necropsy or during recovery, showed acute hepatitis with varying degrees of necrosis.

The lymphocyte culture method was based on techniques published previously.^{3,4} Leucocyte-rich plasma was diluted with four volumes of Eagle's basal medium containing penicillin and streptomycin. Ten ml was dispensed into three or four 100 ml glass bottles and cultured for six days with 5% carbon dioxide in air. The first bottle acted as a control. Halothane was added to the remainder to give initial concentrations of 5 and 10 or 25 µg/ml. Two ml of the cell suspension was cultured with phytohaemagglutinin and smears examined after three days to demonstrate the ability of the lymphocytes to transform. On the fifth day 0.5 µCi ³H-thymidine was added to each bottle, and the cells were harvested after a further 24 hours. Cells from 0.1 ml of each culture were examined, after staining, for transformation and signs of toxicity. The remainder were washed, hydrolyzed, and then incorporated into a phosphor solution for liquid scintillation counting.

There was no significant difference in radioactivity between halothane and control cultures, and no blast-like cells were seen in smears. In 14 of the 17 patients, cells examined on the sixth day of culture showed no morphological signs of toxicity, but only 13 of the 14 showed a normal lymphoblastic response to phytohaemagglutinin. In the remaining three patients, few viable cells were seen.

Discussion

The techniques used in our laboratory have been successful in detecting cell-mediated immunity to other antigens,⁴ but we have been unable to show this in patients with suspected halothane hepatitis. Patients with jaundice due to other identifiable causes were excluded.

Widely different initial halothane concentrations were employed to find the optimum level for any lymphocyte stimulation. Preliminary tests in which lymphocytes were cultured in the presence of both halothane and phytohaemagglutinin had shown suppression of transformation at initial halothane concentrations of 50 µg/ml or more. Halothane concentrations may have fallen with time, but the odour of halothane was still detectable on the sixth day of culture. Cells from three of our patients did not survive in culture. Two of the three were in hepatic coma, but viable cultures were obtained from two others who were just as ill.

The techniques used by Paronetto and Popper differ in some respects from ours, but the selection of patients appears similar. Two of the patients found positive by Paronetto and Popper were retested later by them and found negative. Walton *et al.*⁵ were unable to show lymphocyte transformation to halothane in 15 suspected halothane sensitive subjects, but only four were jaundiced when tested.

In conclusion, we have been unable to show lymphocyte transformation to halothane in patients suspected of halothane sensitivity, and have found this test of no value in the diagnosis of halothane hepatitis.

¹ Klion, F. M., Schaffner, F., and Popper, H., *Annals of Internal Medicine*, 1969, 71, 467.

² Paronetto, F., and Popper, H., *New England Journal of Medicine*, 1970, 283, 277.

³ Gaylarde, P. M., and Sarkany, I., *British Medical Journal*, 1972, 3, 144.

⁴ Sarkany, I., *Lancet*, 1967, 1, 743.

⁵ Walton, B., *et al.*, *Journal of the American Medical Association*, 1973, 225, 494.

Royal Free Hospital, London NW3 2QG

P. J. A. MOULT, M.R.C.P., Honorary Assistant Lecturer, Department of Medicine

A. B. ADJUKIEWICZ, M.R.C.P., Honorary Lecturer, Department of Medicine

P. M. GAYLARDE, B.Sc., Research Assistant, Department of Dermatology

I. SARKANY, F.R.C.P., Consultant Dermatologist

SHEILA SHERLOCK, M.D., F.R.C.P., Professor of Medicine

Improved Method for Aspiration of the Pleural Cavity

The conventional method of aspiration of the pleural cavity using either a wide bore disposable needle or a rigid trocar and cannula may be frustrating and carries a definite risk to the patient. Complete aspiration is rarely possible in spite of careful placement of the needle because the residual fluid level lies below the puncture site. Attempts to overcome this deficiency by changing the position of either the needle or the patient carries the risk of damage to the lung and the use of a puncture site below the level of the eighth interspace in the posterior axillary line may result in the needle traversing the diaphragm and passing into either the liver or the spleen.

A safe and efficient alternative method involves the use of a 12-14 gauge radiopaque E-Z CATH intravenous placement unit (figure). The main advantage of this type of catheter over other similar types is that the needle lies within the cannula attached to a stainless steel stylette and can be completely withdrawn once the cannula is introduced. Another advantage is that the cannula remains encased in a soft polyethylene bag which facilitates sterile manipulation.

Application

The patient is seated upright with arms folded and leaning forward on to a bed table. An appropriate rib space is chosen after study of the posteroanterior and lateral radiographs and the puncture site infiltrated with local anaesthetic down to the pleura. The needle and cannula are introduced until arrival in the pleural cavity is indicated by the appearance of aspirate in the transparent catheter. The stylette and needle are then withdrawn about 4 in. (10 cm) and an assistant kinks the cannula between forefinger and thumb before their complete withdrawal. A 60-ml syringe with a three-way tap fitting is then attached to the Luer fitting on the end of the cannula and aspiration started in the normal way.

When towards the end of the procedure, fluid enters the syringe in a jerky fashion and is more easily withdrawn on expiration the catheter is advanced and further aspiration is then performed. As the catheter is flexible, it is possible in difficult cases to change the patient's position from erect to supine. If the effusion is large and the patient experiences respiratory distress due to too rapid removal, the catheter can be strapped into place and sealed for use at a later date. It is also sometimes useful to position the catheter under x-ray control.

Surgical Unit, Westminster Hospital Medical School, London S.W.1

T. WILSON, F.R.C.S., Surgical Registrar

P. LUMB, M.B., B.S., House Surgeon