite large doses of morphine. Again ultrasound was used to locate the correct position for femoral nerve block (fig 1) providing sufficient analgesia to permit application of a traction splint and subsequent transfer for definitive radiographs.

Bedside ultrasonography is being used increasingly by emergency physicians and trauma surgeons in the ED. The FAST scan has become common practice in many trauma centres and has been shown to be accurate in detecting intraperitoneal haemorrhage.[1] The use of ultrasound in the diagnosis of long bone fracture in pregnancy has also been described.[2] Although ultrasound has been used to guide placement of regional nerve blocks electively,[3] there are no reports of this use in the ED setting.

The cases presented illustrate how ultrasound can be used to help confirm the clinical suspicion of long bone fracture in the trauma or resuscitation room. Often the trauma patient may be haemodynamically too unstable for transfer to the radiology department, or there may be delays in obtaining limb radiographs. Confirmation of femoral fracture permits early planning for traction splint application and contributes to the resuscitative process.

The accurate placement of a femoral nerve block in this clinical setting also offers significant benefits for the patient. The traditional method of using a nerve stimulator to locate the femoral nerve can be extremely painful for the awake patient with a femoral fracture (personal observation), yet the blind introduction of local anaesthetic into the femoral region risks ineffective nerve block. Ultrasound offers a non-invasive, painless method of identifying the local anatomy, specifically the femoral vein and artery. The introduction of local anaesthetic lateral to the femoral artery can then be visualised directly, increasing the likelihood of effective block.[3]

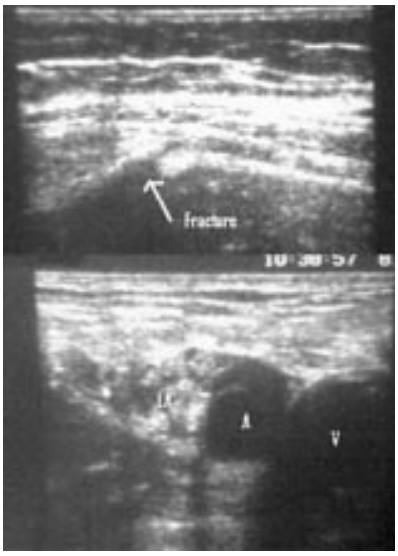

Figure 1 Sonograms demonstrating distal femoral fracture (top); and outlining femoral vein (V), femoral artery (A), and demonstrating introduction of local anaesthetic (LA) around femoral nerve (below).

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Transthoracic echocardiography during cardiac arrest due to massive pulmonary embolism

I read with interest the case report by MacCarthy *et al*[1] describing the use of transthoracic echocardiography during cardiac arrest due to massive pulmonary embolism (PE). Such cases raise the question of whether thrombolysis could be used routinely during all non-traumatic cardiac arrests, not just those known to be caused by PE.

Up to 70% of cardiac arrests have thrombosis (PE or myocardial infarction) as their underlying cause.[2] Thrombolysis is of verified therapeutic benefit in both these conditions. Bottiger has prospectively studied administration of recombinant tissue plasminogen activator (r-tPA) in patients suffering out of hospital cardiac arrest.[2] Compared with controls, patients who received thrombolysis were significantly more likely to have return of spontaneous circulation and survive to admission to a coronary intensive care. There was no significant difference in survival to discharge, although numbers were very small. Several retrospective studies of out of hospital arrests of all causes have shown similar results.

Administration of thrombolysis not only treats the direct cause of the cardiac arrest, but it has also been shown to improve blood flow in the microvascular circulation of the brain during the post-arrest period.[3] This may account for the excellent neurological status of the survivors in several of the studies.

With the introduction of single bolus thrombolytic agents, administration of thrombolysis during cardiac arrest would be a rapid, simple procedure. On the basis of the current evidence however, thrombolysis could not be recommended as a routine treatment in all cardiac arrests, but it should be considered on a case by case basis by the arrest team leader. Large randomised controlled trials are needed to provide a definitive answer to this important clinical question. Such a study, led by Bottiger, is due to start in Germany later this year (2002) (personal communication) and its results are eagerly awaited.

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