Assessing animal welfare at the slaughterhouse using Animal-Based Measures in docked and undocked heavy pigs.

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RIBMINS online conference 2020
16/10/2020

Background

- Assessment of swine welfare needs objective, valid and reliable indicators
- Several studies suggest the use of Animal-Based Measures (ABMs) as welfare indicators
- Recent interest in incorporating welfare indicators during meat inspection at abattoir (Harley et al., 2014)
- Tail and skin lesions have the potential to be 'iceberg' indicators of welfare issues on farm (van Staaveren et al., 2017)
- Relationship between tail lesions and lung diseases, reduced carcass weight and increased rate of condemnation (Teixeira et al., 2016)
- Little is known about the prevalence of tail and skin lesions in heavy pigs (>110 kg live weight)

Aim of the study

- ✓ **Evaluate ABMs in Italian heavy pigs (9 months-old, ~165kg live weight) at abattoir**
- ✓ **Compare pigs with intact tails (undocked) to pigs with not-intact tails (docked)**
- ✓ **Correlate tail and skin lesions with other lesions**

Material and methods

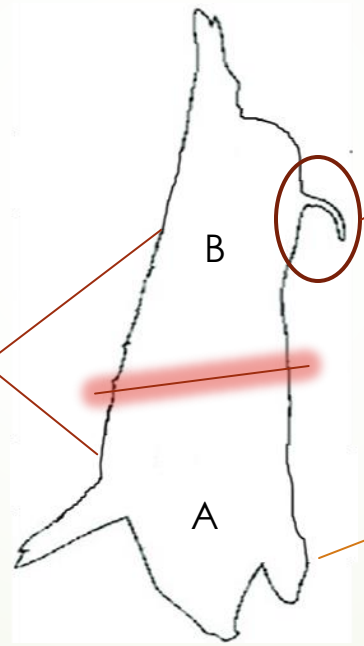
- Data collection was carried out in a commercial abattoir located in Northern Italy between January and March 2020
- Slaughter line speed of 480 pigs/hours, weekly throughput of ~24000 pigs
- Undocked pigs batches ('Animal welfare chain')

Skin lesions

- 0: None or little superficial damage
- 1: Some superficial damage clearly signed up to three short (2-3 cm) and deep lesions
- 2: Clear deep and long damage (>3 cm) including much superficial damage or circular areas
- 3: Deeper damage

Aaslyng et al, 2013

Cranial part (A)
Caudal part (B)



Tail lesions

- 0: No visible lesions
- 1: Skin perforated with reddish discoloration
- 2: Skin perforated with reddish discoloration and loss of skin (dented skin)
- 3: Skin perforated with brownish or blackish discoloration and loss of skin (dented skin)
- CL: Complete loss of the tail up to the tail base with perforated or healed skin surface

Vom Brocke et al., 2019

Ear lesions: presence/absence
Vertebral abscesses: presence/abscense
Swelling a the base of the tail: presence/abscence

Statistical methods

- Descriptive summary statistic
- Tail lesions score collapsed into four groups (score 0, score 1, score 2, score ≥3)
- Skin lesions were arranged in two groups (score ≤1, score ≥2)

- Comparison of Undocked *vs* docked pigs groups using chi-square or Fisher exact test (Odds ratio if P<0,05)

- Correlation analysis
- The strenght of the pairwise association between tail lesions scores, skin lesions scores, ear lesions and vertebral lesions was assessed by calculating the Spearman's correlation coefficient (multivariate analysis)

- Overall tail and skin lesions was calculated

  Sum (relative proportions*score value)

Results

- **108 batches**
- **71 farms**
- **11908 pigs**
- **8984 docked pigs**
- **3214 undocked pigs**

