

TWO ASPECTS OF CO₂-STUNNING METHOD FOR PIGS: ANIMAL PROTECTION AND MEAT QUALITY

Christian Ring, Ludwig-Maximilians University of Munich, Bavaria

SUMMARY

Stunning of animals with CO₂ does not result in hypoxia, but must rather be attributed to the narcotic effect of the CO₂. The stage of excitation is not noticed by the slaughter pigs with consciousness, it is the stage II of anaesthesia.

In 1986 scientists of the Ludwig-Maximilians University of Munich and the Technical University of Munich got the order by the Government of the Federal Republic of Germany and five Lands of this EC-member state to investigate whether the unconsciousness generated by CO₂ must be reduced to hypoxia or to the narcotic effect of this gas; further on the question should be answered whether slaughter pigs have to suffer at least during the stage of excitation?

Therefore 47 pigs stunned by CO₂ have been examined in a laboratory and a minor population as a control in a slaughterhouse. The following parameters have been determined: PaCO₂, PaO₂, pH (as blood gas criteria), enzyme activities and electrolytes (as clinical criteria); moreover electro-encephalography curves have been registered. All pigs have been monitored by video during the CO₂-stunning period.

CONCLUSIONS

The questions asked in the introduction can be answered as follows:

1. Since the pigs of the N₂-group, in spite of a lower PaO₂ than the CO₂-group, didn't show any signs of restlessness, choking attacks, collapsing or flight reflexes for two

minutes the stunning by CO₂ cannot be considered to be caused by hypoxia (Table 1).

2. The severe excitation appeared as uncoordinate, convulsive, motoric disinhibition. At the moment of excitation the values of arterial pH and PCO₂ agreed with the data reported to be typical of anaesthesia. The excitations have to be evaluated as symptoms of stage II of anaesthesia (stage of excitation). During this stage the faculty of perception and sensation is mainly eliminated. According to the stage of anaesthesia, spontaneous reflexes are elicitable, throughout. To get in this stage, the stage of anaesthesia I, the stage of analgesia, has to be passed. In this stage no special clinical reactions are expected. The sensitivity to pain was decreasing. The stage of analgesia begins according to literature at an arterial pH below 7.1 (Table 2) and a PaCO₂ (Table 3) of about 100 mm Hg.

From the EEG curves got without artifacts the common things were as follows: in a single case already from the 14th second the narcotic effect of CO₂ caused a decomposition of the basic activities and the motoric unrestlessness by disinhibition. The decomposition of the basic activities occurred by a short-time deceleration of the course of waves or by a continuous development of an inactive curve. This inactive curve appeared after an excitation. Immediately after an excitation the pigs were laying calm and relaxed. (Table 4).

The time before the stage of analgesia was experienced by the pigs on while fully conscious. During this stage unpleasant feelings cannot be excluded, obvious signs of unpleasant feelings, however, were not noticed.

After the stage of excitation the animals passed the stage of surgical tolerance and reached the stage of asphyxia when they were exsanguinated.

