TABLE II—Time (days) from Last Halothane Anaesthetic to Onset of Jaundice for Complete Ngai¹¹ Data (A) and for Cases remaining after cases thought not to be related to Anaesthesia are excluded (B)

No. of Previous Exposures to Halothane	A			B		
	Median	Mean	No. of Cases	Median	Mean	No. of Cases
0	4.3	6.24	91	3.3	5.12	80
1	7.4	8.70	37	7.0	8.74	34
2	5.3	5.00	9	5.3	5.00	9
>2	3.0	3.00	2	2.0	2.00	1

in the literature what does this mean? We do not know what proportion of the cases of postoperative liver failure actually occurring have been recognized by physicians or what proportion of those cases recognized have been recorded and submitted for publication nor even what proportion of those submitted have actually appeared in print. Neither do we know what criteria make a case more likely to be recognized, a recognized case more likely to be submitted, or a submitted case more likely to be published.

It is difficult to decide what conclusions to draw from any one of these four series or how to compare the conclusions drawn from one with those drawn from another. How many of the cases in Inman and Mushin's sample of those reported to the Committee on Safety of Medicines are included in the Ngai data or in those reported by Simpson *et al.* or Klatskin? The possibilities for this kind of speculation are endless.

If Inman and Mushin are correct in showing that "the interval between the last of a series of halothane anaesthetics and the onset of jaundice is significantly shorter than the corresponding interval following a single exposure," why is this effect not

universally applicable? We should expect to see it in each of the four series and in the series combined. The overall interval for the 154 cases after a single exposure to halothane in the four series was 7.3 days, but this does not differ appreciably from the intervals quoted for patients who had previous exposures to the drug (see table I).

In voluntary case reporting people report what they want. There is no control over bias nor even any good way of knowing what the bias is towards. What would be most helpful is a study based on surveillance in which the experimental design assures virtually complete reporting of all cases of postoperative liver failure occurring within a definable population, thus minimizing the effects of preconceived ideas as to what should be reported.

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Medical Techniques

Side-to-side Antecubital Arteriovenous Fistulae for Haemodialysis

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Summary

Initial experience with side-to-side anastomosis of the brachial artery to the median cubital vein is reported in 11 patients in whom it was impossible to use or continue using the more normal sites. Eleven patients have so far been dialysed for a total of 80 fistula months. There was one early failure and no late ones. The appreciable morbidity was considered acceptable in these otherwise difficult patients.

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Introduction

Internal arteriovenous fistulae for chronic haemodialysis are subject to fewer complications¹⁻⁴ and last longer⁵ than external arteriovenous shunts. It is usually possible to form an internal fistula between the radial artery and cephalic vein at the wrist as a primary procedure,¹ but there is a small group of patients in whom this is not possible. The forearm veins may be too small or may be thrombosed after venepunctures or because of previous external shunts. Women with small superficial veins constitute a particularly difficult group.

Since Brescia *et al.*¹ first reported the use of forearm fistulae many modifications have been proposed.²⁻¹¹ The use of the antecubital fistula is one method of prolonging the dialysis life of patients in these difficult groups. We describe here our experience of this procedure in 11 patients.

