Inhalational, total or partial intravenous anaesthesia- all balanced and opioid-free?

In recent years, total intravenous anaesthesia (TIVA) became increasingly popular in veterinary medicine. History has shown that inhalational and injectable anaesthetics underwent several waves of popularity among human anaesthetists until nowadays both techniques, inhalational anaesthesia and TIVA, are used alongside. By combining inhalational and intravenous anaesthesia, so-called partial intravenous anaesthesia (PIVA), became a third alternative in anaesthesia, both for humans and animals. Further, in target controlled intravenous anaesthesia (TCI) the user is defining a desired concentration of drug in the human body (target) rather than an infusion rate. The rates necessary to reach and maintain that concentration are calculated by the syringe pump using an algorithm. Advantages of TIVA in humans are described as the reduced incidence of post-operative nausea and vomiting, better quality of recovery, greater hemodynamic stability, less bradycardia and shorter hypotensive episodes and better intubation conditions.

Although comparable studies are lacking in veterinary medicine, TIVA seems to be an attractive technique where inhalational anaesthesia equipment is not available or for veterinarians who do not feel comfortable using inhalational anaesthesia. Clearly, once the specific inhalational equipment is available, inhalational anaesthesia is a safe, cheap and comfortable technique, allowing for quick changes of anaesthetic depth. Additional safety of inhalational anaesthesia is probably due to the fact, that patients are generally intubated and oxygen is used as a carrier gas. However, likewise for TIVA, oxygen supplementation, intubation and the possibility to provide intermittent positive pressure ventilation are required for safely performing this technique. When respecting these guidelines, TIVA should be as safe as inhalational anaesthesia.

Among the drugs commonly used for veterinary TIVA or PIVA, we can find propofol, ketamine, alfaxalone, benzodiazepines, alpha-2 agonists and opioids. In-depth knowledge of these drugs is required in order to be able to provide safe TIVA to all patients. As with anaesthetics protocols in general, no one single protocol is suitable for all patients or all indications and thorough knowledge of the drugs will help the practioner to adapt the protocol according to the patient’s needs.

Current literature gives a multitude of protocols that demonstrated useful in specific situations. Among these protocols, we can find for example, propofol only, propofol and remifentanil, alfentanil or fentanyl, propofol and ketamine, midazolam and sufentanil, alfaxalone only, alfaxalone and medetomidine, and many more. Comprehensive knowledge of the pharmacodynamics and pharmacokinetics of the drug as well as reliable monitoring equipment will help the anaesthetist to adapt the protocol according to the needs of each patient.