uncommon also. Those found by screening to have hepatitis C should be advised to avoid sharing needles, minimise alcohol intake, and use barrier methods of contraception in new relationships. Wider introduction of needle exchange schemes and health education programmes might prove to be more practical and cost effective than mass screening for reducing the spread of hepatitis C.

Conclusions

People who request hepatitis C screening should be offered careful counselling before testing. There should be specialist follow up for those found to be infected. More widespread screening of asymptomatic individuals cannot be justified until the course of the disease is better understood, treatment with clear clinical benefit becomes available, or a vaccine is produced.

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Lesson of the Week

Paradoxical embolism in a young woman

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Paradoxical embolus should be considered in all patients with acute arterial occlusion but no obvious arterial embolic source

Acute arterial ischaemia of the lower limb is common and mainly affects elderly people. It is usually due to thrombosis or embolism from a source in the left side of the heart. We describe the case of a young woman who presented with evidence of acute arterial embolism and venous thrombosis. This highlights a diagnosis that should be considered in all patients with an unusual presentation of leg ischaemia.

Case report

After an alcoholic binge a 31 year old woman fell asleep in an uncomfortable position curled up on a sofa. She woke the next morning with blue swollen feet that were tingling. She ignored this, but over the next seven days her condition deteriorated and her feet became more painful and blistered. When admitted to the local hospital, she was dishevelled and dehydrated with a fever of 39.5°C. Her heart rate on admission was 70 beats/min in sinus rhythm, and she was hypotensive at 90/60 mm Hg. There were no heart murmurs. Her foot pulses were impalpable, which was thought to be due to oedema; her pulse status was not investigated further at this stage. She was thought to have bilateral leg cellulitis and was treated with intravenous antibiotics. When her right leg failed to improve after three days she was reviewed by the local surgeons, who correctly diagnosed arterial ischaemia, started anticoagulation treatment with heparin, and arranged for transfer to this hospital.

On admission her general condition had improved, but the right foot was clearly unsalvageable and there was a large ulcer over the dorsum of the left foot (fig 1). Examination of the leg pulses showed the absence of a right femoral arterial pulse, while in the left leg pulses were palpable as far as the popliteal fossa. Occlusions of the right common femoral and left distal popliteal arteries were confirmed by duplex Doppler ultrasonography, which also unexpectedly showed an extensive left iliofemoral deep vein thrombosis. Angiography con-

firmed the ultrasonographic findings and showed poor flow in only one vessel in both calves. Arterial embolism, in particular paradoxical embolus, was suspected. Transoesophageal echocardiography showed no obvious embolic source, but a patent foramen ovale with a reversible shunt was demonstrated during Valsalva's manoeuvre. The right ventricle was dilated, and pulmonary embolism was subsequently confirmed by a ventilation-perfusion scan. Interestingly, the electrocardiogram recorded on admission to our hospital had shown a typical S1, Q3, T3 pattern consistent with pulmonary embolism despite the absence of respiratory symptoms and signs. A diagnosis of paradoxical arterial embolus was made.

Anticoagulation was continued, but long term compliance with warfarin was thought to be unlikely because of the patient's poor social circumstances, and a Venatech inferior vena caval filter was therefore inserted. Above knee amputation of the right leg was performed, and this has healed well. The patient has had no further embolic episodes, the caval filter is working without obvious complication, and she has been advised to continue warfarin treatment.

Comment

Paradoxical embolism describes the passage of a venous embolus across an intracardiac defect or a right to left shunt across the great vessels to lodge in the systemic arterial circulation. The shunt may be a consequence of congenital heart disease but can also occur across a patent foramen ovale if right atrial pressure exceeds that in the left atrium. Such a pressure reversal is a transient occurrence during the normal cardiac cycle, but it may also occur when right atrial pressure is raised physiologically during Valsalva's manoeuvre or pathologically in right heart failure or acute pulmonary embolus.¹

Paradoxical embolus is a rarely diagnosed cause of arterial ischaemia, but it would be recognised more often if

