

# Pre-medication and anaesthesia in dogs and cats

Summary of Recommendations from  
2009 Expert Round Table Discussion

# Introduction

On 17<sup>th</sup> February 2009 the panel met to discuss aspects of anaesthesia focussing particularly on pre-medication considerations as well as the induction, maintenance and recovery periods. Many topics were discussed including the need for an evidence-base in anaesthetic practice, multimodal approaches to analgesia and case-specific anaesthesia. After a day of discussion, the following recommendations have been made.\*

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\* Please refer to the relevant datasheets for specific product information. Some dosages quoted in this document may vary from the authorised dosage regimes.

# Pre-anaesthetic medication and the pre-anaesthetic period

## Aims of pre-anaesthetic medication

- To produce anxiolysis, for facilitating handling and reducing catecholamine release
- To promote immobility and hyporeflexia through muscle relaxation
- To provide analgesia
- To “smooth” the induction, maintenance of, and recovery from anaesthesia
- To decrease the requirement for induction and maintenance anaesthetic agents, and thus reduce their side effects

## General recommendations

- Before anaesthesia, a full clinical examination should be carried out in all animals
- The routine use of pre-anaesthetic blood tests is unnecessary and unjustified unless indicated by the findings of the medical history and a full physical examination
- In cats and dogs (except neonates), food should be withdrawn at least 6 hours before anaesthesia but water should be available up until the time of pre-medication
- Appropriate pre-medication including adequate analgesia is highly beneficial in most cases as it will reduce the dose of induction agent required and facilitate induction. Appropriate restraint and a calm and quiet environment will also facilitate induction
- The timing of induction relative to pre-medication is important and should coincide with the peak effect of the pre-medication agents, i.e. >30 minutes after IM acepromazine, 15 to 20 minutes after IM medetomidine

# Pre-anaesthetic medication and the pre-anaesthetic period

## General recommendations

- Correct timing of pre-medication must be flexible, as stated previously, however for analgesics given intramuscularly to work, a period of 20 minutes should elapse between pre-medication and induction of anaesthesia. If a period of more than an hour has elapsed then re-dosing or an incremental dose of an analgesic should be considered
- More reliable effects of sedative and analgesic agents are achieved through intramuscular injection in comparison to subcutaneous injection
- More reliable effects are also achieved when animals are kennelled in a calm quiet environment after pre-anaesthetic medication is given
- Pre-anaesthetic medication should provide sufficient analgesia and anxiolysis for venous catheterisation (stress-free for both the subject and the vet)
- Excessive sedation, for example an animal that is non ambulatory, is undesirable after premedication
- Cats and small dogs often need greater doses of sedatives in comparison to larger dogs for adequate sedation (e.g. 0.05 - 0.1 mg/kg acepromazine)
- Routine use of antimuscarinic (parasympatholytic) drugs, e.g. atropine, is not recommended
- Animals begin to lose heat as soon as they are sedated - measures to maintain normothermia should be implemented after drug administration
- Labelling of syringes is important. Clear labelling of similar coloured bottles is also recommended
- The use of white boards for recording the time and route of drug administration greatly facilitates pre-anaesthetic medication as these help indicate the need to administer additional doses of short-acting drugs

# Pre-anaesthetic medication and the pre-anaesthetic period

## ASA 1 patient for a soft tissue surgery. E.g. bitch spay,

- The routine use of non steroidal anti inflammatory drugs (NSAIDs) holding a licence for pre-operative use is recommended. NSAIDs are enzyme inhibitors and as such there is a lag period before they become effective
- The combined effects of sedatives and opioid agonists is preferable to either alone
- The preferred sedative agents are acepromazine or  $\alpha 2$  agonists, e.g. medetomidine or dexmedetomidine
- Buprenorphine is a suitable opioid when used in combination with a NSAID

## Brachycephalic animals

- Animals should not be left unsupervised once they receive pre-anaesthetic medication
- Maintenance of a patent airway is a priority THROUGHOUT the peri-anaesthetic period
- The subject should be observed throughout recovery until FULLY recovered
- IV access should be secured as soon as possible in case problems develop after pre-medication
- Pre-oxygenation is recommended where feasible
- There is an increased risk of regurgitation in these breeds
- If possible, provision for emergency airway surgery and/or rapid intubation should be made

## Caesarean operation

- As emergency cases, these may present with full stomachs. Even if they have not eaten for many hours, the stomach may not be empty
- Protecting the airway with e.g. a cuffed endotracheal tube (ET) is essential in case of regurgitation or emesis during induction or recovery
- Increased reliance on opioid analgesia is recommended given the risk of hypotension caused by the gravid uterus and haemorrhage
- The pregnant bitch or queen is sensitive to all anaesthetics; lower doses are required