Data on 11 Patients with Antecubital Fistulae

Case No.	Indication	Interval before First Dialysis (Months)	No. of Dialyses	Outcome	Fistula Status	Complications	Comments
1	Other sites used, inadequate forearm vessels	1	50	Died	Patent (at death)	—	Died after rejection of 2nd transplant
2	Inadequate forearm vessels	1	10	Successful transplant	Patent	—	Distal end of cephalic vein anastomosed end-to-side to brachial artery
3	Failed forearm fistula	10 Days	90	Trained for home dialysis	Patent	Mild rest pain, claudication	Symptoms a minor inconvenience
4	Failed forearm fistula	3	72	Successful transplant	Patent	Fistula, aneurysm, pain, paraesthesia	Symptoms during dialysis disappeared when aneurysm appeared
5	Failed forearm fistula	9	15	Trained for home dialysis	Patent	—	Fistula re-explored after 24 hr but functioning satisfactorily
6	Other sites used, failed forearm fistula	1	120	Successful transplant	Patent	Claudication in hand	Difficult to needle. Symptoms a minor inconvenience
7	Other sites used, failed forearm fistula	1	98	Chronic hospital dialysis	Patent	Oedema, paraesthesia	Symptoms during and immediately after dialysis. Insets own needles
8	Other sites used, failed forearm fistulae { Left arm	Not used	—	—	Clotted	Early failure	Very small antecubital vein
	{ Right arm	3	46	Chronic hospital dialysis	Patent		Atypical anatomy
9	Other sites used, failed forearm fistula	2	25	Died	Patent (at death)	Paraesthesiae, claudication	Difficult to needle while ill after failure of 2nd transplant
10	Other sites used, failed forearm fistula	3	50	Chronic hospital dialysis	Patent	Severe "steal syndrome," oedema aneurysm	Rejected two transplants. Failed saphenous vein graft
11	Other sites used	4	10	Chronic hospital dialysis	Patent	Postoperative infected haematoma	Difficult to needle. Converted to saphenous vein graft which failed

Method

The antecubital fossa was exposed under local anaesthesia through a 5-cm S-shaped incision beginning medial to the biceps tendon and passing distally. The median cubital or basilic vein was dissected free, and the bicipital aponeurosis divided to expose the brachial artery, which was mobilized. A probe was passed distally along the vein and any valves were disrupted. A 5-mm side-to-side arteriovenous anastomosis was made without tension or kinking of the vessels. In one patient (Case 2) the median cubital vein was occluded by thrombus. The cephalic vein was mobilized and divided, the proximal end ligated, and the distal end anastomosed end-to-side to the brachial artery to provide retrograde arterial perfusion of the cephalic venous system in the forearm.

Results

Twelve antecubital fistulae operations were performed in 11 patients with one early failure and no late ones (see table). Six of the 11 internal antecubital fistulae were being used at the time of writing, all with hospital dialysis only. Over 580 dialyses were performed on the 11 patients during 80 fistula months without failure of a fistula. We found it preferable not to attempt to use the fistula for at least four weeks to allow full dilatation of the median cubital vein and its tributaries. Even after longer periods dilatation of the forearm veins is often not satisfactory for repeated dialysis. Only two patients were dialysed regularly and the other three dialysed occasionally using the forearm veins. In nine patients one or both needles were regularly inserted in the region of the antecubital fossa without loss of the fistula. This was not unexpected as antecubital anastomosis was used only when the forearm veins were very small or had thrombosed after previous use for dialysis access. The upper arm cephalic

vein remained patent in eight patients and the upper arm basilic vein in nine. Both patients and nursing staff found insertion of needles in the antecubital fossa region and the upper arm more difficult than in the forearm veins. For this reason only three of the six remaining patients still needing dialysis succeeded in inserting their own needles and only two were trained for home dialysis.

The only early postoperative complications were an infected haematoma in one patient and mild oedema of the forearm and hand in two patients. Six patients developed a "steal syndrome." Four complained of paraesthesiae in the fingers and, in some instances, claudication of the intrinsic muscles of the hand and occasionally the forearm, but they considered it to be a minor, acceptable inconvenience. One patient (Case 10) developed a severe "steal syndrome" with mixed features of ischaemia and ulnar and median nerve deficits leading to severe loss of useful function in her left hand. At first this was only significant during dialysis, but after her second cadaveric transplant she awoke with a more permanent disability. Another patient (Case 4) suffered moderately severe pain and paraesthesiae in the hand during dialysis for three months.

