4TH ANNUAL MEETING OF THE

EVCBMAW

EUROPEAN VETERINARY CONGRESS OF BEHAVIOURAL MEDICINE AND ANIMAL WELFARE

SEPTEMBER, 28TH – OCTOBER, 1ST 2022 · PALMA (MALLORCA)

SPAIN

European Veterinary Congress of Behavioural Medicine and Animal Welfare

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ESVCE European Society of Veterinary Clinical Ethology

Animal Welfare and Behavioural Medicine

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ABSTRACT **BOOK**

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OC-07

PIGLETS BEHAVIOURAL RESPONSES TO SURGICAL CASTRATION UNDER INHALATION ANAESTHESIA: PRELIMINARY RESULTS

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Surgical castration of male piglets is a common, but stressful and painful practice (Prunier et al, 2006). This study aimed to evaluate piglets behavioural responses to surgical castration under inhalation anaesthesia and pharmacological and non-pharmacological analgesic treatments.

50 commercial-hybrid piglets were allocated to three treatments: Placebo (n=17) (5 ml of water), Glucose (n=16) (5 ml of glucosate at 10%), Meloxicam (n=17) (5 ml of meloxicam 1 mg/kg). Treatments were administered before castration per os. Piglets were castrated under automated isoflurane anaesthesia at 4 days of age. Before and after surgical castration, eye temperature was measured with an infrared camera (Avio Nec G120EX) and behaviour of piglets was video recorded for ten minutes. Videos were evaluated by 2 trained observers (continuous focal sampling), considering explorative behaviour, inactivity, lying and flight reactions. Procedures were approved by Italian Ministry of Health (863/2020-PR). Any time (pre-post procedure) and treatment effects were investigated using analysis of variance (ANOVA).

After castration, piglets showed a significant reduction of exploration and flight reactions and a significant increase of both ventral and isolated lying, regardless from the treatment (time $p<0.001$; treatment $p>0.05$). Inactivity was not influenced neither from time nor treatment ($p>0.05$). The eye temperature decreased significantly after castration, but it was not influenced by the treatment (time $p<0.01$; treatment $p>0.05$).

Piglets castrated under inhalation anaesthesia showed alterations in behaviour and body temperature regardless of treatments; it remains to be investigated whether treatments affected the latency to return to normal behaviour.

REFERENCES

Prunier, A., et al. (2006) "A review of the welfare consequences of surgical castration in piglets and the evaluation of non-surgical methods", Animal Welfare, 15, pp. 277-289.

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PIGLETS BEHAVIOURAL RESPONSES TO SURGICAL CASTRATION UNDER INHALATION ANAESTHESIA: PRELIMINARY RESULTS

PorCastro Project

divas

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Introduction

Surgical castration of male piglets

Why

- Prevent the presence of **Boar Taint**
- Reduce **undesirable aggressive or sexual behaviours**

Introduction

Surgical castration of male piglets

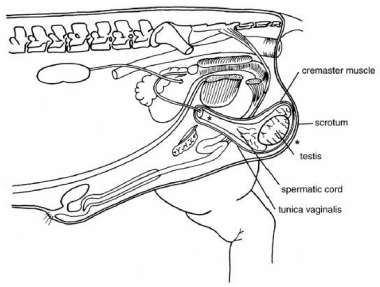
Why

- Prevent the presence of **Boar Taint**
- Reduce **undesirable aggressive or sexual behaviours**

How

- Dir 2008/120/CE:
  - **Piglets younger than 7 days of age can be castrated by skilled personal without anaesthesia/analgesia**
- Surgical castration:
  - In EU: 61% piglets -> 54% no pain relief
  - In Italy (heavy pigs - dry cured products): 93% surgically castrated -> 97% no pain relief

(De Bryine et al, 2016)



Introduction

Surgical castration of male piglets

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(De Bryine et al, 2016)

Consequences

- **Pain**: acute and chronic
  - Physiological alterations
  - Behavioural alterations
    - Vocalisation
    - Pain-related behaviour
    - Reduction in activity and social cohesion
- **Stress** (+++ Manipulation)

