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# A SIMPLE TECHNIQUE FOR CONTINUOUS INTRAVENOUS INFUSION OF ADULT SHEEP

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In studying the *in vivo* activity of various biologically active substances during prolonged administration the researcher is faced with a number of practical and economic considerations. The alternatives are:

(i) Continuous parenteral infusion of a very small number of animals.
(ii) Administration of larger doses at intervals (orally or parenterally) to a greater number of animals.
(iii) Implantation of the material in a slow-release form or as a depot injection.

In attempting to approximate the normal biological situation continuous infusion should be the method of choice where implants cannot be used. In view of this, as system was developed whereby sheep could be infused continuously through a fixed intravenous cannula for up to 20 days.

The ventral neck area of the sheep was clipped, shaved and disinfected and the skin on the site of infusion infiltrated with local analgesic. Cannulation of the jugular was found to be more efficient when the animal was restrained in the standing position rather than when recumbent. A 2,8 mm (12 guage) hypodermic needle, 110 mm long, was inserted caudally into the jugular vein and a polyethylene catheter (I.D. 1,4 mm x O.D. 1,9 mm, Intramedic, cat No. 7440) introduced into the lumen of the vein through this needle. Approximately 150 mm of the cannula was passed into the vein, the needle was removed and a 1,422 mm (17 guage) needle (shortened to 40 mm) was inserted into the exposed end of the cannula. The cannula was then flushed with 1 ml heparinized saline (500 units/ml,0,9% saline) and a small rubber cap was placed over the hub of the needle.

The point of entry of the cannula through the skin was sealed with cotton-wool soaked in flexible collodion (S.A. Druggists) and the shaved area was sprayed with a film of topical antiseptic (Surgispray, Novo Industries). A 50 mm x 50 mm square of adhesive plaster (Elasto-plast) was moistened with anaesthetic ether and pressed down firmly over the wound. A 50 mm wide strip of masking tape was then wound around the neck of the sheep to shield completely the point of entry into the skin and to prevent soiling. After removal of the rubber cap the catheter was connected to a saline bag (1 litre capacity, Viaflex container, Baxter) via a Plexitron "intravenous infusion" set (60 drops/ml, Baxter) with a small Hoffman clamp as flow regulator. The saline bag was suspended from a hook tied to a nylon cord (5mm diameter) and the one end was attached to a linen strap placed around the body of the sheep and situated just behind the shoulders. To counterbalance the mass of the full saline bag and also to keep the nylon cord taut a weight (0,9 kg for 500 ml saline) was attached to the free end of the cord (Fig.1). This maintained a constant

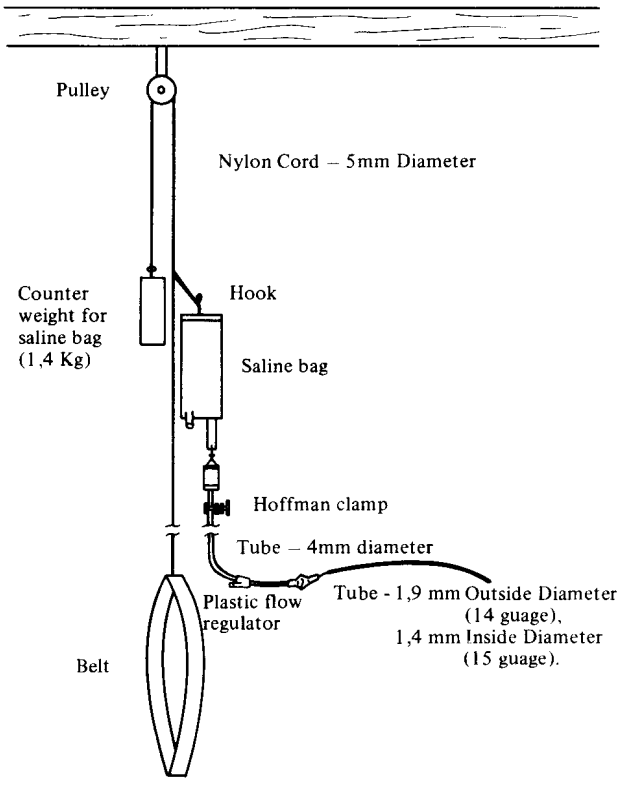


*Fig. 1 Grobbelaar, et. al.*

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"head" between the withers of the ewe and the liquid reservoir, both in the standing and recumbent positions. To prevent the ewes from turning around in their individual pens they were each fitted with a halter and tied to the feed trough.

During the trial 28 lactating ewes were continuously infused with normal saline as the carrier for hormone preparations. The reservoirs were renewed daily and the flow rate was checked hourly to ensure that the total volume of 500 ml was infused in 24 hrs. This was achieved at approximately 20 drops/minute.

Daily blood samples were drawn into heparinized syringes by disconnecting the infusion apparatus at the junction between the cannula and the connector drip (Fig. 1) after interrupting the flow via the plastic flow regulator.

The main problem encountered was that of suckling lambs chewing at the tubing and thereby severing the delivery tube. This could be prevented by encasing the tube within thick-walled 18 mm Tygon tubing. Slitting the outer tube along its length allowed the cannula to be exteriorized for sampling. The patency of the catheter was maintained in all cases, except where the saline flow was interrupted for more than 30 minutes. In such cases patency could be restored in some instances by forcing heparinized saline under pressure through the catheter using a 10 ml disposable syringe. If this failed the cannulation process was repeated on the opposite side of the neck.

The accumulation of fibrin at the tip of the cannula eventually (after 7 days or more) prevented the withdrawal of blood samples although infusion was not interrupted. In such cases needle puncture of the jugular on the opposite side was employed.

No infection at the site of entry into the body was observed, but fibrosis of the adjacent tissue occurred in a few animals.

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