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HAEMATOLOGICAL EFFECT OF AZAPERONE SEDATION IN PIGS

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SUMMARY

The short-term effect of azaperone sedation on packed cell volume (PCV), haemoglobin (Hb) level, red blood cell (RBC) and white blood cell (WBC) counts was investigated at 15 - minute intervals over a 1 - hour period in 5 pigs. The haematological values were tabulated. The PCV, Hb and RBC values were below the normal ranges accepted for the pig. The WBC values remained fairly constant around the upper limit of the normal range. It was concluded that azaperone has a measurable effect on the porcine PCV, Hb and RBC values.

Key Words: Haematological. Azaperone. Sedation. Pigs.

RESUME

L' effect a courte duree du sedatif Azaperone sur l' Hematocrite le taux d' Hemoglobine, des globules rouges et blancs a ete observe a 15 minutes d'intervalle sur la periode d'une Heure sur un echantillon de 5 cochons. Les valeurs Hematologiques ont enregistrees sur un tableau Hematocrite, le taux d' Hemaglobine et de globules rouges etaient en dessous des valeurs normales acceptable pour le cochon. les valeurs du taux de globule blancs sont restees constantes dans les environs de la limite superieure des valeurs normales. La conclusion est que l'azoperone a d' effect mesurable sur les valeurs du taux d' Hematocrite, d' Hemoglobine et des globules rouges du cochon.

The pig, either as a meat producing or laboratory animal, presents handling difficulties for routine physical examination and blood sampling due to its physical features and temperament. Pigs vigorously resist physical restraint and the struggling animal can easily become overheated in hot, humid weather (Benson & Thurmon, 1979). Thus, it has long become overheated in hot, humid weather (Benson & Thurmon, 1979). Thus, it has long become recognized that the use of sedatives is the solution to the handling problems inherent in this species (Callear & Van Gestel, 1971). Although the phenothiazine derivatives induce tranquility n pigs, their effective dose varies considerably (Vaughan, 1961). A butyrophenone derivative, azaperone, currently enjoys widespread use as a potent and effective sedative agent for pigs (Benson & thurmon, 1979; Hall & Clarke, 1991).

With regard to blood sampling, there is presently some concen about the effects that sedatives might have on the animal's blood picture. For instance, the administration of the phenothiazine derivative, acetylpromazine, has been reported to reduce the PCV in horses (Mackenzie & Snow, 1977; Parry & Anderson, 1983) and in dogs (Lang et al., 1979). Since the butyrophenones are said to have similar neuroleptic properties to the phenothiazine derivatives (Hall & Clarke, 1991), the former might also produce similar haematological changes. However, there is no factual evidence to support this supposition. The aim of this investigation, therefore, was to determine the short-term effect of sedation with azaperone on PCV, Hb, RBC and WBC values in pigs.

MATERIALS AND METHODS

Animal

The experimental pigs consisted of 5 Large White X Landrace cross pigs of both sexes (4 males, 1 female), aged 6 months and with a mean (± sem) body weight of 3.10 (± 1.7) kg (range, 30 and 32 kg). The pigs were selected randomly from a commercial herd of 10 littermates kept in a pen with concrete floor. They were being raised on a home-made fattening ration fed to appetite once daily. Fresh water was made available in the pen free choice. Just before the start of the trials, the pigs were judged to be in good general health based on findings of physical examination.

Drug Administration

In the morning of each day of the trial, food but not water was withheld from the pig which was then weighed. With the aid of manual restraint by two assistants, the pig's neck area at the base of the ear was swabbed clean with surgical spirit-soaked cotton wool. Azaperone (Stresnil; Janssen Pharmaceutica, Beerse, Belgium), supplied as a 40 mg per ml solution for injection in 100 - ml

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multidose vial, was injected at a dose rate of 8 mg per kg deep intramuscularly (im) in the prepared site, using 19G X 5cm hypodermic needle. The pig was then left alone for the drug to take effect. The time to knock-down effect was noted and recorded.

Blood Sampling

The laterally recumbent pig was manipulated to dorsal recumbency on a straw bale. The pig's forelegs were held back and its head pressed down. The area around the thoracic inlet was cleaned with surgical spirit - soaked cotton swabs. Five millimetres of blood was then collected from the pig by venepuncture of the anterior vena cava as described by Muirhead (1981). The pig was returned to lateral recumbency. The hypodermic needle was detached from the syringe and the collected blood sample was decanted into a vacutainer coated with lithium heparin. The sample was mixed with the anticoagulant by gently rotating the vacutainer within the palms for about 1 minute. Serial blood samples were subsequently taken at 15 - minute intervals over a 1 - hour period. Immediately after collection, the blood samples were kept in ice packs pending the time of laboratory evaluation.

Haematological Evaluation

The anticoagulated blood samples were evaluated within 3 hours of collection by the personnel of a commercial laboratory. Each blood sample was evaluated for PCV, Hb, RBC and WBC. A haematocrit centrifuge was used to determine the PCV expressed in percent, using a centrifugation time of 2 minutes at 14,500g. Haemoglobin was determined by the cyanmethaemoglobin method and expressed I gramme per decilitre (g/dl) of blood. The RBC count in millions per cubic millilitre ($x10^6/mm^3$) and the WBC count in thousands per cubic millilitre ($x10^3/mm^3$) were carried out using standard diluting pipettes and a haemocytometer (Schalm et al., 1975).

