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COMMON ERRORS IN ANAESTHESIA AND PAIN MANAGEMENT IN SMALL ANIMALS

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Introduction

Anaesthetic practice in small animals has evolved significantly in recent decades, but errors that compromise patient safety persist. This paper reviews the most common errors in veterinary anaesthesia and analgesia, addressing human, technical and organisational causes, and proposes strategies for their prevention based on evidence and recommendations.

Anaesthesia and pain management are cornerstones of modern veterinary medicine. When applied correctly, they enable surgical, diagnostic and therapeutic procedures to be performed safely. However, the anaesthetic process involves risks that can be exacerbated by human, technical or systemic errors. Identifying and proactively addressing these risks is crucial to ensuring animal welfare and clinical quality.

Since Robert Macintosh questioned the inevitability of deaths under anaesthesia in 1949, multiple initiatives have been developed to reduce avoidable harm, particularly by addressing human error.

Key concepts: Error vs Violation

Error is defined as the unintentional use of an incorrect plan or failure to carry out a planned action.
A violation, on the other hand, is a deliberate (but not necessarily reprehensible) deviation from established practices, carried out with the intention of achieving a goal while maintaining safety.

Common errors in anaesthesia

Errors can be classified as:

1. Technical and equipment failures
    a. Poorly calibrated or poorly maintained equipment (vaporisers, infusion pumps).
    b. Absence of standardised monitoring systems.
    c. Lack of preoperative equipment checks, which increases the risk of intraoperative failures (1).
2. Human errors
    a. Planning errors
        i. Generic anaesthetic protocols without individualisation by species, breed, age or clinical condition.
        ii. Lack of knowledge of pharmacological contraindications.
    b. Dosage errors
        i. Incorrect calculation due to inaccurate weight estimation.
        ii. Repeated doses without considering accumulation or interaction.
    c. Errors in administration
        i. Administration via the wrong route
        ii. Administration to the wrong patient
3. Poor monitoring
    a. Delegation of critical tasks to untrained personnel.
    b. Neglect during the recovery phase, when most complications occur (2)

In general, we could also classify human errors as:

- Action failures (slips, lapses).
- Decision failures (errors based on rules or knowledge).
- Communication failures.

Common errors in pain management

- Underestimation of pain, especially in animals such as cats, which tend to hide it.
- Limited use of multimodal strategies, when the ideal is to combine opioids, NSAIDs, local anaesthetics and non-pharmacological techniques (3)
- Premature discontinuation of analgesia, causing a rebound effect.
- Lack of systematic reassessment, without applying validated scales such as the Glasgow Composite Pain Scale (4).

Environmental/social factors contributing to error (5)

- Organisational:
  - Staff shortages, high workload, poor coordination.
- Work environment:
  - Demanding simultaneous tasks under pressure, excessive stimuli and data.
- Frequent distractions (one every 4 minutes).
- Alarm fatigue (1.2 per minute; 80% have no therapeutic consequences).
- Unexpected problems (18% require intervention; 3–5% with serious events).
- Sleep deprivation (17–19 hours without sleep ≈ driving with a blood alcohol level of 0.05%).

AVA guidelines (2018) for avoiding errors (6)

1. Patient safety
   - Mandatory use of safety checklists.

2. Case planning
   - Personalised design of the anaesthetic plan.
   - Referral in cases beyond the scope of practice.

3. Analgesia
   - Tailored analgesic plan.
   - Continuous assessment using validated scales.
   - Clear information for the patient's owner.

4. Staff
   - Mandatory presence of trained staff.
   - Student supervision.
   - Use of specialised staff when possible.

5. Monitoring
   - An anaesthetist dedicated to each case.
   - Equipment such as pulse oximeter, capnography, pressure monitors.

6. Patient support
   - Temperature control, fluid therapy, ventilatory support.

7. Emergency preparedness
   - Annual CPR training.
   - Guaranteed intravenous access.

- Emergency equipment available and checked.

8. Recovery
   - Adequate monitoring and documentation.
   - Appropriate space for recovery.

9. Continuous training
   - Ensure a minimum number of hours per year of specific training
   - Appoint a person in the clinic responsible for ensuring that staff are trained

10. Records
   - Complete documentation, with monitoring of morbidity and mortality.

Non-technical skills

Currently, it has been identified that in order to mitigate these risks, anaesthetists must acquire additional competencies known as non-technical skills.

These are defined as behaviours that do not directly involve the use of medical knowledge, drugs or specialised equipment.

They include:
- Interpersonal skills: effective communication, teamwork, leadership.
- Cognitive skills: situational awareness, decision-making.

Although these skills are not new, leading anaesthesia professionals have applied them intuitively. What is innovative is their formal incorporation into medical school curricula and residency programmes.

ANTS (Anaesthetists' Non-Technical Skills) system

With the aim of systematising and evaluating these skills, the ANTS system was developed in 1999 through a collaborative project between the *Industrial Psychology Research Centre at the University of Aberdeen* and the *Scottish Clinical Simulation Centre* (7).

This system groups non-technical skills into four main categories, subdivided into 15 specific elements:

Category	Elements
Task management	Planning and preparation Prioritisation Establishing and maintaining standards Identification and use of resources
Teamwork	Coordination with team members Information sharing Use of authority and assertiveness Assessment of capabilities Supporting others
Situational awareness	Information gathering Recognition and understanding Anticipation
Decision making	Identification of options Risk assessment and selection Reassessment of decisions

Institutional perspective

Our hospital, in addition to faithfully following the recommendations of the AVA (Association of Veterinary Anaesthetists) on anaesthetic safety, is in the process of incorporating the ANTS system as a tool for continuous improvement.

Its implementation will enable us to:

- Provide structured feedback to clinical staff.
- Facilitate reflective analysis of professional performance.
- Promote a proactive approach to incident prevention.

Recommendations for improvement

- Use of checklists before, during, and after the procedure.
- Implementation of continuous training in anaesthesia and analgesia, including clinical simulations.
- Promotion of a non-punitive safety culture that encourages reporting and analysis of errors as part of institutional learning.
- Adoption of the AVA Guidelines (2018) on anaesthetic safety, which include advanced monitoring, personalised planning, and well-defined recovery and emergency protocols

Reducing errors in anaesthesia and pain management in small animals requires a multidisciplinary approach. It is essential to recognise that safety does not depend solely on the correct use of drugs and equipment, but also on the organisation of the clinical environment, the skills of the team and the institutional commitment to continuous improvement.

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