

# Behavioural responses of 26-day-old piglets to vaccination: Comparison of IM and ID injection routes

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## BACKGROUND AND OBJECTIVES

Animal welfare issues are fundamental for the general public. Accordingly, attention to reducing pain in routine procedures in farms has grown in the recent years. **The aim of this study was to evaluate piglet behavioral response during vaccine administration, by comparing intramuscular injection with needle (IM) and intradermal injection without needle (ID).**

## MATERIAL & METHODS

In a commercial farm, 490 three weeks old piglets were divided into two comparable groups. At 26 days, one group received M.hyo intramuscular vaccination (IM group, n=247), the other received M.hyo intradermal vaccination (ID group, n=243). Vaccines for both groups were administered at the same temperature.

**“PAIN BEHAVIOUR” SUB-STUDY:** Four behaviors suggestive of painful stress are observed: vocalization, fighting, stiffening and defecation. They are recorded for each piglet at the time of vaccination. A piglet expressing 0, 1, 2, 3 or 4 of these behaviours is given a score of 0, 5, 15, 30 and 50 respectively. Scores 0 and 5 were indicative of absent or mild pain, while scores 15, 30 and 50 were considered to be indicative of moderate to severe pain. The following parameters are calculated and compared for each group:

- Mean score per group (Kruskal-Wallis test)
- Distribution of pain levels (Pearson Chi-square test)

**PAINFUL “GRIMACES” SUB-STUDY:** In each group, two subgroups of 100 piglets were randomized before weaning: they were comparable in average bodyweight, sex ratio and maternal origin. **For these 200 animals, the vaccination scene was filmed to record the piglets’ facial expressions at the time of injection (see pictures 1 and 2). The videos were viewed by a trained operator and the painful grimaces were scored according to Viscardi 2017.** Each piglet was given a score between 0 and 5. Scores 0 and 1 evoked absent or mild pain, while scores 3, 4 and 5 evoked moderate to severe pain. The following parameters are calculated and compared for each group:

- Mean score per subgroup (Kruskal-Wallis test)
- Distribution of pain levels (Pearson Chi-square test)

## RESULTS

**Pain behaviors average scores are 5.6 and 1.5 respectively for IM and ID groups (p<0.0001). The proportion of pigs expressing signs of moderate to severe pain are 23.1 and 2.9% respectively (p<0.0001, figure 1).**

**Average scores for facial grimaces of pain are respectively 1.3 and 0.45 for the IM and ID subgroups (p=0.023). The proportion of pigs expressing grimaces of moderate to severe pain are respectively 25 and 2.3% (p=0.0059, figure 2).**

## DISCUSSION & CONCLUSION

Injection by ID route appears less painful than IM route with both methods of measurement. This, however, does not take other factors like vaccine adjuvants and antigen amount into account. This should be addressed in further investigations.

**Scoring pain behaviors and pain facial grimaces gives very similar overall results.**

However, on an individual scale, they are complementary as a shouting and struggling pig may not make a grimace, and vice versa. **These two methods of pain evaluation appeared to be quite easy to implement in field conditions.**

## REFERENCE

Viscardi, A.V.; Hunniford, M.; Lawlis, P.; Leach, M.; Turner, P.V. Development of a Piglet Grimace Scale to Evaluate Piglet Pain Using Facial Expressions Following Castration and Tail Docking: A Pilot Study. *Front. Vet. Sci.* 2017, 4, 51.

Picture 1. Video recording of fascial expressions of an IM-vaccinated piglet. See Camera FarmCam IP2 (Luda.Farm, Krokslätts fabriker 30, SE43137 Möndal, Sweden) in the foreground.



Picture 2. Identification after video recording of the fascial expressions of an ID-vaccinated piglet. See the IDAL G3 injector on the left side and the FarmCam IP2 on the right side.



Figure 1. Pain behaviors sub-study: graphical distribution of pain levels for ID and IM routes (Pearson KHI-square test; p<0,0001)