Introduction

Surgical castration without pain relief is a welfare issue

"Pain mitigation methods, which are both **effective and suitable** for application under pratical condition are needed "

(Gottardo et al, 2016; Yun et al, 2019)

Introduction

Pain Mitigation

In order to relieve pain, surgical castration of male piglets may be performed under general anaesthesia and with the administration of analgesics for the post-operative pain

ANAESTHESIA	ANALGESIA
GENERAL ANAESTHESIA	NSAIDs
LOCAL ANAESTHESIA	NON-PHARMACOLOGICAL APPROACHES

Introduction

Pain mitigation

Some resources for on-farm application of pain relief

- **Inalatory anaesthesia devices -> Isoflurane**
  - Vaporization of liquid volatile anaesthetic, mask applied to piglets' snout
  - Fast induction (1 min)
  - Uncousciousness
  - Rapid Recovery (< 2 mins)

- **Analgesics, NSAIDs -> Meloxicam per os**
  - Inhibitory effect on prostaglandin
  - Antinflammatory and antipiretic
  - Oral administration: less invasive, but slower onset of effect

- **Non-pharmaceutical options: oral administration of glucosate**
  - Use in pediatric medicine

Aim of the study

This study aimed to evaluate piglets behavioural responses to surgical castration under inhalation anaesthesia and pharmacological and non-pharmacological analgesic treatments

Procedures were approved by
Italian Ministry of Health (863/2020-PR)

Materials & Methods

Animals

- **50** Commercial-hybrid piglets, from 9 different litters
- **4 days of age**
- **Balanced for body weight** (2.00±0,30 kg)
- Experimental period: 3/2021 - 12/2021
- Intensive pig farm in Northern Italy

Procedures were approved by
Italian Ministry of Health (863/2020-PR)

Materials & Methods

Treatment Groups

- 3 Experimental treatments (Per os, before castration)
  - **PLACEBO** (P; n=17): 5 mL water
  - **GLUCOSE** (G; n=16): 5 mL glucosate solution 10%
  - **MELOXICAM** (M; n= 17): 5 mL Meloxicam at a dose of 0.4 mg/kg
- Surgical castration under inhalation anaesthesia with isoflurane (Induction 4%; Maintenance dose: 1.5%), performed by a veterinarian
- Mean duration of the procedure: 102,69±7,82 sec

Procedures were approved by
Italian Ministry of Health (863/2020-PR)

Materials & Methods

Data Recordings

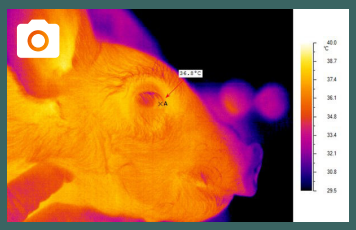
- **Video Recordings: Behavioural observations**
  - Groups of 3 Piglets (1/treatment) were housed in a cage with paper shavings
  - 3 min
  - Pre/Post
  - ETHOGRAM:
    - Explorative behaviour
    - Inactivity
    - Ventral lying
    - Isolated lying
    - Flight reactions
  - Solomon Coder - Program for coding behaviour

Procedures were approved by
Italian Ministry of Health (863/2020-PR)

Materials & Methods

Data Recordings

- **Thermography: eye temperature measure**
  - Pre & Post
  - *Caruncola lacrimalis*
  - Avio thermoGear Nec G120EX infrared camera



Statistical analysis

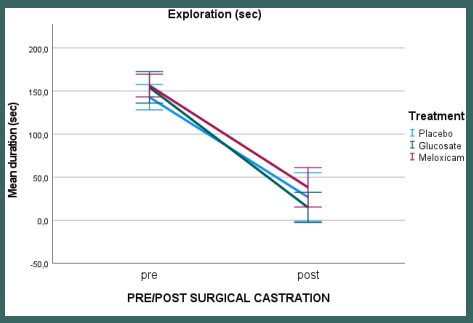
- Any time (pre-post procedure) and treatment effects were investigated using **analysis of variance - ANOVA**
- **SPSS 27**