Table 1

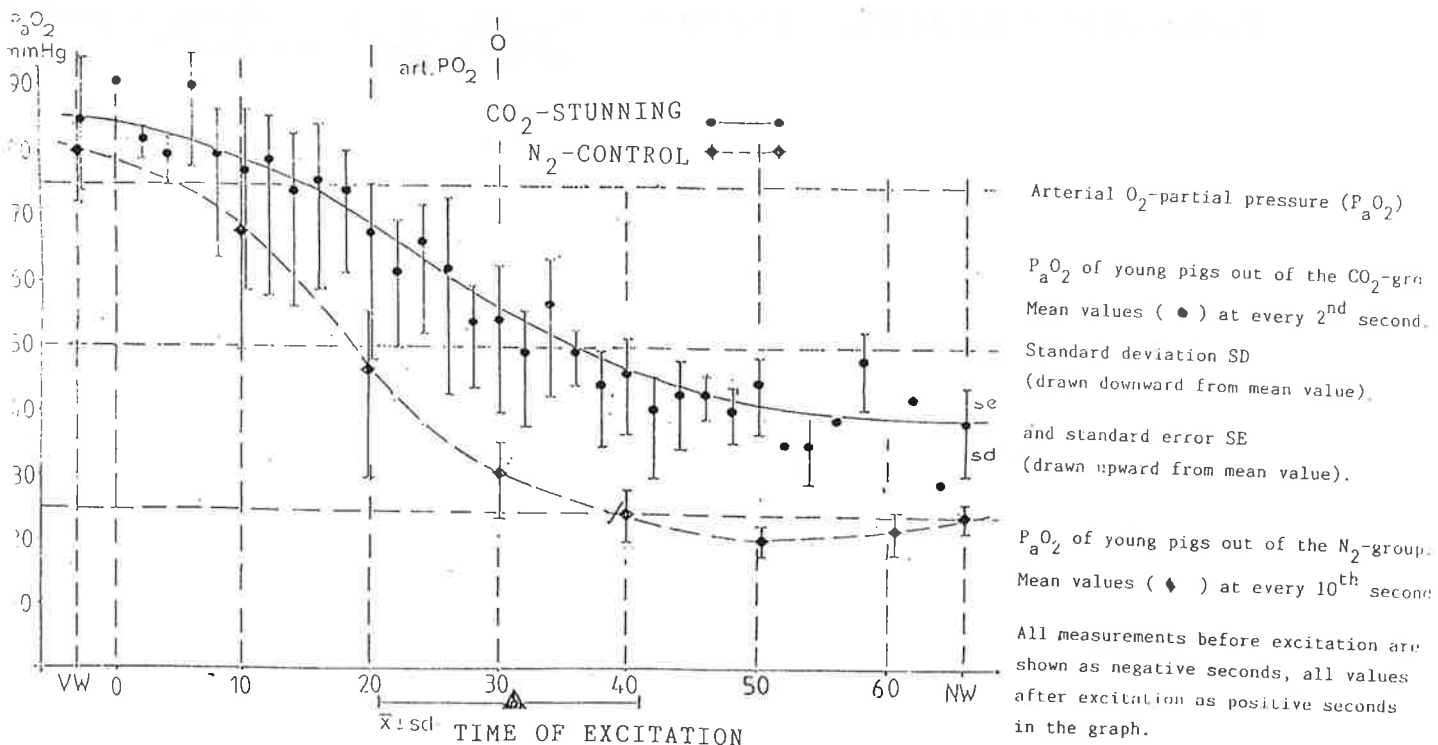


Table 2

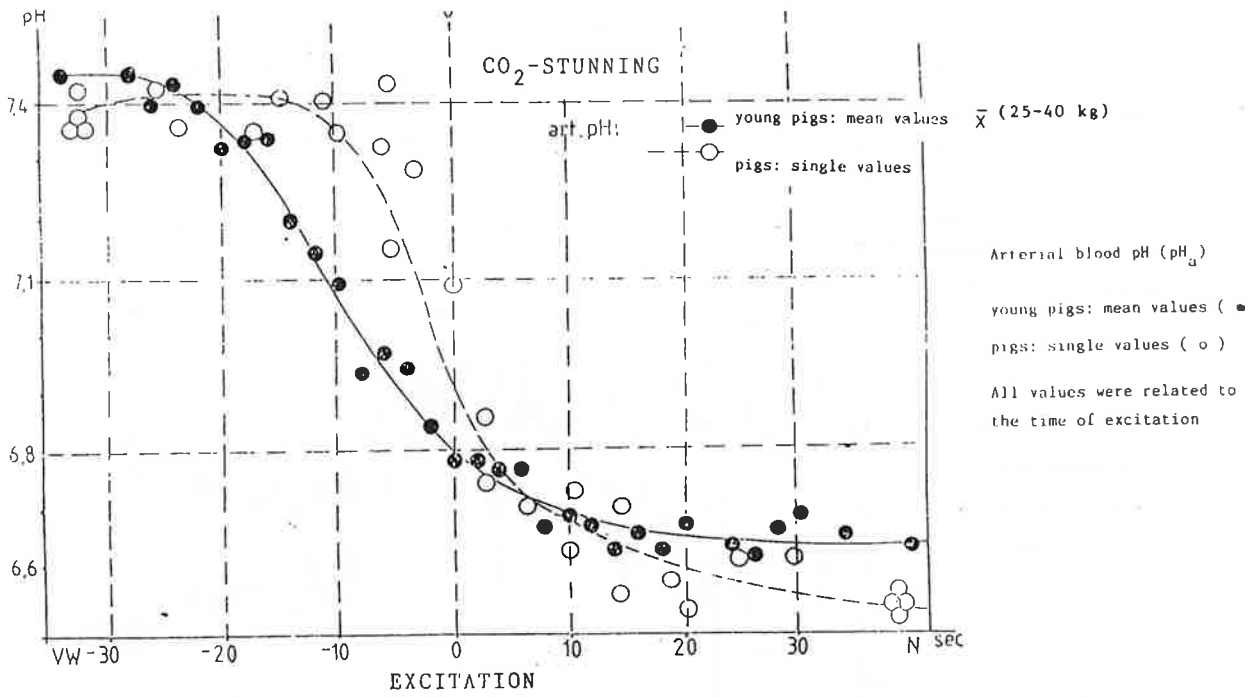


Table 3

