Induction of anaesthesia in pigs using a new alfaxalone formulation

H. Keates

ALPHAXALONE, a potent steroid anaesthetic agent, has been used in veterinary practice for approximately 30 years since its pharmacological properties were described by Child and others (1971). Alfaxalone has been combined with the weak anaesthetic agent alphadalone to improve solubility. As alfaxalone and alphadalone are poorly soluble in water, they have been formulated in 20 per cent polyoxyethylene castor oil (Cremophor-EL) and saline (Althesin or Saffan; Glaxo). This combination has been used to induce or maintain anaesthesia in a wide variety of species, including cats, horses, sheep and pigs (Hall 1972), primates (Whelan and others 1999), fish (Harvey and others 1988) and birds (Samour and others 1984).

In a survey of 918 practices in Australia published in 2001, it was found that this formulation of alfaxalone and alphadalone was the preferred agent for the induction of anaesthesia in cats, being used by 46 per cent of practitioners (Nicholson and Watson 2001). In a survey of 161 practices in South Africa, alfaxalone/alphadalone was chosen by 54 per cent and 40.4 per cent of practitioners for the induction and maintenance of anaesthesia, respectively, for cats (Joubert 2000).

This formulation of alfaxalone and alphadalone is non-irritant, non-cumulative and has a high therapeutic index in most species. It causes a dose-related fall in systolic blood pressure (Dyson and others 1987) and respiratory depression (Hall and others 2001). Most of the problems with alfaxalone in the past have been due to the formulation. Cremophor-EL causes histamine release, which may contribute to decreased blood pressure and which causes oedema of the pinnae and the paws in cats, and dose-related anaphylactoid reactions in dogs (Hall and others 2001).

The combination of alfaxalone and alphadalone has been used in pigs at a dose rate of 6 mg of steroid mixture/kg bodyweight (Hall 1972). As the drugs have been marketed at a concentration of 12 mg of steroid mixture/ml, this dose rate results in inconveniently large volumes in large animals. A lower dose rate (2 mg/kg) can be used if the pig is premedicated with azaperone at a dose rate of 4 mg/kg (Hall and others 2001).

Recently, a 10 mg/ml solution of alfaxalone in 2-hydroxypropyl-beta-cyclodextrin (Alfaxan-CP; Jurox) has been released in Australia for use in both cats and dogs. This combination has no associated release of histamine (Best and Pearson 1997). This short communication describes the use of this new formulation to anaesthetise pigs before intubation and maintenance with halothane for the harvesting and implantation of embryos.

Sixty Landrace × Large White pigs were considered as two separate groups on the basis of weight. There were 37 gilts of mean (sd) bodyweight 116.1 (7.3) kg, and 23 mature sows weighing 242.2 (8.0) kg. The pigs were premedicated half an hour before induction of anaesthesia with an intramuscular injection of azaperone in the neck muscle. The dose of azaperone was low as the pigs had to be walked into a crate after sedation. As the gilts were more nervous than the older sows, azaperone was administered at a higher dose to these animals. The mean (sd) doses and dose rates are shown in Table 1.

Induction of anaesthesia was by intravenous bolus injection of the formulation into an ear vein. The pigs were then moved to the surgery and given 5 per cent halothane in oxygen (4 litres/minute) by mask via a circle absorber with the vapouriser out of circle for one to two minutes while an intravenous catheter was placed in an ear vein. An endotracheal tube was placed and the pigs were connected to the circle absorber for maintenance with halothane in oxygen. Some of the pigs required a further intravenous injection of the anaesthetic formulation to produce satisfactory conditions for intubation. The total amount of drug administered to each pig (initial bolus plus further injection) was used to calculate a dose rate for each pig (mg/kg bodyweight) (Table 1).