# Pre-anaesthetic medication and the pre-anaesthetic period



## Cardiovascular disease

- In most cases, animals showing no signs of exercise intolerance should not be at much greater risk during anaesthesia
- A well sedated/pre-medicated animal will probably have fewer problems during anaesthesia resulting from arrhythmias
- Any subject with unstable cardiovascular disease should be stabilised pre-operatively
- Appropriate choice of pre-medication relies on accurate diagnosis of the underlying condition
- Animals on cardiac medication should continue this medication throughout the peri-anaesthetic period
- Acepromazine is not necessarily contraindicated as it may improve cardiac output by reducing the afterload

## Clinically geriatric subjects

- It is useful to differentiate clinically geriatric subjects from chronologically geriatric animals
- The former have a reduced dose requirement for sedatives, but opioid doses may not necessarily be reduced
- Thermoregulation and fluid balance is especially important
- Existing osteoarthritis may be exacerbated by unsympathetic body positioning under anaesthesia
- If an animal is in receipt of NSAIDs then these should be continued perioperatively - fluid therapy may be required to ensure hypotension is prevented and renal blood flow is preserved

# Pre-anaesthetic medication and the pre-anaesthetic period

## Dental operations

- Airway management is of critical importance
- Adequate pain management through the use of opioids and/or local anaesthesia is recommended
- Careful assessment of renal function should be made given the high proportion of geriatric subjects that undergo dental operations
- Hypothermia is common in these often long and wet procedures
- The use of uncuffed ET tubes with pharyngeal packs may offer advantages over cuffed tubes in airway protection whilst reducing risk of tracheal trauma, particularly in cats and small dogs
- Some dental procedures are unnecessarily prolonged
- Monitoring is difficult but should be attempted and the duration of anaesthesia kept as brief as possible

## Endocrine diseases

- Wherever possible, only attempt anaesthesia in medically stabilised subjects
- Stable endocrine disease does not preclude pre-anaesthetic medication
- Diabetic animals should have their blood glucose monitored throughout the peri-anaesthetic period irrespective of the insulin medication
  - Mild hyperglycaemia is preferable to any degree of hypoglycaemia
  - There are no pre-medication or anaesthetic drugs which cannot be used safely in diabetic animals
- Cats with hyperthyroidism need to be sedated to reduce stress and oxygen demand and where possible, should be stabilised medically before non-emergency anaesthesia

## Epileptic subjects

- There is no sound evidence to indicate acepromazine lowers seizure threshold
- No anaesthetic agent is contraindicated in epileptic subjects
- Subjects receiving medication should continue doing so in the peri-anaesthetic period
- Animals should be monitored for seizures during the peri-anaesthetic period

# Pre-anaesthetic medication and the pre-anaesthetic period

## Hypovolaemia

- Opioids can be administered
- NSAIDs, acepromazine and  $\alpha 2$  agonists should not be administered until normovolaemia has been achieved
- Careful history taking can avoid missing cases of hypovolaemia masked by hyperdynamic physiological compensation in animals with significant fluid losses
- If surgery is urgent, the circulating blood volume can be rapidly restored before induction with plasma replacement fluids such as starch or gelatins. The rest of the ECF deficit can be restored later during and after anaesthesia
- The priority must be to restore normal circulating volume indicated by good peripheral pulses, normal heart rate and warm extremities

## Increased intracranial pressure

- These cases require specialist consideration and management, and advice should be sought from a recognised expert in anaesthesia, and preferably sent to an appropriate referral facility

## Morbidly obese patient

- Animals should be dosed on an ideal, rather than an actual bodyweight basis
- Airway management is important as the obese are prone to upper airway obstruction
- Ideally, weight reduction should be attempted before elective procedures
- Intramuscular injection is more difficult in these cases

## Non-surgical cases

- Butorphanol may have advantages where sedation rather than analgesia is required

## Paediatric cases (< 3 months of age)

- Doses of drugs at the lower end of ranges should be used
- Careful attention should be paid to maintenance of normal body temperature and blood glucose concentration
- Homeostatic mechanisms are not fully developed so anaesthesia must be managed with greater care
- Food should not be withheld before surgery

# Pre-anaesthetic medication and the pre-anaesthetic period

## Painful cases

- Subjects should receive 'multimodal analgesia' using opioids, NSAIDs, local anaesthetics, ketamine,  $\alpha 2$  agonists etc
- Analgesics should be dosed according to their desirable effects, and not on a "by the clock" basis
- Pain is an individual experience and is dynamic, so dose requirements vary according to case
- A system of pain assessment should be used, e.g. the Glasgow Composite Pain Measure Short-Form Scale (<http://www.gla.ac.uk/faculties/vet/smallanimalhospital/ourservices/painmanagementandacupuncture/>)
- Pain assessment in cats is more difficult than in dogs
- The rational use of analgesia is justified in painful cases despite possible side effects
- In severe pain, e.g. trauma, spinal cases, non-licensed  $\mu$  agonist opioid controlled drugs offer distinct advantages over licensed drugs

