Practical Aspects of Anaesthesia of the Bovine Digit

R. S. Jones
University Department of Anaesthesia
4th Floor, Royal Liverpool Hospital
Prescot Street, P.O. Box 147
Liverpool L693BX

Paper presented at the XIIIth World Congress on Cattle Diseases, Durban, S. Africa, Sept. 17-21, 1984.

Introduction

Prior to the introduction of regional nerve blocks for anaesthesia of the digits in the bovine species it was considered somewhat hazardous for either or both of the animal or anaesthetist. General anaesthesia with intravenous agents or epidural anaesthesia or local inviltration anaesthesia were used. Whilest the technique of Raker (1) was considered to be a considerable advance it was still far from ideal. It involved the injection of local anaesthetic solution at four separate sites and hence required a sound knowledge of anatomy. In addition inflammatory processes were likely to distort the various structures and make the actual injection and spread of local anaesthetic solution difficult. In potentially infected areas there was always the possibility of the introduction of and/or dissemination of infection. In the light of these disadvantages a technique of intravenous regional anaesthesia of the bovine digits was developed. The technique of I.V.R.A. had orginally been described as early as 1908 in the human subject (2) and had been adapted for use in the dog (3).

Materials and Methods

Technique

The technique involved is simple and involves placing a tourniquet around the limb and injecting a suitable local anaesthetic solution into an accessible superficial vein distal to the tourniquet.

After sedation with a 2% solution of Xylazine ("Rompun", Bayer) at a dose rate of 2 ml per 500 kg the cow is cast and restrained in lateral recumbency. If sedation is not adequate then ketamine may be administered at a dose of 5 mg/kg intravenously at least ten minutes after the Xylazine (4). Alternatively chloral hydrate (30-60 gm) may be administered orally.

Once the cow has been cast three limbs are hobbled and the affected (diseased) limb is left free. A tourniquet of stout rubber tubing or an inflatable cuff is applied above the hock of the carpus. The efficiency of such a tourniquet can be improved in the hind limb by including a roll of bandage in the depression between the tibia and the Achilles tendon (5). The skin overlying any prominent vein, distal to the tourniquet, is clipped and prepared aseptically. In the hind limb the lateral metatarsal vein is the one usually chosen and in the fore limb the medially placed radial vein is the most accessible. Thirty ml of 1.5-2 percent plain lignocaine (without adrenaline) is injected rapidly into the vein using a 19 gauge 2.5 cm needle directed either proximally or distally depending on personal preference. The needle is then withdrawn and a swab held firmly over the site of injection for 3-5 minutes to prevent haematoma formation. Anaesthesia of the whole limb, distal to the tourniquet is complete within 10 minutes. During this time the site of surgery can be prepared. It is impractical and unnecessary to practice exsanguination of the limb as advised in the human subject. Anaesthesia remains as long as the tourniquet is in place and has been shown to be safe for up to 75 minutes in a number of cattle. Following completion of the operation the tourniquet is released. The limb remains completely anaesthetised for 5 to 10 minutes after removal and partial anaesthesia may persist for at least a further 30 minutes.

Discussion

The mode of action of I.V.R.A. is not understood but it is suggested that anaesthesia is produced by diffusion of the local anaesthetic solution from the venous bed. The technique is a quick, simple and reliable method of producing anaesthesia of the bovine digit. In direct contrast to previously described techniques (1) a detailed anatomical knowledge is not required. Any failures which occur are usually due to tourniquet problems or failure to allow sufficient time for anaesthesia to develop. The interdigital area is the last area to be anaesthetised.

The speed of onset of anaesthesia is governed by the volume of anaesthetic solution. Around 30 ml has been found to be the most suitable volume that can be injected rapidly and reduce the possibility of extravascular injection.

Problems of toxicity due to lignocaine have not been observed. Using a 2% solution in a 500 kg animal assumes a maximum dose of 1.2 mg kg-1 and figures of more than 5 mg kg-1 have been quoted for toxic signs to develop. It is advisable to leave the tourniquet in place for at least 15 minutes and to check the cardiovascular and respiratory systems for at least 10 minutes after the release of the tourniquet.

References

1. Raker, C.W.: 1956 J. Amer. Vet. Med. Assn., 128:238. 2. Bier, A.: 1908 Arch. Klin. Chir. 86:1007. 3. Hall, L.W. Wrights Veterinary Anaesthesia and Analgesia. 7th ed. Bailliere Tindall, London. 4. Waterman, A.E.: 1981 Vet. Rec., 109:464. 5. Prentice, D.E., G.W. Jones, R.S. Jones and D.W. Jagger. 1974 Vet. Rec. 94:293.