Validation of the eye signs occurrence as the anesthesia depth indicator during general anesthesia in horses

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Introduction
Equine anaesthesia carries a great risk. Maintaining the stable depth of anesthesia in horses depends on the precise monitoring of the horse's vital signs. The eye signs (eye bulb rotation, corneal and palpebral reflex, nystagmus) are said to be basic monitoring for estimating the stage of anesthesia. However, the practice questions the usefulness of eye signs in anesthesia plane estimation, especially during ketamine CRI.

Materials and methods
11 horses were observed in the study (7 in group ISO+KET and 4 in group ISO) and were anesthetized in the same way except maintenance (group ISO+KET with isoflurane and CRI of ketamine and group ISO with isoflurane). The depth of anesthesia was determined by vital signs (ECG, breathing, SpO2, EtCO2,IBP). In the same time eye signs were recorded every 5 min (Fig 1.).

Results
The observations of eye signs were compared to the literature findings. The reliability of eye signs in both groups were studied and presented in Table 1 and 2.

Conclusion
The eye signs were not reliable in order to determine the stable depth of anesthesia in these horses during general anesthesia with isoflurane or isoflurane and ketamine maintenance.

Literature

1. Enderle A.K., Levionnois O.L., Kuhn M., Schatzmann U.: Clinical evaluation of ketamine and lidocaine intravenous infusions to reduce isoflurane requirements in horses under general anaesthesia, Veterinary Anaesthesia and Analgesia, 2008, 35, 297–305.
2. Kalchofner K.S., Ringer S.K., Boller J., Kästner S.B.R., Lischer C., Bettschart-Wolfensberger R.: Clinical assessment of anesthesia with isoflurane and medetomidine in 300 equidae. Pferdeheilkunde, 2006, 22, 301-308.
3. Valverde A.: Balanced anesthesia and constant-rate infusions in horses. Vet Clin North Am Equine Pract. 2013, 29, 89-122.

Fig.1 Checking the provoked palpebral reflex during general anesthesia in patient.

Tab. 1 Reliability of measurements in group ISO + KET.

	Spontaneus palpebral reflex	Provoked palpebral reflex	Eye bulb rotation	Corneal reflex	nystagmus
reliability	98,8%	90,5%	42,9%	100%	100%

Tab 2. Reliability of measurements in group ISO.

	Spontaneus palpebral reflex	Provoked palpebral reflex	Eye bulb rotation	Corneal reflex	nystagmus
reliability	89,6%	68,8%	75%	100%	100%