Vena caval filters: keeping big clots down

Pulmonary emboli are usually unexpected, and research has concentrated on eliminating the source, deep vein thrombosis.¹ Once a deep vein thrombosis has developed we rely heavily on anticoagulation, even though evidence that this works is poor.² Surgeons have thus been attracted by the idea of trapping clots in the leg or pelvic veins, where they are no threat to life. After an unproductive flirtation with femoral vein ligation, vena caval occlusion was favoured for several years. As this prevented large pulmonary emboli the consequent swelling of the legs was tolerated despite the high morbidity and mortality of retroperitoneal operations in severely ill and anticoagulated patients. This policy was, however, misguided as we now know that multiple small pulmonary emboli may shower into the lungs via large collateral veins in 30-50% of patients.³

The current vogue for intraluminal filters began with the Mobin-Uddin umbrella (figure), which is passed under radiographic control via the internal jugular vein through the right atrium and lodged in the inferior vena cava below the renal veins.⁴ Blockage by a large embolus tends, however, to

The Mobin-Uddin filter (left) may be displaced from the inferior vena cava when a large embolus occludes the filter and causes distension. In the Kimray-Greenfield filter (right) emboli would be captured centrally and usually lyse without obstructing the inferior vena cava.

dilate the inferior vena cava and collapse the original 23 mm umbrella, occasionally causing disastrous displacement into the heart or pulmonary artery. The introduction of a heparin bonded 28 mm filter reduced this risk, but caval occlusion still occurred in about half of patients, leading to the expansion of collateral veins through which emboli could pass.⁴

These problems were solved by the ingeniously simple, though expensive (about £850), Kimray-Greenfield vena caval filter (figure). This resembles a spider with six stainless hairpin like legs forming a cone into which emboli may lodge without occluding blood flow. Large emboli force the

terminal hooks on these spring loaded legs deeper into the vein wall and prevent migration.⁵ As the embolus lyses no collateral veins develop, and blood from the legs continues to be filtered.⁶ Insertion via either the femoral or internal jugular veins has been eased by redesigned catheters from which the filter is ejected.⁷ Complications are few and usually result from inaccurate placement and occasionally from tears in the inferior vena cava. In 156 patients who either had a proved pulmonary embolus but were unable to take anticoagulants or who had recurrent emboli despite anticoagulation only 2% had further emboli after filter insertion; and in 148 the inferior vena cava was patent after two years.⁸

Although many thousands of these devices are placed in France and the United States, we do not know for certain when they should be inserted. Certainly they should not be inserted in all patients with pulmonary emboli as recurrence may be reduced to under 5% by anticoagulants alone.⁹ In my view, the main indication is proved pulmonary embolism despite adequate anticoagulation. A filter should also be inserted into a massive free floating clot in a large vein. Recurrent pulmonary emboli should be confirmed by looking for a change on a ventilation-perfusion scan or by pulmonary angiography. The source of emboli in the legs or pelvic veins must be determined by venography or by using indium-111 labelled platelets.¹⁰ The filter should then be placed immediately and long term anticoagulants continued where possible to protect inferior vena cava patency and control the original deep vein thrombosis. Although emboli smaller than 5 mm may slip through, I find it easier to sleep at night knowing that a clot big enough to swell a leg can no longer pass to the lungs.

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Telling patients about their medicines

Three out of four people consult their general practitioner each year; on average men visit him three times¹ and women more often. Two thirds of consultations end with the prescription of a medicine, and patients need to know certain things about the medicines if they are to derive maximum benefit.² Yet studies from North America and Britain have shown that patients' knowledge about their medicines is very limited.³⁻⁷

Doctors and pharmacists have a shared responsibility to

provide information about medicines,⁸ but both professions are busy and may forget. Furthermore, any verbal instructions may be forgotten, and patients may be confused by technical jargon.^{9,10} Many think that not enough is explained by doctors or pharmacists^{6,7} and would welcome more information. The Association of the British Pharmaceutical Industry (ABPI) has inquired into providing written leaflets, and after reviewing published evidence and consulting the royal colleges and allied faculties, numerous other professional bodies, and consumer groups it has recommended in a discussion document that printed leaflets should be provided with medicines. The definitive document will be available in the autumn.

