affected limbs. Obvious temperature differences between the normal and affected limbs were observed but attempts to magnify the temperature differential by induction of reflex vasodilatation using a heated foot bath were not successful. The temperature differences appeared to be related to occlusion as they were not demonstrable when normal flow in the arteries returned.

REFERENCES

A PRELIMINARY STUDY OF MICROFILTERS: DO THEY HAVE A ROLE TO PLAY DURING BLOOD TRANSFUSION?
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Many factors have been incriminated in the aetiology of the post-traumatic pulmonary insufficiency syndrome. One factor, which can possibly be avoided, is the deposition in pulmonary capillaries of cellular debris of microemboli following massive transfusion.

Swank (1961) and McNamara (1971) have demonstrated that cellular degradation products appear in increasing amounts as stored blood ages. Quantitively this debris is measured by the screen filtration pressure or s.f.p.

Reul (1973) postulated that the use of microfilters during blood transfusion can diminish the amount of cellular debris presented to the lung. The efficiency of three microfilters employing surface or depth filtration principles was assessed under simulated clinical conditions in the laboratory: a microfilter being a filter with a significantly reduced pore size when compared with a standard filter.

One-, 2- and 3-week-old blood stores in citrate phosphate dextrose solution was transfused at a constant pressure of 250 mm Hg using a Fenwal BD4 pressure infuser. The microfilter under investigation was placed in line with a routine Baxter BR10 infusion set and the number of units which each filter could tolerate at these high flow rates was noted. Differences in the plasma haemoglobin content before and after filtration was measured to indicate erythrocyte damage.

The results showed that in the fresher week-old blood all microfilters were more efficient in handling large volumes of blood and the haemolysis was less. Microfilters employing surface filtration methods were more efficient in the filtration of large blood volumes and caused less haemolysis than depth filtration microfilters.

REFERENCES

BACTERIAL FILTERS FOR MECHANICAL VENTILATORS
Anita Holdcroft, Jean Lumley, H. Gaya, M. Darlow, and D. J. Adams
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Autoclavable ventilators are an expensive alternative to mechanical ventilators which can be disinfected. It has been suggested (Leading article, Br. Med. J., 1973) that bacterial filters can be used to prevent contamination of a ventilator and its environment. The potential hazards of permeability to bacteria and an increase in resistance developing in the circuit, due to condensation of water vapour, has now been largely overcome by heating or siliconizing the filter (Pyle, Darlow and Firman, 1969; Mitchell and Gamble, 1973).

The efficiency of bacterial filtration and change in resistance of the system was assessed first in the laboratory, and then in the clinical situation on the ward. Bacterial filters were connected to the inspiratory and expiratory ports of a Cape-Waine ventilator, that on the expiratory side being heated. The system was challenged by nebulizing Escherichia coli, Klebsiella aerogenes, Pseudomonas aeruginosa, Staphylococcus aureus, and a staphyloccocal bacteriophage (to simulate a viral challenge), through the circuit for a total of 48 hours. Bacterial cultures were taken at various sites and filter resistance was measured before and after the study. No organisms were detected at any stage in the filtered air, and the filter resistance was unchanged.

Similar filters (inspiratory and expiratory) were used in an intensive care unit for more than a year. The inspiratory filter was attached to the air inlet port of a Cape-Waine ventilator and the expiratory filters were kept in the same position as in the laboratory tests. The system was used in rotation with other ventilators for a total running time of 1500 hours. Daily culture swabs were taken from the ventilator and the patient tubing and filter resistance was measured at intervals. Finally the laboratory nebulization and resistance tests were repeated.

It was found that contamination of the ventilator tubing occurred only in the patient tubing and in each case the organism was indistinguishable from that previously grown from the patient's respiratory tract. No growth occurred in the cultures taken from the ventilator, and no significant change in filter resistance was demonstrated over the period of the clinical study.

The results of these tests indicate the suitability of bacterial filters as an alternative to disinfecting or autoclaving of mechanical ventilators in ward use.

REFERENCES

METABOLISM OF 14C-LABELLED ALPHAXALONE IN MAN
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Alphaxalone is the major active constituent of the new steroid induction agent Althesin (0.9% alphaxalone, 0.3% alphadalone acetate, 20% polyoxyethylated castor oil, 0.25% NaCl in water). Studies in the rat (Card, McCulloch and Pratt, 1972; Child et al., 1972) showed that the plasma half-life of 14C alphaxalone was 6-8 min and the liver was the main site of metabolism. There was no redistribution in fat and approximately 70% of the radioactivity was excreted in the bile in the first 3 hours after administration. Further excretion studies over 5 days showed that 60-70% appeared in the faeces and only 20-30% in the urine.
The present study reports on the metabolism in man of alphaxalone (3α-hydroxy-5-pregnane-11,20-dione) labelled in the 21 position with 14C. This was made up as Althesin with a specific activity of approximately 5 μCi/ml.

