International Platform of Registered Systematic Review and Meta-analysis Protocols

INPLASY

Protocol for systematic review of TIVA versus inhalant anaesthesia in dogs

INPLASY202590082
doi: 10.37766/inplasy2025.9.0082
Received: 21 September 2025
Published: 21 September 2025

Kaartinen, J; Hynes, A; Bennett, R.

Corresponding author:
Johanna Kaartinen

jkaartinen@rvc.ac.uk

Author Affiliation:
Royal Veterinary College.

ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Data analysis.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202590082

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 21 September 2025 and was last updated on 21 September 2025.

INTRODUCTION

Review question / Objective PICO: * Population: Dogs, canines * Intervention: Total intravenous anaesthesia (TIVA), propofol, alfaxalone * Comparator: Inhalant anaesthesia, isoflurane, sevoflurane * Outcomes: Cardiovascular and pulmonary variables, recovery times, adverse effects, etc.

Rationale Total intravenous anaesthesia is a popular option in small animal anaesthesia due to perceived benefits in terms of cardiopulmonary safety, recovery characteristics improvement etc. compared to inhalant anaesthesia. We aim to systematically review literature and critically assess prospective clinical studies in dogs investigating any outcome comparisons between TIVA and inhalant protocols to find evidence of TIVA outcome benefits compared to inhalant anaesthesia in dogs.

Condition being studied Any conditions included. Rationale is to explore all published studies looking into TIVA versus inhalant anaesthesia in dogs to seek evidence of any outcome benefit for canine patients to guide clinical decision-making.

METHODS

Search strategy Terms: TIVA AND DOG AND INHALANT; ANAESTHESIA AND PROPOFOL OR ALFAXALONE AND TIVA AND DOG; PROPOFOL AND SEVOFLURANE OR ISOFLURANE AND DOG Search refined: Years 1990-2025 Databases: PUBMED, EMBASE, Science Direct. Google Scholar was search to find additional manuscripts.

Participant or population Studies investigating domestic dogs were included.

Intervention Total intravenous anaesthesia (TIVA). In current veterinary practice, this is based on propofol or alfaxalone anaesthesia in dogs.

Comparator Inhalant anaesthesia. In current veterinary practice, this is based on isoflurane or sevoflurane in dogs.

Study designs to be included Prospective clinical and preclinical studies.

Eligibility criteria Prospective studies in dogs comparing TIVA versus inhalant anaesthesia will be included. We aim to not restrict eligibility of studies in the first instance to include as many as found in literature search for any outcome to be assessed for risk of bias. Studies in other species and in wild dog populations were excluded. Older studies, prior to 1990 were excluded as different anaesthetic protocols may have been used previously.

Information sources PUBMED, SCIENCE DIRECT, EMBASE Grey literature: Google scholar was search to find additional manuscripts with the same key words.

Main outcome(s) Most studies show moderate or high risk of bias limiting conclusions that can be drawn.
Propofol TIVA protocols maintain systemic arterial blood pressures more effectively than inhalant anaesthesia. Although use of propofol TIVA is also associated with more hypoventilation. In addition, during neuromuscular blockade, use of certain TIVA protocols shortened NMB duration. However, the limited number of prospective studies and the differing areas of bias makes it difficult to draw firm conclusions about the benefit of TIVA versus inhalant anaesthesia in dogs.

Data management Data is kept in personal files by 2 main authors. Risk of bias assessment was done by 2 main authors independently and checked for discrepancies after initial assessments are done. Any discrepancy is looked at and agreed by consensus.

Quality assessment / Risk of bias analysis The official Cochrane risk of bias tool and SYRCLE risk of bias tool for animal studies were adapted to our research question. Potential sources of bias related to study design and reporting were considered and discussed among the authors, until a final evaluation form was built. For evaluation of bias, six areas were considered: 1. Selection bias – randomisation process; inclusion/exclusion criteria, sample size/power; conflict of interest, 2. Performance bias – differences in treatments between animals, and 3. Detection bias – blinding of researchers and outcome assessment; quality / objectivity and reliability of outcome measures, 4. Attrition and exclusion bias – amount, nature, and handling of incomplete outcome data, 5. Reporting bias – selective reporting, and 6. Other sources of bias – those specific to the trial design such as crossover or cluster randomised trials.
To assess the areas of bias, eight final questions were developed. If even one "key" domain has high risk, the overall judgment was high. If there were some concerns and none are high risk, the judgment of moderate risk was made. Only when all domains were low risk, the judgement of low risk of bias was made. Risk of bias analysis of all included papers was performed by two of the authors independently. Any disagreement between reviewers was resolved by consensus. Studies were ranked as high, moderate or low risk of bias.

Strategy of data synthesis A systematic literature search was performed in accordance with the preferred reporting items for systematic reviews and meta-analysis (PRISMA) guidelines. In addition, the Systematic Review Centre for Laboratory Experimentation (SYRCLE) risk of bias tool was consulted during assessment.
Each paper was evaluated by two main authors for its level of evidence (LoE) and assessed for quality and risk of bias. LoE was assigned following a structured assessment, based on The Oxford 2011 Levels of Evidence from the Oxford Centre for Evidence-Based Medicine (OCEBM 2011) whilst additionally allowing distinction between clinical (realistic) (LoE II) and experimental conditions (LoE III). Briefly, the highest level of evidence category I (LoE I) includes meta-analyses and systematic reviews, level II randomised controlled clinical trials, level III randomised controlled experimental trials conditions, level IV cohort studies and level V case series and reports.

Subgroup analysis see Quality assessment /Risk of bias analysis. and Strategy of data synthesis.

Sensitivity analysis see Quality assessment /Risk of bias analysis. and Strategy of data synthesis.

Language restriction Initially no but publications to be included will need to be translated/published in english.

Country(ies) involved United Kingdom.

Keywords TIVA; DOG; INHALANT; ANAESTHESIA; PROPOFOL; ALFAXALONE; SEVOFLURANE; ISOFLURANE.

Dissemination plans Publication in the Journal of Veterinary Anaesthesia and Analgesia.

Contributions of each author
Author 1 - Johanna Kaartinen - Review design, review process plan and execution, risk of bias

assessment, drafting, revision and approval of final version.
Email: jkaartinen@rvc.ac.uk
Author 2 - Aoife Hynes - Conception of the review idea, first draft, revision, and approval of final version.
Email: aoifehynes@icloud.com
Author 3 - Rachel Bennett - Conception of the review idea, execution of review process, risk of bias analysis, revision and approval of final version.