Anaesthesia in caesarean section

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EVA RIOJA GARCIA presents stabilisation, anaesthetic and analgesic protocols relating to a case of dystocia in a pregnant cat

A THREE-YEAR-OLD cat is presented for a caesarean section due to presence of dystocia. There are five kittens and they are still alive.

The cat is alert, but quiet, with an estimated dehydration level of seven per cent, heart rate of 210bpm and respiratory rate at 45 breaths per minute.

Questions

• A. Would you perform any preoperative blood work and stabilisation of this patient?

• B. What would be the ideal characteristics of the anaesthetic protocol?

• C. What would be your perioperative analgesic protocol for the mother?

Answer A

Yes. At least a minimum database should include a haematocrit, total protein and creatinine to estimate a bit better the level of dehydration and provide some baseline data in case complications arise during surgery. The cat needs some intravenous fluids to correct the estimated dehydration level of seven per cent and avoid intraoperative hypotension, which is very common when the uterus is exteriorised (due to redistribution of blood).

The amount of crystalloid isotonic fluid (Hartmann's or sodium chloride 0.9 per cent) necessary to administer is 6kg x 0.07 = 0.42L (420ml), of which at least one third (140ml) should be administered before induction of anaesthesia and the rest during surgery.

Also before induction of anaesthesia, the cat must be preoxygenated for five minutes as the oxygen requirements are elevated, the functional residual capacity of the lungs reduced and the closing volume of the alveoli increased (that is, easier to develop atelectasis), so the chances of hypoxaemia are very high if the cat develops induction apnoea.

Answer B

Avoid sedative drugs that cause cardiovascular and fetal depression (that is, alpha-2 agonists or phenothiazines) and long-duration opioids in premedication (that is, methadone or morphine). Use agents that will be readily eliminated by the newborn kittens, ideally that do not require liver metabolism, as liver function is not mature yet, such as propofol and isoflurane. Alfaxalone is also a good choice, even though it undergoes liver metabolism, but it seems to be easily metabolised by the kittens.

All these anaesthetic agents cause dose-de- pendent hypotension and therefore fentanyl may be used in premedication (3µg/kg to 5µg/kg IM, SC or IV) as it decreases the anaesthetic requirements, provides analgesia, causes minimal cardiovascular depression and it is short lasting (20 to 30 minutes).

Benzodiazepines cause depression of the newborn kittens and, therefore, if used, a benzodiazepine antagonist (that is, flumazenil) should be administered sublingually. If no antagonist is available, it is recommended not to use a benzodiazepine. If the newborns present depression due to placental transfer of an opioid administered to the mother, reversal may be achieved with a drop of sublingual naloxone. However, it is necessary to remember naloxone only lasts 30 minutes and re-narcotisation/depression can occur if a long-lasting opioid (that is, methadone or morphine) has been used in premedication. Buprenorphine is a long-lasting opioid (up to eight hours) and it cannot be antagonised with naloxone, therefore its use is also reserved for the postoperative period.

Answer C

A short-lasting opioid such as fentanyl (3µg/ kg to 5µg/kg IM, SC or IV) or pethidine (3mg/ kg to 5mg/kg SC or IM, never IV) could be used to provide analgesia to the mother during surgery. Once the kittens are extracted from the uterus, a longer-lasting opioid such as morphine or methadone (0.2mg/kg SC, IM or IV) or buprenorphine (0.02mg/kg SC, IM, IV or oral mucosal) may be administered for the first 24 to 48 hours. A lumbosacral epidural injection with sterile preservative-free lidocaine two per cent (0.12 mL/kg) and sterile preservative-free morphine (0.1 mg/kg) can also be used, which will provide up to 18 hours of analgesia.

Another option is to perform a line block with diluted lidocaine (maximum total dose 5mg/kg) at the incision site; however, greater volumes of lidocaine are needed (compared with epidural) and it will be present in greater concentrations in the fetuses, causing more newborn depression.

Controversy surrounds the use of non-steroidal drugs in post-parturient females as some drug will be present in milk. One single dose of a non-steroidal is frequently used by the author with no observed problems in the newborns and provides excellent analgesia to the mother.

• Please note some drugs mentioned within this article are used under the cascade.