RESULTS

Following the i.m injection of azaperone in each case, the knock-down effect of the drug occurred within 20 minutes of injection. The mean haematological values from the pigs sedated with azaperone are shown in Table 1. The mean PCV, Hb and RBC values were below the normal ranges accepted for the pig. The mean WBC values remained fairly constant around the upper limit of the quoted normal range.

Table 1. Selected haematological values in azaperone sedated pigs

Time Interval (min)	PCV[b] (%)	Hb[c] (g/dl)	RBC[d] (x106)	WBC[c] ($x10^3$)
RV[1]	32 - 35	10 -16	5 - 8	11 - 22
0[g]	29.0 ± 2.9	8.5 ± 0.9	5.1 ± 0.7	23.8 ± 8.9
15	29.0 ± 2.5	8.1 ± 0.7	4.8 ± 0.4	20.1 ± 8.9
30	29.0 ± 1.7	8.1 ± 0.8	4.4 ± 0.6	22.1 ± 7.3
45	27.8 ± 1.8	7.5 ± 0.8	4.6 ± 0.5	22.8 ± 11.4
60	28.8 ± 2.8	8.5 ± 0.9	5.1 ± 0.7	24.9 ± 6.5

Data expressed as mean ± SD of pigs
a= at the dose rate of 8 mg/kg, i.m; b = packed cell volume; c = haemoglobin concentration
d = red blood cells; e = white blood cells; f = reference values obtained from Schalm et at, (1975).
g = values obtained following drug-induced lateral recumbency

DISCUSSION

The results of this investigation show that azaperone sedation in pigs caused measurable, albeit slight, decreases in mean PCV, Hb and RBC values during a 1- hour period following injection of the sedative drug.

A number of dosages of azaperone, ranging from 0.4 to 10 mg peer kg, have been recommended for use in the pig [Jones, 1972; Cox, 1973]. In this trial, however, a high i.m dose rate of 8mg per kg ofthe drug was employed for its knock-down effect, thereby obviating any additional physical restraint that might be necessitated with the use of lower dosages. Furthermore, the drug was injected into the neck in preference to the rump muscles because of the meat value of the latter. A single, fixed i.m dosage was employed; consequently, comparisons between different doses and routes of administration could possibly not be made.

The number of pigs used for this trial was not considered large enough to permit a valid statistical analysis of the data obtained. This was due to cost constraint, which is a common problem with studies on large domestic species in which it is often necessary to make the best use of the few available data. Moreover, this tiral was of short duration, terminating before the observed haematolgocal changes had returned to pretreatment values. Since it was intended only to permit blood sampling. It was also recognized that normal haematological values for pigs were not available in the laboratory used for this study. In line with the recommendation of Kornegary (1967) that stress and excitement of pigs should be avoided when taking blood samples, control blood sampling in non-sedated, conscious pigs was not attempted in this trial. Rather, normal ranges of haematolgical values reported in the literature for pigs (Schalm et al., 1975) were quoted as reference values inspite of their inherent limitations. Some variations are likely to occur between individual pigs, apart from those attributable to laboratory techniques or other factor. Consequently, this study could only consider trends rather than absolute haematological values.

It is interesting to find that the mean PCV, Hb and RBC values showed similar trends over the time period of observation (Table 1). This would appear to have advantage in clinical practice. For instance, when the PCV determineation is done correctly there might be no need to do Hb determination or RBC count for screening purposes, since these three values would generally fluctuate together.

The appearent lower PCV, Hb and RBC values in azaperone - sedated pigs than the quoted reference values (Table 1) could be indicative of some anaemic state. Similar observations have been made in acepranazine - sedated horse (Mackenzie & Snow, 1977; Pary & Anderson, 1983) and dogs (Lang et al, 1979). This effect would appear to be predictable I all cases where drugs with adrenolytic properties are given to subjects in which the spleen is an important storage organ for red blood cells. Therefore, the explanation might relate to the opposing effect of stress and sedation on the spleen. In conscious animals, cattecholamines produced in response to stress situations cause the spleen to contract with the release of the red blood cells stored in it into the circulation, thereby producing increases in PCV, Hb and RBC values. Sedative drugs with adrenolytic properties, such as acetylpromazine and azaperone, reverse the effect of stress on the spleen, leading to its relaxation and re-uptake of red blood cells with a consequent fall in PCV, Hb and RBC values of the peripheral blood.

In this trial, the mean WBC values appeared to the above the quoted normal range immediately following the injection of azaperone (Table 1). How the total WBC count was affected by the degree of struggling by the pigs during drug administration is not known, but it certainly must have had effect. At the time of injecting azaperone, fear and excitement associated with normal handling of the pigs might have caused the release of endogenous adrenaline, leading to mobilization of leucocytes from the marginal pool into the circulating pool. It is probable that the residual effect of such release was being detected at the zero-minute sampling interval. An apparent rise in WBC value at the 60 - minute sampling interval was probably related to regaining of consciousness by the pigs and therefore could be similarly explained by catecholamine release.

In conclusion, if the slow induction to lateral recumbency by azaperone (about 20 minutes) could be ignored, the sedative drug facilitates stress-free blood sampling in pigs. However, it is generally recommended that, for correct clinical interpretationof haematological results and for acurate diagnosis, careful note is made of any sedative agent administered and the degree of stress undergone by the animal when a blood sample is being taken.

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