Five patients with normal hepatic and renal function gave informed consent for the insertion of a central venous cannula and the administration of 14C Althesin as part of their anaesthetic. 10-20 μCi of Althesin were given and central venous blood samples were taken at frequent intervals thereafter during surgery. In addition given and central venous blood samples were taken at

Radioactivity was detected in the urine within 30 min. It is concluded that, in man, alphaxalone is rapidly taken up by the liver, metabolized to a more polar compound, possibly by conjugation, and then excreted in the urine.

The results show that the 14C disappeared very rapidly from plasma and appeared in the bile within 10 min. Radioactivity was detected in the urine within 30 min. Over 5 days approximately 80% of the radioactivity administered was excreted in the urine.

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REFERENCES


THE ASSESSMENT OF ALBUMIN EXTRAVASATION DURING SURGERY

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Albumin is known to accumulate at the site of surgery (Blalock, 1931; Mouridsen, 1969). Burns are known to be accompanied by extravasation of albumin: this loss is recognized and influences the fluid therapy of the burned patient. The hypothesis is that similar extravasation of protein could accompany surgery and might contribute to hypovolaemia, fluid retention and oliguria. In preliminary experiments measurement was made of the change in albumin and haemoglobin concentration which accompanied surgery. Consistent change was hard to observe as loss of albumin is accompanied by loss of water and electrolytes, and any blood loss or infusion causes alteration in the concentrations of both haemoglobin and albumin. When the albumin:haemoglobin ratio was calculated the results did suggest that major surgery was accompanied by disproportionate albumin loss.

Subsequently patients' red cells have been labelled with 51Cr and have been injected 5–7 days before surgery with a dose of 131I-albumin. This period allows equilibration of the 131I-albumin in the body. Before, during and after surgery samples of blood were withdrawn into sequen-
trene bottles and were haemolysed by freezing. From each sample approximately 2 ml was accurately weighed into tubes for counting. The tubes were counted in series, several times, with tubes for background and cross-over estimation on a Wallac Decem GTL 300 auto-gamma-spectrometer with a teletype output. The punched paper tape was read by a tape reader attached to an Olivetti 602 desk top computer employing a program developed to summate the several cycles of results. The totals were then analysed using a second programme designed to correct the counts for background, cross over, and sample weight and then express the 51Cr, 131I, and their ratio as fractions of the level at the start of surgery, with accompanying values for the 95% confidence limits.

Initial results are encouraging and interesting. The results show that the 14C disappeared very rapidly from plasma and appeared in the bile within 10 min. Radioactivity was detected in the urine within 30 min. Over 5 days approximately 80% of the radioactivity administered was excreted in the urine.

It is concluded that, in man, alphaxalone is rapidly taken up by the liver, metabolized to a more polar compound, possibly by conjugation, and then excreted in the urine.

REFERENCES


COMPARATIVE STUDY OF RECOVERY FROM SHORT ANAESTHESIA WITH THIOPENTONE OR ALTHESIN, APPARATUS USED AND RESULTS

M. Dubois, and I. C. Geddes
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Following the methodological study relating to recovery from short-duration anaesthesia previously presented to the Society (Dubois and Geddes, 1973) we were able to undertake a detailed study of the recovery of 35 “day patients” who had received single doses of two different short-acting anaesthetics, thiopentone (5 mg/kg) and Althesin (50 μl/kg).

A parallel comparison of 35 clinical signs of recovery and the results of seven psychomotor tests was made. In addition a control series of 20 volunteers were tested without receiving any anaesthetic. The seven psychomotor tests were: polar pursuit tracker; maddox wing; hand dynamometer; peg board; visual reaction timer; steadiness test; and computer-assisted psychometric system.

Measurements were made twice before injection of the anaesthetic and five times afterwards. The study covered a period of 24 hours. A careful standardization of the experimental protocol, apparatus, choice and use of the induction agent, patient, operation environment and timing of tests was made. Some 170 items of data were collected for each patient.

There was a wide scatter of results for all the tests but the following conclusions can be made. The patients were markedly upset in many aspects of their behaviour in the first 2 hours after either drug. The upset was more intense with thiopentone and two tests demonstrated anomalies 4 hours after thiopentone. Two tests assessed anxiety and the patients showing anxiety (about 60% of the total) also had disturbances of performance in the other tests before any anaesthetic was given.

REFERENCE