

policy for promoting child health must look both at screening for the rare disorders and at community interventions for the common ones. David Hall, professor of community paediatrics in Sheffield and convenor of the meeting, believes a body is needed with overall responsibility for public health in childhood; it would need to work jointly with the education service. Certainly the issues discussed at the meeting go well beyond the brief of the National Screening Committee. Meanwhile, we need a quick decision from the committee on newborn screening

for deaf children, who deserve a better deal than they are getting, and a thoughtful one on tandem mass spectrometry screening for metabolic disorders, before local policies change in a haphazard way.

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A full meeting report will be available from the National Screening Committee, c/o Child growth Foundation, 2 Mayfield Avenue, London W4 1PW (£15). A repeat session of the meeting will be held on 8 January 1998: fax 0181 995 9075 for information.

Ultrasound for the diagnosis of deep vein thrombosis: where to now?

A new protocol for diagnosis and treatment

In this issue Cogo and others from Italy, Canada, and the Netherlands describe using two ultrasound examinations a week apart in 1702 outpatients with suspected deep vein thrombosis of the leg to determine whom to treat (p 17).¹ Four hundred and twelve were diagnosed with thrombosis by this procedure; the rest were observed without treatment for six months. Nine of the untreated patients developed proof of thromboembolic disease during follow up: two had pulmonary embolism, fatal in one. Overall, fewer than 1% of patients presenting with possible deep vein thrombosis were missed with the authors' approach and only one (<0.1% of patients enrolled) paid with his life. Is the authors' protocol now ready for routine use? Is this the requiem for the venogram?

The protocol was straightforward. The authors used the least expensive type of ultrasound imaging: grey scale real time ultrasound. Doppler signals, manoeuvres to change venous flow, and colour were not used. While Doppler and colour technology are essential for measuring valvular regurgitation echocardiographically and certain other applications, they appear unnecessary in the authors' hands for identifying deep vein thrombosis requiring treatment.

The authors used full compressibility of the vein—that is, complete obliteration of the vein lumen as visualised on the ultrasound screen after pressure with the transducer probe—as the sole criterion for clot. They have previously validated this technique.² They compressed each leg at just three sites: the common femoral vein next to the artery at the femoral ligament, the popliteal vein next to the artery behind the knee, and the same vein about eight centimetres distal, where it trifurcates into smaller calf veins. These manoeuvres can be easily and quickly learnt, although interpretation of the result at the distal popliteal vein is tricky. The first two sites are readily identifiable but inclusion of the third site was a mixed blessing: it allowed detection of more thromboses (thereby reducing the need for follow up studies from two to one³), but caused false positive readings, reducing the specificity of the result and the positive predictive value of clot detection at this distal site. Failure of compressibil-

ity at the first two sites was proved to be thrombus by contrast venography 99% of the time but at the third site only 79% of the time. While some doctors may follow symptomatic distal popliteal vein clots for propagation before treating, many will anticoagulate. If these results are generalisable, about 20% of patients with abnormal compressibility limited to the distal popliteal vein will be falsely positive and unnecessarily subjected to anticoagulation. Fortunately, a compression ultrasound examination abnormal solely at this distal site was rare, occurring in only 23 (1.4%) patients.

Only 12 (3%) of the 412 patients with abnormal ultrasound examinations were picked up at the second test a week after presentation; by then, 400 patients with abnormal tests had already been identified. Is it worth bringing 1300 patients back to find thrombi in 12 (roughly 1%)? We think it is. A follow up visit a week after deep vein thrombosis is suspected is reasonable, and the consequences of missing those 12 patients' disease are worrisome. The cost of each ultrasound examination should not be high, far less than that of venography or empirical anticoagulation.

The study results appear valid. Only 0.7% of patients studied slipped through the two ultrasound examinations to present with thrombosis or embolism. Even if we assume that the eight protocol violators (one patient with venous thrombosis found at elective venography and seven given anticoagulation without objective evidence of thrombosis) all truly had thrombosis and had been missed by the second examination, the failure rate of the protocol would still be only 1.4% over six months.

These results may not be generalisable to patients excluded from the study, especially pregnant patients and those with previous leg thromboses. Recurrent leg thromboses are not uncommon.^{4,5} Nevertheless, were low cost ultrasound devices,⁶ the limited expertise required for these simple examinations, and low molecular weight heparin for treatment⁷⁻¹⁰ all readily available to practitioners, this new paradigm for diagnosis and treatment would represent a profound change in care, to the advantage of many thousands of patients worldwide. Diagnosis would be simple and

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office based, and treatment home based, with great convenience, savings, and no apparent loss in safety.

All this good news does not represent the requiem for the venogram. Contrast venography will remain essential for the foreseeable future for diagnosing symptomatic calf thromboses that do not extend proximally, previously thrombosed legs again symptomatic, or asymptomatic leg thromboses in patients with or at risk of pulmonary embolism¹¹ and for evaluating the efficacy of antithrombotic and thrombolytic drugs and of new imaging and patient management techniques (like the Cogo study). Promising uses of ultrasound contrast agents are being investigated in organ imaging, but there is little firm progress to report on from contrast ultrasound imaging of the deep veins.¹² This study indeed does represent a highly useful and generalisable advance for a large segment of our patients, but we still have a long way to go.