Undocked vs docked pigs

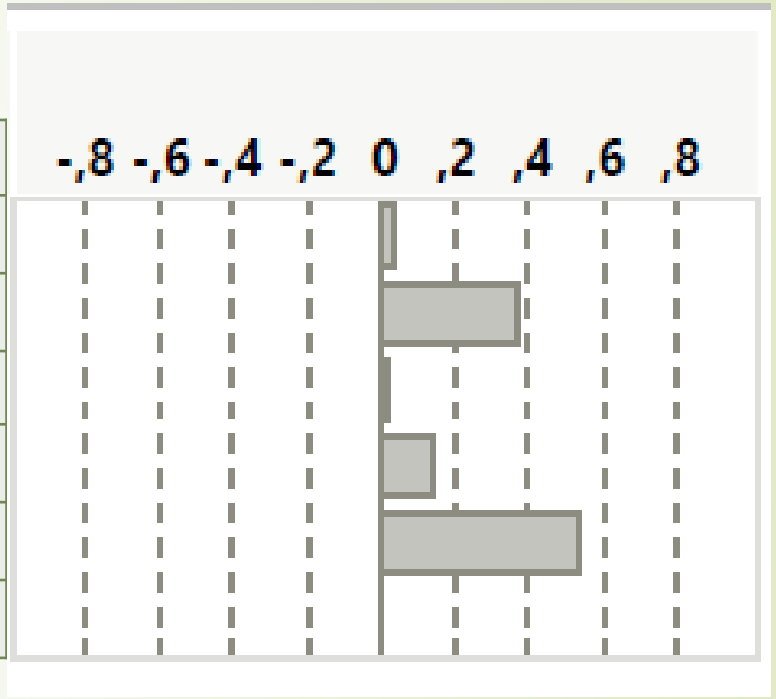
Tail lesions	**P-value**	**OR (95% CI)**
Score 0 (no lesions)	<0,0001	0.15 (0.06 to 0.16)
Score 1 (mild)	<0,0001	4.6 (4.1 to 5.2)
Score 2 (moderate)	<0,0001	11.7 (9.1 to 15.0)
Score ≥3 (severe)	<0,0001	4.2 (3.9 to 8.6)

	Undocked (%)	**Docked (%)**
Tail lesions		
Score 0 (no lesions)	2181 (66.7)	8110 (93.3)
Score 1 (mild)	699 (21.7)	507 (5.8)
Score 2 (moderate)	300 (9.3)	45 (0.5)
Score ≥3 (severe)	75 (2.3)	36 (0.4)
Skin lesions _cranial		
Score ≤1	3069 (95.0)	8108 (93.3)
Score ≥2	163 (5.0)	243 (6.7)
Skin lesions_caudal		
Score ≤1	3120 (97.0)	8522 (98.0)
Score ≥2	100 (3.0)	156 (2.0)
Ear lesions	58 (1.8)	358 (4.1)
Vert.lesions	12 (0.4)	6 (0.1)

Results

Multivariate analysis (Spearman'correlation coefficient)

Variable	Variable by	Spearman' rho	p-value
Ear lesions	Tail overall score	0.0279	0.7746
Vertebral lesions	Tail overall score	0.3696	<.0001*
Vertebral lesions	Ear lesions	0.0176	0.8562
Skin overall score	Tail overall score	0.1411	0.1451
Skin overall score	Ear lesions	0.5398	<.0001*
Skin overall score	Vertebral lesions	-0.0043	0.9651



Discussion and conclusions

- Prevalence of mild (=1), moderate (=2) and severe (≥3) tail lesions was greater in undocked pigs compared to docked pigs
- Weak (r_s =0.3696, P<0.0001) correlation between overall tail lesions score and vertebral lesions was reported, supporting the concept that tail lesions can be associated with increased rate of condemnation (Teixeira et al., 2016)
- Strong (r_s =0.5398, P<0.0001) correlation between overall skin lesions score and ear lesions was also reported, indicating skin lesions as possible good indicators of some welfare issues on farms (e.g. agonistic behaviour)
- This work supports the use of tail and skin lesions as 'retrospectives' indicators of swine welfare
- Incorporating welfare outcomes in the Meat Inspection activities may expand its role as an health and welfare surveillance tool

Thank you for your attention!

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