### Table 1: Dose and dose rates for the administration of azaperone and alfaxalone in pigs and mature sows

<table>
<thead>
<tr>
<th>Pigs</th>
<th>Bodyweight (kg)</th>
<th>Azaperone Dose (mg)</th>
<th>Azaperone Dose rate (mg/kg)</th>
<th>Alfaxalone Dose (mg)</th>
<th>Alfaxalone Dose rate (mg/kg)</th>
<th>Dose rate (mg/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gilts (n=37)</td>
<td>116.1 (7.3)</td>
<td>278.8 (18.7)</td>
<td>2.1 (0.2)</td>
<td>100.4 (17.6)</td>
<td>0.9 (0.2)</td>
<td>2.6 (0.5)</td>
</tr>
<tr>
<td>Gilts (n=23)</td>
<td>242.2 (8.0)</td>
<td>287.0 (21.9)</td>
<td>1.2 (0.1)</td>
<td>167.3 (8.9)</td>
<td>0.7 (0.1)</td>
<td>2.7 (0.2)</td>
</tr>
</tbody>
</table>

*Note: Dose rate for azaperone and alfaxalone is given in mg/kg bodyweight.*
Identification of Cryptosporidium parvum 'cattle' genotype from a severe outbreak of neonatal foal diarrhoea

A. Grinberg, L. Oliver, J. J. Learmonth, M. Leyland, W. Roe, W. E. Pomroy

The intestinal protozoan parasite Cryptosporidium parvum has been intensively studied over the past decade, due to its major impact on human and animal health. So far, two genotypes of C. parvum have been characterised: the 'human' genotype, associated with infections in man and primates, and the 'cattle' genotype, found in human beings and also in domestic livestock such as cattle, sheep and goats (Morgan and others 2001, Akiyoshi and others 2002). The genetic divergence between the two genotypes manifests at a number of genomic loci, including the 18S rRNA gene (Xiao and others 2000), the Cryptosporidium oocyst wall protein (COWP) gene (Spano and others 1997), the ribonucleoside reductase (rnr) gene (Widmer and others 1998), the polythreonine repeat (poly T) (Carraway and others 1997) and the β-tubulin gene (Caccio and others 1999). Extensive within-genotype genetic heterogeneity also exists (Widmer and others 2002, Mallon and others 2003).

Equine cryptosporidiosis was initially described in immunodeficient Arabian foals using morphometric and morphologic parasitological methods, followed by descriptions of the disease also in immunocompetent foals (Snyder and others 1978, Gibson and Huber 1983, Gajadhar and others 1985, Coleman and others 1999). Whereas some surveys indicate that infections with Cryptosporidium species in horses are relatively common, reports confirming its role in foal diarrhoea are scarce and attempts to produce experimental disease have been unsuccessful (Tizziore and Campbell 1981, Tizziore 1983, Xiao and Herd 1994, Netherwood and others 1996). Moreover, the published data on the genetic makeup and biology of the equine isolates is scant and, strictly speaking, even their taxonomy within the genus of Cryptosporidium is still unresolved. This short communication describes the results of an investigation of a severe outbreak of diarrhoea in thoroughbred foals, accompanied by the shedding of Cryptosporidium-like structures in the faeces of the affected animals. To the authors' knowledge, this is the first report of an outbreak of cryptosporidiosis in foals, which incorporates epidemiological, clinical and pathological data, as well as the genetic characterisation of the outbreak isolates.

During the peak of the foaling season in 2002, there was a severe outbreak of foal diarrhoea in a commercial thoroughbred broodmare farm located in the Waikato region of New Zealand. The outbreak lasted for approximately one month and, during that period, nine foals suffered from acute, mild to severe disease accompanied by dehydration and weakness. Approximately 30 foals were born on the farm during the same period. The index case and six other foals were aged between four and nine days at the onset of diarrhoea. The other two manifested the disease when they were three weeks of age, which was seven to 10 days after returning to the farm from a regional neonatal intensive care unit where they were sent soon after birth due to unrelated con

References


A. Grinberg, DVM, M. Leyland, MSc, W. E. Pomroy, BVSc, PhD, DipVetClinSurg, Infectious Diseases Management Group, W. Roe, BVSc, Pathobiology Management Group, Institute of Veterinary, Animal and Biomedical Sciences, J. J. Learmonth, GDimSc, Protozoa Research Unit, Institute of Molecular BioSciences, Massey University, Private Bag 11 222, Palmerston North, New Zealand L. Oliver, BSc, BVSc, Hamilton Veterinary Services, PO Box 10-373, Hamilton, New Zealand

The Veterinary Record, November 15, 2003

Veterinary Record (2003) 153, 628-631