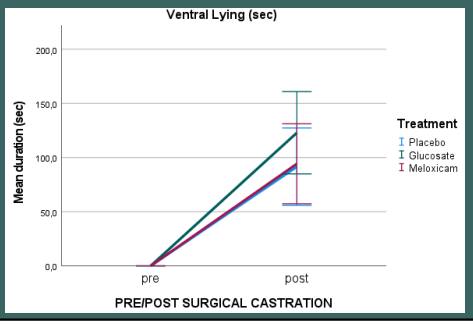
Results & Discussion

Behavioural Observations

After castration:

- Significant reduction of **exploration and flight reactions**, regardless from the treatment (time p=0.000; treatment p=0.290)
- Significant increase of **both ventral and isolated lying**, regardless from the treatment (time p=0.000; treatment p=0.353, p=0,529).
- **Inactivity** was not influenced neither from time nor treatment (time p= 0,512; treatment p=0.358).





Results & Discussion

Behavioural Observations

After castration, regardless the treatment

- Significant reduction of **exploration and flight reactions**
- Significant increase of **both ventral and isolated lying**
- **Inactivity** was not influenced

Behavioural alterations suggest castration is painful in pigs (Gottardo et al., 2016; Hay et al., 2003; Llamas Moya et al., 2008; Sutherland et al., 2010; Yun et al, 2019).

Isoflurane role in relieving pain during and after castration remains **uncertain** (O'Connor et al., 2014; Prunier et al., 2006; Schulz et al., 2007; Walker et al., 2004; Yun et al, 2019).

Results & Discussion

Behavioural Observations

After castration, regardless the treatment

- Significant reduction of **exploration and flight reactions**
- Significant increase of **both ventral and isolated lying**
- **Inactivity** was not influenced

Gottardo et al. (2016) demonstrated that in the first 30 min after castration, piglets who received injectable **meloxicam** prior to castration displayed **similar pain-related behaviour** compared to non-castrated piglets.

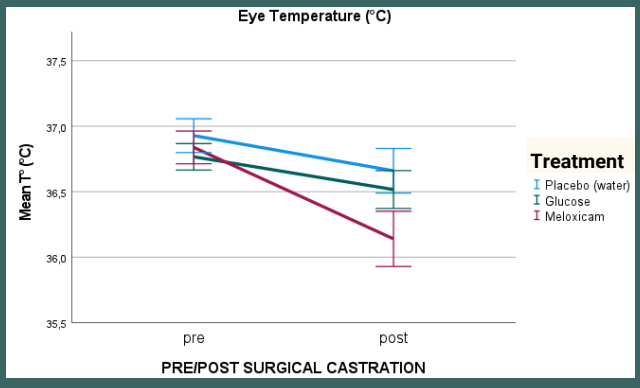
12% sucrose solution administered 1 min prior to surgery was **not effective i**n decreasing the behavioural indicators of distress in piglets undergoing routine management procedures (Rand et al, 2002).
Sucrose administration provides **some degree of pain relief**, but is not effective in controlling the stress related to castration and handling (Davis et al, 2017)

Results & Discussion

Eye Temperature

After castration:

- The eye temperature decreased significantly but it was not influenced by the treatment (time p=0.001; treatment p=0.125).



Treatment	PRE (mean T° ± SD)	POST (mean T° ± SD)
Placebo	36,9±0,5°C	36,7±0,5°C
Glucose	36,8±0,3°C	36,5±0,5°C
Meloxicam	36,8±0,5°C	36,1±0,7°C

Eye Temperature

Results & Discussion

After castration:

- The eye temperature decreased significantly but it was not influenced by the treatment (time p=0.001; treatment p=0.125).

In addition to the already lower thermoregulatory capacity and low energy reserves in young piglets (Vasdal et al., 2010), **isoflurane inhalation** can induce **hypotermia and vasodilatation** (Sheffield et al, 1994).

Conclusions and future perspectives

- Piglets castrated under inhalation anaesthesia showed alterations in behaviour and body temperature regardless of treatments
- It remains to be investigated whether treatments affected the latency to return to normal behaviour

Thanks for your attention!

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In collaboration with

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