

# LETTERS TO THE EDITOR

## Management of pulmonary embolism

In the diagnostic algorithm offered by Drs H Gray and S Firoozan (October 1992;47:825-32) for the management of pulmonary embolism, pulmonary angiography was the investigation of choice following an intermediate probability lung scan or a low probability scan when a high clinical suspicion of embolism remained. Rightly or wrongly, it is a fact that most clinicians will not refer patients for pulmonary angiography under these circumstances,<sup>1</sup> probably because the investigation is mistakenly perceived as dangerous and is not routinely available in the majority of hospitals in this country.<sup>2</sup> Even in centres where pulmonary angiography is available, only an average of four angiograms are performed each year.<sup>3</sup>

There is now a growing body of evidence that attention can turn instead to investigation of the proximal veins of the legs (the source of embolism in the vast majority of cases) if the ventilation perfusion lung scan gives an equivocal result. If venography or non-invasive studies such as Doppler ultrasonography or impedance plethysmography are negative, the chances of subsequent embolism are small.<sup>3</sup> This pragmatic approach may have more widespread acceptability than advocating pulmonary angiography for every intermediate probability lung scan. If the diagnosis remains in doubt following these investigations angiography must remain an option.

One further point that was not emphasised by the authors is that full anticoagulation with heparin should be commenced as soon as the diagnosis of pulmonary embolism is suspected clinically, without waiting for the results of lung scans. Anticoagulation can then be stopped or continued once the results of ventilation perfusion scanning are known.

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- 2 Cooper TJ, Hayward WJ, Hartog M. Survey on the use of pulmonary scintigraphy and angiography for suspected pulmonary thromboembolism in the UK. *Clin Radiol* 1991; 43:243-5.
- 3 Hull R, Hirsh J, Sackett DL, Taylor DW, Carter C, Turpie AGG, et al. Replacement of venography in suspected venous thrombosis by impedance plethysmography and 125-I fibrinogen leg scanning: a less invasive approach. *Ann Intern Med* 1981;94:12-15.

We noted the recent article on the state of the art of management of pulmonary embolic disease reported by Drs H Gray and S Firoozan (October 1992;47:825-32). We disagree that "little may be gained from investigations specific to the deep venous

system" and suggest that the extent, location, and morphology of thrombosis are important in the management and assessment of the risk of embolisation.

We recently cared for an elderly man admitted to the intensive care unit because of nosocomial pneumonia and septic shock. Marked oedema of the entire lower left leg developed. Doppler ultrasound examination of the left leg revealed a partial (three quarters) occlusion of the common femoral and proximal superficial femoral veins; proximal extension of the thrombosis was not observed. Anticoagulation was started but, because of the large lower extremity thrombus and the risk of pulmonary embolism in this patient, elective placement of an inferior vena cava filter was planned. Venography showed a large pedunculated, free floating clot in the inferior vena cava just inferior to the renal veins and contiguous with the left iliofemoral thrombus. A Greenfield filter was placed in the suprarenal inferior vena cava via a transjugular approach.

The management of pulmonary embolism centres on an accurate diagnosis of deep venous thrombosis and prevention of massive pulmonary embolisation. Free floating iliofemoral thrombosis carries a high risk of pulmonary embolisation.<sup>1</sup> Radomski *et al* found pulmonary embolism in 50% of 26 patients with free floating inferior vena cava thrombi and subsequent development of pulmonary emboli in 27% of these 26 patients, despite adequate anticoagulation.<sup>2</sup> Extended indications for placement of an inferior vena cava filter include extensive thrombosis and high risk of cardiorespiratory compromise from a pulmonary embolism.<sup>3</sup>

We believe that evaluation of the proximal extension of venous thrombosis is necessary and that high risk patients may benefit from further studies to search for iliac and inferior vena cava thrombosis, including a free floating thrombus which would most certainly alter therapy.

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- 1 Norris CS, Greenfield LJ, Herrmann JB. Free-floating iliofemoral thrombus. A risk of pulmonary embolism. *Arch Surg* 1985; 120:806-8.
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- 3 Rohrer MJ, Scheidler MG, Wheeler B, Cutler BS. Extended indications for placement of an inferior vena cava filter. *J Vasc Surg* 1989;10:44-50.

**AUTHORS' REPLY** We are grateful to Dr Morrell and Professor Seed for their comments and have no disagreement with them. We agree that the main purpose of any investigation in the management of pulmonary embolism is to establish whether pulmonary embolism is likely to be the diagnosis or not. Clearly if pulmonary angiography is not available or if it is undertaken infrequently then more helpful diagnostic information may well be obtained by turning attention to the leg veins. The value of any investigation, whether it be on the leg

veins or the pulmonary circulation, will obviously depend on the perceived accuracy of the information obtained. If Doppler ultrasonography or impedance plethysmography is felt to provide accurate information in an institution, then information derived from these investigations will be useful. Where pulmonary angiography is undertaken more frequently this may be the investigation of choice.

We agree entirely that full anticoagulation with heparin should be started as soon as the diagnosis of pulmonary embolus is suspected, the only possible exception being where the clinical likelihood of pulmonary embolism is low and there is a relative contraindication to anticoagulation. However, the default should certainly be to anticoagulate the patient and await the results of investigations.

The case described by Shapiro and Albino is one of deep venous thrombosis where the perceived risk of pulmonary embolism was high, but in whom the clinical presentation was one of deep vein thrombosis rather than pulmonary embolism. Where a patient presents with symptoms or signs to suggest pulmonary embolism there is little to be gained from investigating the deep venous system in order to make the diagnosis, since almost all cases of pulmonary embolism will arise from peripheral venous thrombus formation. A separate issue is whether treatment specifically directed at the deep venous system, such as the insertion of an IVC filter, reduces the mortality or risk of further pulmonary embolism. IVC filters are commonly inserted in the USA but are much less commonly used in the UK. There is obvious attraction in the idea of inserting a device between the peripheral thrombus and the pulmonary circulation that might catch detached clot, but the evidence for IVC filters reducing morbidity or mortality associated with pulmonary embolism is scanty. For those patients at high risk of further emboli in whom anticoagulation is contraindicated, or in those who have recurrent emboli despite adequate anticoagulation, the case for IVC filter insertion is stronger.

The case reported by Shapiro and Albino reinforces a point made in our review article, namely that the value of investigation on the deep venous system depends on the experience of those undertaking the investigation and the limitation of technique. Doppler ultrasonographic examination of the left lower extremity showed no extension of the thrombosis into the IVC, and yet subsequent venography showed free floating iliofemoral thrombosis. For those clinicians who feel that there is a definite prognostic benefit from insertion of IVC filter devices in selected patients, it is obviously important to select the investigation that in their institution has the highest sensitivity and specificity.

Since the rate of recurrence of pulmonary embolism is remarkably low (around 5%) and it is rare for patients to die from further embolism after hospital discharge, we remain unconvinced that the routine investigation of the deep venous system contributes to the management of patients with pulmonary embolism.

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