

Evaluation of the adequate timing to administrate an intramuscular prophylactic penicillin G (procaine benzylpenicillin suspension) in Belgian blue cow before the caesarean section realisation

Djebala S.¹, Croubels S.², Martinelle L.³, Moula N.⁴, Sartelet A.¹, Bossaert P¹

¹. Clinical department of ruminant, University of Liege, Quartier Vallée 2, Avenue de Cureghem 7A-7D, Liège 4000, Belgium.

². Department of Pharmacology, Toxicology and Biochemistry. University of Ghent, Salisburylaan 133 D, ingang 24, 9820 Merelbeke, Belgium.

³. Experimental station farm, University of Liege, Quartier Vallée 3, Chemin de la ferme 2-8, Liege 4000, Belgium.

⁴. Department of animal production, University of Liege, Quartier Vallée 2, Avenue de Cureghem 6, Liège 4000, Belgium.

Corresponding author: sdjebala@uliege.be

Abstract: Antibiotics (AB) are widely used to limit infectious complications after caesarean section (CS), the most common surgery in Belgian bovine veterinary practice. Most vets administer AB, mainly benzylpenicillin procaine suspension (BPG), during or after CS. However, to maximise their efficiency, AB should be administered preoperatively, and result in plasma concentrations above the minimal inhibitory concentration (MIC) throughout the surgery. We aimed to determine the time after intramuscular (IM) injection of BPG necessary to reach sufficient plasma concentrations, in order to rationalize prophylactic AB use in CS.

Twelve non-pregnant Belgian blue cows received an IM injection of BPG (21000 IU/kg). Blood samples were collected in heparinized tubes from a jugular catheter at -15, 15, 30, 45, 60, 120, 240 and 480 minutes relative to injection, centrifuged and stored at -80°C. Plasma BPG concentrations were measured by high performance liquid chromatography.

Although MIC depends on the AB molecule and the germ, plasma BPG levels of 500 ng/mL are generally considered to inhibit the majority of bacteria encountered during CS. At 15 minutes after injection, plasma BPG levels were 668 ± 255 ng/ml (374 to 898 ng/ml), exceeded 500 ng/mL in 8/12 cows, and were close to 500 ng/mL in the other 4/12 cows. Plasma BPG concentrations reached a maximum of 1495 ± 629 ng/ml (919 to 2882 ng/ml) at 60 to 240 minutes after injection, and remained elevated until 480 minutes after injection (1002 ± 323 ng/ml; 667 - 1642 ng/ml).

In conclusion, IM injection of BPG 15 minutes before CS is sufficient to reach satisfactory BPG concentrations from the beginning to the end of surgery.