The following pain management protocol is tiered to ensure a global relevance, recognizing that not all analgesic modalities are available to veterinary practitioners and vary from region to region around the world. Its implementation will be guided by the various analgesic modalities available along with the needs of the individual patient requiring treatment. This protocol is reproduced from the WSAVA Global Pain Treatise, a succinct yet comprehensive review of pain assessment, various pain modalities, and the treatment of various clinically painful scenarios in both dogs and cats. The WSAVA GPC Pain Treatise published in the *Journal of Small Animal Practice* and is available for open access at the GPC pages of **www.wsava.org**.

Neonatal and paediatric patients

Studies in neonates and infants show that when anaesthesia or analgesia was withheld, altered pain sensitivity and increased anxiety occurred with subsequent painful experiences, when compared to children receiving analgesia. This suggests that infants retain a 'memory' of a painful experience with subsequent altered response to a painful stimulus. This has also been shown in laboratory animals.

The term paediatric generally refers to the first six months of life. Due to important physiological changes which occur during this time frame, a further demarcation is defined as: neonatal (0–2 weeks), infant (2–6 weeks) weanling, (6–12 weeks) and juvenile (3–6 months). This distinction is made to highlight the metabolic changes that occur during these periods of maturation.

There tends to be apprehension in administering analgesic drugs, especially opioids, to young animals due to the often cited 'decreased ability for drug metabolism and high risk of overdose'. While this may be a potential concern in the neonate, it is not necessarily so through all stages of maturation. While there are no reports in the veterinary literature suggesting increased dosing should be considered in the young cat or dog, personal experience with intensive monitoring of the young (3–6 month old) animal has shown opioid doses for analgesia may be equal to, and can be higher than, a mature adult emphasizing that administering the analgesic to effect, rather than a pre-determined dose, is the most important method of clinical dosing. However, young animals can be susceptible to the sedative effects of opioids. Opioids can be reversed with careful titration of naloxone should there be clinical evidence of CNS depression and respiratory depression, hypotension and bradycardia (unless an emergency, <0.002 mg/kg may suffice; higher doses may result in hyperalgesia, hyperexcitability, cardiac arrhythmias and aggression. Refer to Table 1 of the full Guidelines for instructions). For all these reasons, frequent pain assessment and treatment should be evaluated on a case-by-case basis and tailored to patient needs.

The neonate has reduced clearance of many drugs as compared with older individuals largely because of:

- The greater body water content leading to a higher volume of distribution
- A larger fraction of body mass that consists of highly perfused tissues
- A lower plasma concentration of proteins that bind drugs
- Incomplete maturation of their hepatic-enzymes systems.

The hepatorenal system continues to develop until 3–6 weeks of age; this may result in reduced metabolism and excretion, which may require alterations in dosing and dosing intervals. For all young animals, the presence of milk in the stomach may inhibit the absorption of some orally administered drugs, potentially resulting in lower blood concentrations.

Opioids

Lower doses of fentanyl or morphine are required for analgesia in the neonate (0–2 weeks) when compared to the 5-week-old puppy or kitten. Puppies and kittens are also more sensitive to the sedative and respiratory depressant effects of morphine than adults. Fentanyl may be a more suitable opioid in the young paediatric and neonatal puppy or kitten; however, as it is short-acting continuous IV access and titration are required. Buprenorphine may be an alternative, and associated with minimal respiratory depression. Hydromorphone, oxymorphone and methadone may also be used; however, as with all opioids, starting at or below the lowest dose of the range and increasing to effect is recommended. Opioids can be reversed with titration of naloxone should there be clinical evidence of overdosing.

Non-steroidal anti-inflammatory drugs

NSAIDs are not recommended for animals less than 6 weeks of age; however, for some NSAIDs the age is older. It is essential to consult the package insert of all NSAIDs prior to using in young animals.

Local anaesthetics

Local anaesthetics are recommended, but careful dosing according to accurate body weight is imperative. Lidocaine is painful when infiltrated even with 27–30 gauge needles. To reduce pain, buffering (a 20:1 mixture of local anaesthetic with 1 mEq/mL sodium bicarbonate; e.g. lidocaine 2% = 2 mL:0.1 mL), warming (36–37°) and slow administration is recommended. Mepivacaine does not induce pain on injection. A maximum dose of local anaesthetic is half the adult dose for both kittens and puppies up to 10 days of age.

Topical LA creams (EMLA® Cream; AstraZeneca LP, Wilmington, DE, USA [prescription only mixture of lidocaine 2.5% and prilocaine 2.5%]; MAXILINE®4, Ferndale Laboratories, Ferndale, MI, USA [over-the-counter. Onset time faster than EMLA cream]; ELA-Max® or L.M.X™; Ferndale Laboratories, Ferndale, MI, USA [liposome-encapsulated formulation of 4% lidocaine (OTC)]) are effective when used on intact skin to provide anaesthesia for IV catheter placement, blood collection, lumbar puncture and other minor superficial procedures. The creams should be covered with an occlusive dressing for at least 30 minutes prior to the procedure. Products containing adrenaline (epinephrine) should be avoided. Lidocaine 2% is also available as a sterile gel, and is used for local desensitization of the vaginal vault or penis prior to urinary catheter placement.

Alpha$_2$ adrenoceptor agonists

Alpha$_2$ agents are sedative analgesics and are not recommended due to the cardiovascular effects.

Sedatives

These should not be used in young animals, especially when less than 12 weeks of age. Most sedatives have no analgesic properties and if used may mask pain behaviours.

Nursing

Suckling is analgesic in rat and human infants. Where any painful procedure is required in young animals, contact with the mother as soon as possible is recommended. Other feeding procedures can provide distraction-related analgesia and comfort.

For additional pharmaceutical dosing information, see the dosing tables in the WSAVA GPC Treatise at www.wsava.org

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