## Renal disease

- Peri-anaesthetic fluid and electrolyte balance is important. Consideration should be given to providing fluid therapy throughout the hospitalization, rather than the peri-operative period
- For small dogs and cats, appropriate infusion equipment (syringe drivers /pumps/small volume giving sets) should be used to avoid the risk of over-transfusion
- Agents such as acepromazine,  $\alpha 2$  agonists and ketamine are not contraindicated but lower doses may be advisable
- The overall clinical picture of these cases should be assessed rather than making judgements on the basis of laboratory results alone

# Pre-anaesthetic medication and the pre-anaesthetic period

## Respiratory disease

- The only contraindication for giving oxygen is if the animal is on fire!
- Stress-free administration of oxygen is recommended wherever possible
- A modest level of general anaesthesia is usually safer for subjects with respiratory disease than “heavy” sedation
- Providing clinical signs are monitored, there are no specific contraindications to any drug, although doses may require adjustment
- Overdosing must be avoided. Attempt to achieve “light” sedation initially, giving incremental doses later only if effects are inadequate
- IV access is important in these (as in other) cases

## Trauma cases

- Five key points to remember are:
  1. Analgesia
  2. Fluid therapy
  3. Oxygen
  4. Warmth
  5. Stabilise, assess and re-assess
- Effective, i.e. non-licensed “controlled” opioids offer particular advantages over other agents in cases of trauma, including head and thoracic trauma

# Induction of Anaesthesia

## General recommendations

- Venous cannula pre-placement and pre-anaesthetic medication that achieve the aforementioned goals are pre-requisites of the induction of anaesthesia
- A means of providing oxygen should always be available
- Induction agents (such as alfaxalone and propofol) should be administered slowly allowing their effects to be titrated
- The ultimate purpose of IV induction agents is to gain control of the airway although some induction agents may be used for short periods of surgical anaesthesia
- The use of appropriate drugs by the IM route is permissible in animals whose temperament precludes safe handling and/or venous access
- Animals anaesthetised with IM agents should be regarded as such, and not 'heavily sedated'. These cases require the same standards of care and monitoring as those receiving more complex techniques. Difficulty in recognizing the transition phase from sedation to anaesthesia complicates airway protection. The use of IM anaesthetic techniques are not without hazard and oxygen supplementation is recommended
- The use of phenol-free local anaesthetic sprays are recommended in cats. It should be remembered that:
  - Laryngeal desensitization is not immediate! Administer oxygen via face-mask until intubation conditions are present
  - Laryngeal arreflexia has benefits during both intubation and extubation
- Appropriate pre-medication including adequate analgesia is highly beneficial in most cases as it will reduce the dose of induction agent required and facilitate induction. Appropriate restraint and a calm and quiet environment will also facilitate induction
- The timing of induction relative to pre-medication is important and should coincide with the peak effect of the pre-medication agents, i.e. >30 minutes after IM acepromazine, 15 to 20 minutes after IM medetomidine
- Most pre-medication agents will reduce the dose requirements of induction agents, particularly  $\alpha_2$  agonists
- Inhalation techniques for inducing anaesthesia are useful in many cases. The technique benefits greatly from sedative pre-medication. Attention to scavenging and the reduction of contamination is required. Excessive dead space in chambers will slow the rate of induction

# Maintenance of Anaesthesia

## General recommendations

- During maintenance, patent airways and IV access must be preserved whilst vital signs are monitored as frequently as needed
- A suitably trained person (other than the surgeon) should be in continual attendance throughout surgery and be dedicated to monitoring anaesthesia
- Anaesthetic monitoring equipment refines the monitoring process but does not replace a trained anaesthetist
- Written anaesthetic records are useful to identify trends, record drug doses and to provide a reference for future anaesthetics
- Hypothermia should be avoided. Ideally, subjects should enter the recovery period at their normal body temperature
- Hypothermia is easier to prevent than correct
- Heating devices should be used to prevent heat loss and warm, but not burn the animal
- Intravenous fluid infusion using suitable infusion equipment is recommended
- Appropriate breathing systems with appropriate fresh gas flows must be used. Please refer to the BSAVA Manual of Canine and Feline Anaesthesia and Analgesia for more detailed information

## General recommendations

- Recovery has been identified as the period where most deaths occur in small animal anaesthesia
- Frequent attention should be paid to
  - Airway
  - Breathing
  - Circulation
  - Body temperature
  - Pain
- Animals with intubated tracheae should never be left unattended
- Where possible, IV cannulae should be left in place until animals are fully recovered
- While atipamezole may shorten the recovery period in animals sedated with  $\alpha_2$  agonists its use does not preclude the requirement for frequent attention and monitoring. It will also antagonise any analgesic effects of the  $\alpha_2$  agonist used
- There are a number of reasons for prolonged recovery, hypothermia is a common cause
- Any post-operative stimulation, e.g. wound dressing, should take place while the animal is anaesthetised and not during recovery
- When considering the requirements of recovery, comfort should take precedence over speed
- The nursing requirements of subjects in recovery, i.e. fluids, position, oxygenation, etc., and particularly analgesia and bladder emptying must not be overlooked

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## Pre-medication and anaesthesia in dogs and cats

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