Table 2

Author, date, country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Berrouschot <i>et al</i> , 1977, Germany	76 patients underwent PDT. In 41 patients, PDT was performed "blind". In 35 patients it was executed with simultaneous bronchoscopic monitoring.	Prospective study	The type and rate of complications of the two groups were compared. It looked into the incidence of complications in these two groups	1 death due to tension pneumothorax in the group where PDT was performed "blind". No incidence of pneumothorax/ pneumomediastinum/ malposition of tube, where PDT was under bronchoscopic guidance	Small number of patients in group
Beiderlinden <i>et al</i> , 2002, Germany	136 bronchoscopy guided PDTs were performed on mechanically ventilated patients in ICU.	Prospective study	Postoperative pneumothorax or pneumomediastinum or malposition of tube	No patient had postoperative pneumothorax, pneumomediastinum or malposition of tube	Small number of patients in group
Datta <i>et al</i> , 2003, USA	60 medical/surgical ICU patients who underwent PDT under bronchoscopic visualisation, for persistent ventilator dependence	Retrospective chart review	Operative complications detected on CXRs	In 2 of the 60 patients (3.3%) complications were detected on the post-procedure CXRs. One with a pneumomediastinum and the other with a tension pneumothorax	Retrospective review of CXRs in a small patient group
Polderman <i>et al</i> , 2003, Netherlands	174 critically ill patients in the ICU who underwent bronchoscopic guided PDT	Prospective study	Postoperative pneumothorax or pneumomediastinum or malposition of tube	No patient had postoperative pneumothorax, pneumomediastinum or malposition of tube	Small number of patients in group
Hoehne <i>et al</i> , 2005, USA	73 patients underwent bronchoscopy guided PDT. The majority of the tracheostomies were in trauma patients who needed prolonged ventilatory support	Retrospective chart review	Operative complications detected on CXRs	There were no complications identified on post-procedure CXR.	Retrospective review of CXRs in a small patient group

CXR, chest x ray; ICU, intensive care unit; PDT, percutaneous dilational tracheostomy.

Search outcome

Altogether 393 papers were found, six of which were relevant to the three part question (table 2).

Comment(s)

The study of Hoehne *et al* and Datta *et al* are retrospective, so the evidence base is limited. Although all these six studies are based on small numbers of patients, it is apparent that all these studies unanimously agree on the following point. There is no benefit in doing routine chest x rays to rule out immediate postoperative complications like pneumothorax, pneumomediastinum and malposition of tube, following bronchoscopy guided PDT.

► CLINICAL BOTTOM LINE

At present there is no clinical evidence to support routine post-procedure chest x ray following bronchoscopy guided percutaneous dilational tracheostomy. But a larger study may be required to answer this definitively.

Berrouschot J, Oeken J, Steiniger L, *et al*. Perioperative complications of percutaneous dilational tracheostomy. *Laryngoscope* 1997;107:1538–44.

Beiderlinden M, Karl Walz M, Sander A, *et al*. Complications of bronchoscopically guided percutaneous dilational tracheostomy: beyond the learning curve. *Intensive Care Med* 2002;28:59–62.

Datta D, Onyirimba F, McNamee MJ, *et al*. The utility, of chest radiographs following percutaneous dilational tracheostomy. *Chest* 2003;123:1603–6.

Gambale G, Cancellieri F, Baldini U, *et al*. Percutaneous dilational tracheostomy. Early and late complications and follow-up. *Minerva Anestesiol* 2003;69:825–30;830–3.

Polderman KH, Spijksstra JJ, de Bree R, *et al*. Percutaneous dilational tracheostomy in the ICU: optimal organization, low complication rates, and description of a new complication. *Chest* 2003;123:1595–602.

Hoehne F, Ozaeta M, Chung R, *et al*. Routine chest X-ray after percutaneous tracheostomy is unnecessary. *Am Surg* 2005;71:51–3.

Using the ultrasound compression test for deep vein thrombosis will not precipitate a thromboembolic event

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Abstract

A short cut review was carried out to establish whether patients with deep vein thrombosis (DVT) are at risk of embolism

during ultrasound compression testing. No papers were found that directly answered the clinical question. The clinical bottom line is that currently there is no evidence to suggest that compressing vessels in order to identify a DVT could cause an embolic event. Therefore we can consider ultrasound assessment a safe reliable investigation for the diagnosis of DVT with no evidence of causing harm.

Three part question?

In [patients with a DVT presentation in the emergency department] can [the ultrasound transducer compression test] [precipitate a thromboembolic event?]