If the recommendation is accepted various problems will need to be resolved. The first is the type of information to be given. Fortunately, a consensus exists that the information needs to be brief, concise, and comprehensible and should reinforce rather than replace that given by doctors and pharmacists. The items covered should include the name of the medicine, when and how to take it, side effects and what to do about them, precautions such as possible effects on driving, possible interactions with alcohol or other drugs, the purpose of treatment, and how long to take it.⁷ The leaflet might also cover what to do if a dose is missed, how to tell if the medicine is not working, and how to store the medicine safely and dispose of any left over.

The second problem is who should be responsible for writing the leaflets and keeping them up to date? The ABPI working party has concluded that it should be the manufacturer. There are, however, potential hazards in this recommendation as some manufacturers might attempt to include too much information to protect themselves against litigation. Others might use leaflets for advertising. The alternative might be that a professional organisation such as the British Medical Association or the Pharmaceutical Society of Great Britain could produce generic leaflets that could be adapted by each manufacturer. But, whoever undertakes this task, leaflets must be checked for readability as the average Briton has a reading age of only 9 years. Special leaflets may need to be prepared for those who do not speak English and the blind.

A third question is who should distribute the leaflets? It might be either the doctor or the pharmacist. Most patients do not mind who does it so long as they receive the information. Some doctors will prefer to distribute the leaflets themselves, but experience suggests that few will remember to do this routinely.¹¹ The working party considered that distribution by means of original pack dispensing would be the most reliable and economic method. In addition, it has recommended that a compendium of leaflets should be made available to doctors and pharmacists and for patients' reference. This compendium could contain additional, more detailed information on each product.

The ABPI discussion document also examines some legal and ethical implications of giving information to patients. Under the Medicines Act 1968 and the Medicines Leaflet Regulations 1977 this information must include "contraindications, warnings, and precautions" and be consistent with the product licence. Failure to have leaflets approved by the licensing authorities renders the manufacturers liable to criminal sanction. The existing regulations may encourage some manufacturers to put in too much information and therefore confuse many patients. One way of overcoming this problem might be to include a statement that "the information in this leaflet is limited; further details can be obtained from your doctor or pharmacist."

With these and other problems to be resolved doctors are bound to ask "Is it all worth it?" In my view the answer must be "yes." Patients expect more information than they receive now, and there is a clear need for it. Their knowledge about side effects is poor, and many do not swallow their tablets or capsules with either food or fluid. Furthermore, many patients do not know how to store their medicines safely or dispose of those that are left over.^{6,7} Studies have shown that knowledge of these items can be improved with written leaflets,¹² and for antibiotics compliance is enhanced.^{13,14} More importantly, patients' satisfaction with both the information they have been given and treatment in general is significantly improved.^{11,13} At a time when both public expectations and litigation are increasing these improvements in doctor-patient communication should be welcomed.

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Genetic engineering and corneal grafting

There are about 20 million blind people in the world, and the commonest cause of blindness is a scarred cornea, which can often be helped by a corneal graft; but a graft will remain transparent only if enough of its endothelial cells have survived to keep the cornea dehydrated. Now for the first time endothelial cells have been made to replicate in vitro by scientists using a recombinant epidermal growth factor.

Normally endothelial cells stop replicating after birth, and their numbers dwindle from about 5000/mm² at birth to half that number by the age of 40. The cells are frail, and both surgical manipulation and storage may destroy them: about a fifth die in most keratoplasties. If the number of cells falls to a quarter of the initial population then intractable corneal oedema results, and most surgeons are reluctant to use corneas more than a day or two after the donor's death.

The supply of donor eyes is limited and almost non-existent in most Third World countries, where the demand is greatest. The need for a reliable method of long-term storage has thus been great. Over 20 years ago Mueller *et al* first reported a satisfactory way of deep freezing corneal discs.¹