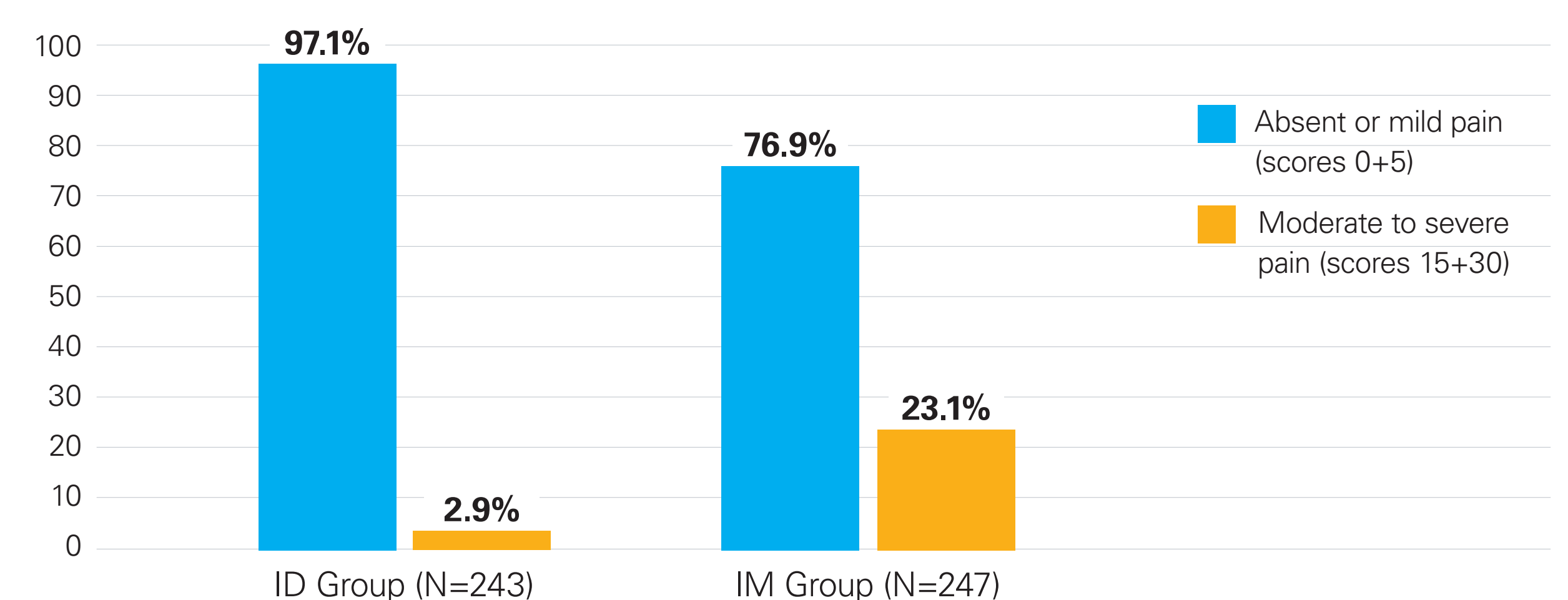
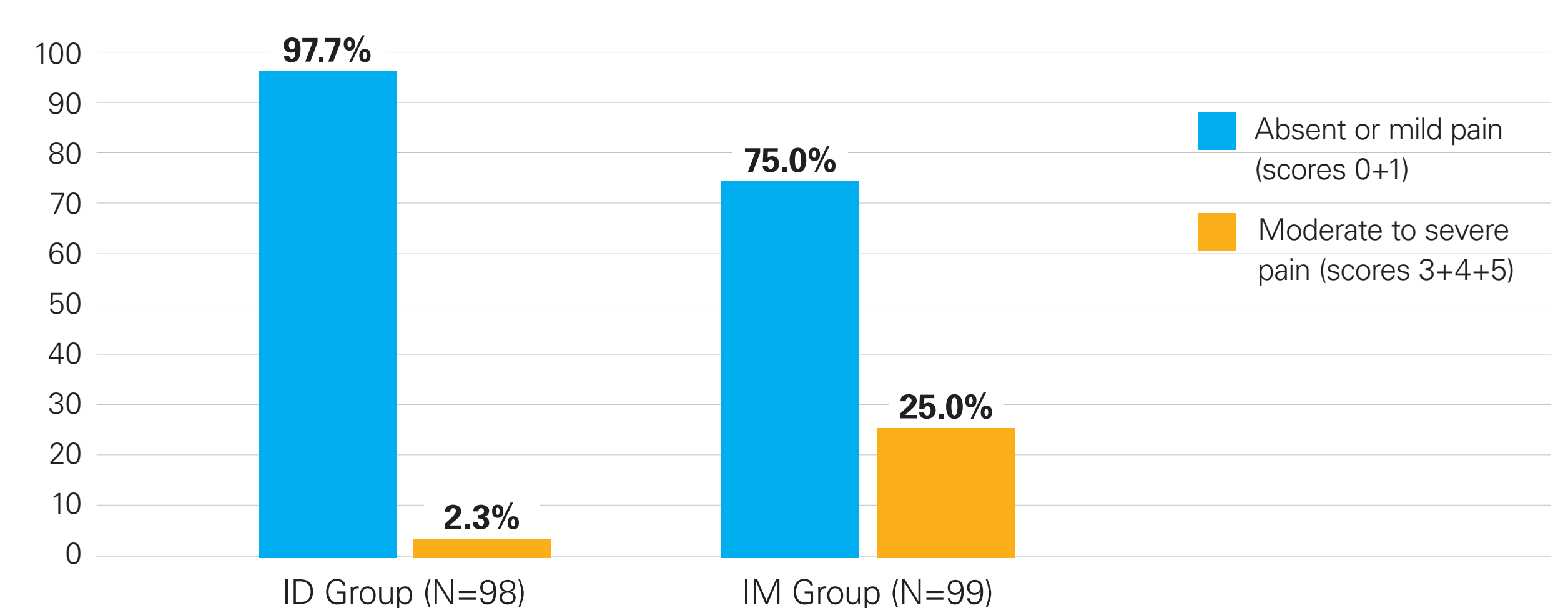


Figure 2. Painful “grimaces” sub-study: graphical distribution of pain levels for ID and IM routes (Pearson KHI-square test; p= 0,059)



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