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Fig 1—Extensive fixed staining and gangrene affecting patient's right foot and calf and large necrotic ulcer over dorsum of left foot

patients with suspected embolism but without obvious embolic source in the left heart or systemic vessels were investigated more aggressively.² The increased availability of transoesophageal echocardiography will make the detection of intracardiac defects easier, and there are now isolated case reports of patients with a thrombus seen straddling their heart defect, in what has been termed impending paradoxical embolus.³ The diagnosis is usually presumptive and relies on the clinical triad of an arterial embolus without obvious source in the arterial circulation, deep vein thrombosis or pulmonary embolus, and an intracardiac defect with a reversed or reversible shunt. The commonest type of intracardiac defect is a patent foramen ovale, and this is the most commonly implicated defect in paradoxical embolus.² Up to 30% of the population have a small probe patency of foramen ovale, but larger defects able to admit the tip of a pencil may occur in as many as 7%.⁴ Paradoxical emboli lodge with almost equal frequency in the cerebral or limb circulations, but they may occasionally reach the coronary, renal, or splenic arteries.⁵ Treatment consists of anticoagulation to prevent progression of the clot, and interruption of the inferior vena cava in defined circumstances may prevent further

incidents. The usual indications for vena caval interruption are when venous embolism from the leg or pelvic veins continues despite anticoagulation, when anticoagulation is contraindicated, or when compliance with treatment is unlikely. The modern design of intraluminal devices allows percutaneous insertion with low complication rates and good efficacy, making them the optimal choice.⁶ Paradoxical embolus is not an indication for heart surgery unless anticoagulation or a vena caval filter fails to control emboli satisfactorily.

The usual causes of acute arterial ischaemia in young people are inadvertent arterial injection by injecting drug users or trauma. Our patient emphatically denied such causes, and it was only the discovery of an unexpected deep vein thrombosis that alerted us to the correct diagnosis. Acute arterial ischaemia should be considered in all patients with unusual leg symptoms of any age, and the absence of foot pulses should lead to palpation of all limb pulses. Hand held continuous wave Doppler ultrasound scanners are readily available and can be used to verify ischaemia by measuring the ankle-brachial pressure index. Unexplained arterial occlusion demands investigation by echocardiography, and the presence of a patent foramen ovale should be specifically sought when there is coexistent venous thrombosis or pulmonary embolus. Anticoagulation remains the first line treatment for paradoxical embolus, but when this is contraindicated or unlikely to be successful insertion of a vena caval filter will be required.

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A MEMORABLE PATIENT

Always a first time

In the early 1970s it was common practice for British anaesthetists to spend two or three weeks during the summer months doing locum work abroad. On one of these expeditions I arrived in the evening at the hospital where I was due to work and was taken round the intensive care unit by the nurse in charge. My attention was drawn to an 18 month old baby with marked stridor and obvious indrawing of the ribs with each inspiration. As I was to be the duty anaesthetist for that night and suspecting epiglottitis, I asked for an anaesthetic machine and paediatric intubation equipment to be available. This caused great consternation as the appropriate duty nurse was at home. Nevertheless, a selection of small endotracheal tubes were conjured up, but while all this was going on the baby stopped breathing, became even more cyanosed than it was already, and was found to be pulseless.

A scalpel blade (no handle) was found and a transverse incision was made into the trachea just

below the thyroid cartilage—probably through the cricothyroid membrane but it was no time to fuss about niceties. The scalpel blade was turned through 90 degrees, opening up the incision, and a small endotracheal tube thrust into the trachea. Mouth to tube ventilation along with external cardiac compression was started and, fortunately, spontaneous respiration and a cardiac output returned immediately.

As no ear, nose, and throat surgeons were available, an ambulance was summoned and, holding the tube in the trachea with my hand, we proceeded to transfer the now wriggling baby to the nearest major hospital. The journey was uneventful, we arrived safely, and the baby made an uneventful recovery.

On my return the staff in the intensive care unit were duly impressed with my surgical skills. Little did they know that that was the first and only tracheostomy I ever performed.—JOHN S M ZORAB is a consultant anaesthetist in Bristol