Discussion

The many reports describing alternative procedures for establishing internal fistulae^{1 2 6-11} are a clear indication that no technique has yet provided a complete solution to gaining effective and prolonged access to the circulation in the more difficult patients. Our policy now is to establish a fistula in the upper limb at the wrist first and failing that at the elbow and resort to external shunts only in emergencies or to leg or thigh fistulae and saphenous vein graft fistulae if attempts to establish a successful internal fistula in the upper limb fail.

A radial steal syndrome occurs with all internal arteriovenous fistulae in the forearm where a side-to-side anastomosis has been performed,¹²⁻¹⁵ and Bussell *et al.*¹⁵ found associated symptoms in six out of seven patients investigated. Embolic phenomena also may occur.¹⁶ Ischaemic symptoms associated with fistulae in the cubital fossa were found in six of our 11 patients: paraesthesiae in the hand and forearm, claudication, and rest pain in the hand and less commonly in the forearm. An appreciable functional loss occurred in only one patient who developed a florid steal syndrome, and she partially recovered after three months. The remaining 10 patients had no appreciable functional loss in the hand or forearm and regarded their symptoms as a minor inconvenience which in most cases only occurred during dialysis. In cases 4 and 10 a dramatic improvement in symptoms and signs occurred when a venous aneurysm developed at the site of the anastomosis.

End-to-side anastomosis at the wrist prevents the steal syndrome in the hand. Abbott *et al.*, however, described a 55% early failure rate with end-to-side anastomoses at the wrist.¹⁷ Inadequate veins in the forearm have been one of the most frequent indications for performing an antecubital fistula operation and it is unlikely that good dilatation of these veins will be achieved at least for some months. Since there may be no forearm system sufficiently patent to maintain retrograde flow against the valve system in poor veins such as these, it is probably wise to perform a side-to-side anastomosis. It has proved possible to insert needles either at the antecubital fossa or into the cephalic or basilic veins of the upper arm, which dilate more rapidly. Only three of our patients were able to insert their own needles though several others were previously able to insert needles into the forearm system with a functioning fistula at the wrist. The re-

latively high flow after antecubital fistulae and the good dilatation of the vein at the anastomosis seems to confer a greater resistance to thrombosis after traumatic needling and we have not found this to be a problem though two patients developed aneurysmal dilatation of the vein at the fistula. Single needle dialysis systems would probably solve many of these problems.

All the fistulae gave good arterial flows of at least 200 ml/min during dialysis through 14-gauge thin-walled needles. There were no cardiovascular complications attributable to the size of the shunt even in patients with overt hypertensive and ischaemic heart disease.

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Across the Atlantic

Role of Semen Cryobanking in American Medicine

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Summary

In the United States there is little public policy regulating the activities of semen cryobanks. The medical profession has also been conspicuously silent on this aspect of medical practice. The potential benefits of semen cryobanking are enormous, yet like all other technologies its application (particularly commercially) may produce unexpected and unwanted consequences. It is suggested that a co-operative effort is needed between public officials and the medical profession to establish standards and guidelines which would maximize the benefits of this technique.

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Introduction

In recent years the number of semen cryobanks in the United States has increased rapidly. Though the concept of semen cryobanking—the freezing and preservation of semen at low temperatures—can be traced back to 1866¹ its implementation on a practical and commercial basis is more recent. In 1969 there were fewer than 10 such banks in the country; by the end of 1973 there were 16, including three major commercial banks with a combined total of seven branch offices. This rapid increase can be attributed to two reasons. Firstly, with the heightened popularity of vasectomy many men have sought a type of “fertility insurance” by freezing their semen for possible later use. Secondly, there has been an increased demand by infertile couples, representing about 30% of all marriages in the United States, for artificial insemination. In the case of a husband's infertility, which accounts for 40-50% of infertility among American married couples, a donor's semen may be used for insemination independent of time and place.

The most common technique for freezing and storing semen is immersion in liquid nitrogen at -196.5°C .^{2,3} Though the fertilizing capacity of frozen semen has generally been found to