Clinical scenario

A 47-year-old woman presents to the emergency department with left calf pain which came on suddenly, making walking difficult. Typical DVT risk factors are present and the examination is consistent with this. Being proficient with the portable ultrasound unit you decide to perform a "rule-in" compression test of the vasculature in the left leg. However, a colleague challenges this decision, questioning whether the test itself could cause an embolus when compressing the thrombus. You therefore wonder if there is any evidence for this adverse effect, in which case you would prefer to start anticoagulation without this information and defend your diagnosis on clinical grounds.

Search strategy?

Medline In-process and other non-indexed citations and Ovid Medline 1950–May Week 1 2007 using the Ovid interface, and EBM Reviews—Cochrane Central Register of Controlled Trials 2nd Quarter 2007, and EBM Reviews—Cochrane Database of Systematic Reviews 1st Quarter 2007, using the Ovid interface: [(deep vein thrombosis.mp.) OR (DVT.mp.) OR (thromboembolism.mp.) OR (thrombo-embolism.mp.)] AND [(compression tes\$.mp.)] AND [(contraindica\$.mp.) OR (detrimen\$.mp.) OR (deleterious.mp.) OR (precipitate) OR (thromboembolism.mp.) OR (thrombo-embolism.mp.)].

Search outcome

Altogether 0 papers were found in Medline, 0 papers were found in the Cochrane Central Register of Controlled Trials 2nd Quarter 2007 and 0 papers were found in the Cochrane Database of Systematic Reviews 1st Quarter 2007. Additionally a PubMed search [compression test, DVT, embolism, risk] yielded 0 relevant papers.

Comment(s)

The lack of evidence in this area is not surprising as a controlled clinical trial would be unlikely to gain ethical approval. However this presents the clinician with the all-too-familiar situation of wondering whether or not they should use this particular investigation. Published work advocates a focussed ultrasound technique as the 'Gold Standard' in identifying DVT. It is becoming an increasingly popular technique in the Emergency and Acute Medical Departments. However, clinicians should give due consideration to the fact that compression sonography for possible DVT has not been evaluated against any risk of causing clinically significant emboli. This information is desirable for accepted good clinical practice.

► CLINICAL BOTTOM LINE

Currently there is no evidence to suggest that compressing vessels in order to identify a DVT could cause an embolic event. Therefore we can consider ultrasound assessment a safe reliable

investigation for the diagnosis of DVT with no evidence of causing harm.

Prophylaxis of venous thromboembolism in patients with lower limb plaster cast immobilisation

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A short cut review was carried out to establish whether patients with lower limb plaster cast immobilisation require venous thromboembolism (VTE) prophylaxis. Nineteen papers were found, of which four were relevant. The clinical bottom line is that for patients requiring lower limb plaster cast immobilisation for injury (fractures and soft tissue), there is evidence supporting the use of low molecular weight heparin (LMWH) as thromboprophylaxis for venous thromboembolism.

Three part question

In [patients with leg injuries requiring lower limb plaster cast immobilisation] is [low molecular weight heparin] necessary to [prevent venous thromboembolism?]

Clinical scenario

A 48-year-old man attends the emergency department with pain and swelling in his right calf after a game of squash. Clinical examination supported by ultrasound identifies a partial rupture of the Achilles tendon. You decide to treat him with an equinus plaster cast and arrange follow up. You wonder whether you should prescribe LMWH for venous thromboembolism prophylaxis for the duration of immobilisation in the cast.

Search strategy

Medline 1950 to week 4 August 2006 using the Dialog Datastar interface: ((casts) OR (casts-surgical#.de.) OR (plaster ADJ cast)) AND ((leg) OR (leg#.w.de.) OR (lower ADJ limb) OR (lower-extremity#.de.)) AND ((low ADJ molecular ADJ weight ADJ heparin) OR (heparin-low-molecular-weight#.de.) OR (lmw ADJ heparin) OR (lmwh) OR (thromboprophylaxis)) AND ((deep ADJ vein ADJ thrombosis) OR (venous-thrombosis#.de.) OR (venous ADJ thromboembolism) OR (thromboembolism#.w.de.) OR (pulmonary ADJ embolism) OR (pulmonary-embolism#.de.)) LIMITED to human AND English.

EMBASE using the Dialog Datastar interface 1950 to week 4 August 2006: ((cast) OR (plaster ADJ cast) OR (plaster-cast#.de.)) AND ((leg) OR (leg#.w.de.) OR (lower ADJ limb) OR (lower ADJ extremity)) AND ((low ADJ molecular ADJ weight ADJ heparin) OR (low-molecular-weight-heparin#.de.) OR (lmw ADJ heparin) OR (lmwh) OR (thromboprophylaxis)) AND ((deep ADJ vein ADJ thrombosis) OR (deep-vein-thrombosis#.de.) OR (venous ADJ thromboembolism) OR (venous-thromboembolism#.de.) OR (pulmonary ADJ embolism) OR (lung-embolism#.de.)) LIMITED to human AND English