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1 Cogo A, Lensing AWA, Koopman MMW, Piovela F, Siragusa S, Wells PS, et al. Simplified compression ultrasound strategy for the diagnostic management of patients with clinically suspected venous thrombosis. *BMJ* 1998;316:17-20.

- 2 Lensing AWA, Prandoni P, Brandjes D, Huisman PM, Vigo M, Tomasella G, et al. Detection of deep-vein thrombosis by real-time B-mode ultrasonography. *N Engl J Med* 1989;320:342-5.
- 3 Heijboer H, Buller JR, Lensing AWA, Turpie AGG, Colly LP, ten Cate JW. A comparison of real-time ultrasonography with impedance plethysmography for the diagnosis of deep-vein thrombosis in symptomatic outpatients. *N Engl J Med* 1993;329:1365-9.
- 4 Schulman S, Rhedin AS, Lindmarker P, Carlsson A, Larfars G, Nicol P, et al. A comparison of six weeks with six months of oral anticoagulant therapy after a first episode of venous thromboembolism. Duration of Anticoagulation Trial Study Group. *N Engl J Med* 1995;332:1661-5.
- 5 Prandoni P, Lensing AWA, Cogo A, Cuppini S, Villalta S, Carta M, et al. The long-term clinical course of acute deep venous thrombosis. *Ann Intern Med* 1996;125:1-7.
- 6 Trotter SJ, Todi S, Veremakis C. Validation of an inexpensive B-mode ultrasound device for detection of deep vein thrombosis. *Chest* 1996;110:1547-50.
- 7 Lensing AWA, Prins MH, Davidson BL, Hirsh J. Treatment of deep venous thrombosis with low-molecular-weight heparins: a meta-analysis. *Arch Intern Med* 1995;155:601-7.
- 8 Levine M, Gent M, Hirsh J, Leclerc J, Anderson D, Weitz J, et al. A comparison of low-molecular-weight heparin administered primarily at home with unfractionated heparin administered in the hospital for proximal deep-vein thrombosis. *N Engl J Med* 1996;334:677-81.
- 9 Koopman MMW, Prandoni P, Piovela F, Ockelford PA, Brandjes DPM, van der Meer, et al. Treatment of venous thrombosis with intravenous unfractionated heparin administered in the hospital as compared with subcutaneous low-molecular-weight heparin administered at home. *N Engl J Med* 1996;334:682-7.
- 10 Columbus Investigators. Low-molecular-weight heparin in the treatment of patients with venous thromboembolism. *N Engl J Med* 1997;337:657-62.
- 11 Davidson BL, Elliott CG, Lensing AWA. Low accuracy of color Doppler ultrasound in the detection of proximal leg vein thrombosis in asymptomatic high-risk patients. *Ann Intern Med* 1992;117:735-8.
- 12 Melany ML, Grant EG. Clinical experience with sonographic contrast agents. *Seminars in Ultrasound, CT, and MRI* 1997;18:3-12.

Audit Commission tackles anaesthetic services

Flexibility, delegation, and changing roles may improve value for money

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Anaesthesia is the largest single hospital specialty. There are over 5500 anaesthetists in England and Wales alone, just under half of whom are consultants. Yet, as the introduction to *Anaesthesia under Examination*,¹ published last month by the Audit Commission, points out, few mainstream medical specialties are as poorly understood. Many patients do not realise that anaesthetists are doctors or that they have responsibilities outside the operating theatre.² Anaesthetists now provide clinical skills in acute and chronic pain management, intensive care, obstetrics, interhospital transfer, trauma, and resuscitation. This new found diversity may be partly to blame for current difficulties in service provision, for consultants' job plans have often not changed to reflect their increased activities.

Anaesthesia under Examination is based on a substantial amount of data. Most British hospitals replied to postal surveys on consultant shortages, maternity services, and services for pain after surgery; 39 randomly selected acute trusts underwent more extensive data collection, and in seven interviews were held with anaesthetists, managers, and patients. By highlighting anaesthetists' pivotal role within acute hospitals, the report has in many ways done the specialty a service: it reminds managers that anaesthetists' activities affect up to two thirds of a trust's income yet their salaries cost only 3% of this figure. Furthermore, although anaesthetists' numbers have risen, much of this increase is in response to demand created by other specialties.

The report identifies wide variations in consultant job plans, anaesthesia costs per operating list, and matching of skill to complexity of surgical cases—with consequent variations in the value for money offered by anaesthetic services. These discrepancies are not explained solely by differing casemix. In looking at anaesthetists' roles outside the operating theatre (except for intensive care, which is the subject of another study due later this year) the report emphasises particularly pain services and obstetric anaesthesia. It highlights unacceptable variations in the management of postoperative pain, while obstetric anaesthetic services are criticised for the lack of good evidence to support dedicated anaesthetic cover. In obstetrics the report suggests a method of deploying staff according to anaesthetic workload, rather than number of deliveries, as at present.³

It is an article of faith in British anaesthesia that a preoperative visit for assessment, information, and counselling is essential, but the Audit Commission found that, because of organisational difficulties, one fifth of patients were not seen by their anaesthetist before theatre. The commission suggests that nurses should perform some of these tasks. While this would not replace the courtesy of a visit by the anaesthetist, nurses should routinely provide the detailed information and assessment, while consultants could concentrate more efficiently on patients who present a greater perioperative risk than normal. The report also recommends wide use of written preoperative infor-