

Anesthetic Effects of Tiletamine-Zolazepam-Xylazine and Tiletamine-Zolazepam-Midazolam Combinations in Growing Pigs

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Introduction: Anesthetic management of pigs can be difficult due to their behavior when physically restrained. Tiletamine and zolazepam (TZ) alone induces rapid immobilization but does not produce adequate muscle relaxation and analgesia sufficient for surgery in pigs. Thus, xylazine has been combined to induce effective and safe anesthesia with good muscle relaxation (1). Midazolam induces hypnosis, sedation, and muscle relaxation, but little or no analgesia. Thus, midazolam is combined with an anesthetic or strong analgesic to enhance anesthetic action (2). The purpose of this study was to evaluate the cardiopulmonary effect of a combination of TZ and midazolam in pigs and to compare its efficacy as an anesthetic with that of TZ and xylazine.

Materials and Methods: Eight Landrace and Yorkshire mixed pigs, with a mean body weight of 25.3 ± 3.3 kg, were randomly divided into two groups. Each pig received two different drug treatments: (i) 1 mg/kg xylazine IM, and 2 mg/kg TZ IM (group TZX); (ii) 0.5 mg/kg midazolam IV, and 2 mg/kg TZ IM (group TZM). Induction time, anesthesia time, standing time and walking time were recorded for each pig. Cardiopulmonary parameters (heart rate, respiratory rate, rectal temperature, Systolic, diastolic and mean arterial pressures) were measured and recorded at the time of 0, 5, 15, 30, 45 and 60 minutes.

Results: Both drug combinations provided a smooth induction and good immobilization. However, induction time tended to be faster in the TZM group than in the TZX group ($P > 0.05$). Recumbency time and standing times were not significantly different between both groups. Heart rate decreased significantly in the TZX group. Mean arterial blood pressure was significantly higher during 15, 30 min in the TZX group. There was a marked decrease in arterial pH in both groups. Five minutes after drug injection, CO₂ values were significantly increased in the TZM group compared with TZX group. In TZM group, arterial carbon dioxide (P_aCO₂) significantly increased at 5 minutes (51.9 ± 9.86 mmHg) but it was gradually decreased to 60 minutes (43.2 ± 4.87). In TZX group, P_aCO₂ decreased during anesthesia. There was no significant difference from baseline also between both groups. The arterial oxygen (P_aO₂) significantly increased at 5 minutes. And then the values gradually increased to 60 min in TZX group. In TZM group, P_aO₂ increased to 30 minutes after administration anesthetics. There was significantly difference at the time of 30 and 40 minutes compared with baseline.

Discussion: The benzodiazepines have anxiolytic, amnesic, anticonvulsant, hypnotic, sedative effect and muscle relaxant properties, but little or no analgesia. Thus they are generally combined with an anesthetic or strong analgesic to enhance anesthetic action. Xylazine improves the effects of tiletamine/zolazepam in domestic swine by increasing muscle relaxation, analgesia and providing a smoother recovery from anesthesia (1). Midazolam is combined with an anesthetic or strong analgesic to enhance anesthetic action (2). In this study, it was considered that anesthetic effects of the TZM group was better than those of the TZX group in the pig. The TZM group showed successful anesthesia and minimal cardiopulmonary effects. From these results, the TZM combination might be used safely for the anesthesia of laboratory pigs.

References¹

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