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The veterinary nurse's role in nursing an equine surgical colic patient

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ABSTRACT: The nurse's role is critical in the pre-operative, peri-operative and post-operative period in surgical colic patients, due to colic being a major cause of morbidity and mortality in horses. The nurse's role can vary hugely when nursing a surgical colic patient as their role could include laboratory work, placing catheters and administering medication, theatre nursing, intravenous fluid therapy and general TLC.

Introduction

Abdominal pain in horses is usually referred to as colic, and this pain arises from the alimentary tract, although sometimes the pain is associated with the liver or kidneys. Colic is a major cause of morbidity and mortality in horses. Many colic episodes may resolve spontaneously or with medical management; however, 7–10% may be fatal if not treated surgically (Proudman, Smith, Edwards, & French, 2002).

Colic work up

When the horse is admitted to the hospital, the veterinary surgeon (VS) must make a diagnosis of whether the patient can be treated medically or whether the patient would need surgical intervention to resolve their abdominal discomfort. A thorough history of the patient is taken, which may include onset of colic, worm history, normal routine and feeding or any recent changes. A clinical examination is performed which includes heart rate, respiratory rate, temperature, mucous membrane colour, capillary refill time and auscultation of borborygmi in both left and right upper and lower quadrants (Boys Smith & Millar, 2012).

The VS also will take bloods for usually a systemic haematology which includes packed cell volume (PCV). Total protein (TP) is also measured either manually using a refractometer or using a biochemistry analyser, and a peripheral lactate

is also measured. A rectal examination, abdominal ultrasonography (see **Figure 1**) and abdominocentesis is also performed.

The VS will also pass a nasogastric tube to attempt to decompress the stomach from either gastric reflux (as horses are unable to be sick like dogs or cats) or gas. This tube may need to be left *in situ* during induction and anaesthesia if gastric reflux is present to prevent distension and possible rupture of the stomach.

Pre-operative nursing care

Once the VS has made the decision that an exploratory laparotomy is required, the veterinary nurse's (VN's) role is critical during the pre-operative, peri-operative and post-operative periods. The VN will need to ensure that the patient's shoes are removed, which reduces the likelihood of injury to the patient during recovery, but also reduces the likelihood of damaging the recovery room floor during their recovery period. The patient's feet should then be wrapped with an elastic adhesive bandage and the patient's tail should be plaited and bandaged up. Also, if time allows and the patient is grossly contaminated, a quick groom removes any mud and dirt from the patient, consequently reducing the level of contamination in the theatre suite (Boys Smith & Millar, 2012).

The patient's mouth should be washed out using a hose pipe or mouth syringe, to remove any food in order to prevent tracheal contamination during intubation,



Figure 1. Abdominal ultrasonography

which could lead to aspiration pneumonia. The patient's head collar should be changed to a rope halter for induction, to reduce the likelihood of facial nerve paralysis from the metal clips on a normal head collar (Boys Smith & Millar, 2012).

A catheter should be placed into the jugular vein to facilitate administration of medication prior to induction but also while the patient is anaesthetised to enable administration of intravenous (IV) fluids, dobutamine, or emergency drugs in case of a crisis. Once the catheter is placed, antibiotics and analgesia should be administered as per the VS's instructions. Antibiotics should be administered around 30–60 minutes prior to starting surgery. If the patient is severely dehydrated, the VN may be required to administer hypertonic saline. The hypertonic saline provides a supranormal concentration of sodium which will cause water to be drawn in from the interstitial space into the intravascular space, rapidly expanding the intravascular volume. Once the patient is anaesthetised the anaesthetist will provide the patient with crystalloid fluids to replace the fluid deficit. If it is safe to do so prior to anaesthesia, the VN should try to clip and scrub the patient's ventral abdomen to reduce the duration of general anaesthesia (Boys Smith & Millar, 2012).

The VN should assist with induction and hoisting the patient onto the theatre table and position the patient into dorsal recumbency (see Figure 2). A urine catheter should be placed, and if placed in a gelding or stallion, the penis/prepuce

should be cleaned and then the prepuce should be prepared by packing the preputial orifice with gauze swabs and closed by a purse string suture (Southwood, 2015).

The surgical site should be prepared by clipping the ventral abdomen and scrubbed using gauze swabs and chlorhexidine as it has been shown to be superior to povidone iodine (Wilson, Hartmann, Carter, Klohn, & Macwilliams, 2011), using a back-and-forth motion until the swabs remain clean. This should be followed by a sterile scrub, either using sterile swabs, chlorhexidine or sterile water, and the scrub is then removed by sterile water or alcohol. Alternatively, a chloraprep applicator could be used.

Throughout the surgery, the VN should anticipate what the surgeon requires to speed up the procedures thus reducing the length of general anaesthesia. Once the patient is prepared for surgery the VN should pass the VS all the instruments and sterile equipment that they require for the surgery. The patient is then draped using a large fenestrated drape over the abdomen which has large plastic pockets which assist the surgeon by keeping the ventral bowl in place and moist from the lavage fluids (Southwood, 2015).

An instrument and swab count should be performed prior to making the first incision and prior to closure, to reduce the risk of leaving an instrument or swab in the abdomen. These checks can easily be recorded on a dry-wipe board or a paper instrument checklist. Once a used swab leaves the surgical field it should be



Figure 2. Hoisting a patient

thrown into a swabs bucket and not discarded straight away into clinical waste, as this will facilitate counting prior to closure (Southwood, 2015).

The VS will incise the ventral midline at 1 cm cranial to the umbilicus and extended 20–30 cm (15 cm in a foal) cranially. The incision is made through the skin, subcutaneous tissue and linea alba. After the body wall is incised, the VS bluntly enters the peritoneum with digital pressure (Southwood, 2015). The VN's role is to ensure that any exteriorised bowel must be kept moist at all times, by lavaging with warm sterile sodium chloride solution, which should assist in reducing the risk of desiccation (Boys Smith & Millar, 2012).

Surgical lesions may include: correcting the position of the bowel (see Figure 3), clearing an impaction from the large or small intestine, freeing entrapped intestine and removing a section of compromised gut and performing an anastomosis.

Aftercare

Initially, monitoring is very intensive, as this allows early detection of any complications which may arise. These checks are usually every 2 hours or more often if required. An intensive colic observation should include heart rate, rhythm and quality, respiratory rate and effort, temperature, abdominal auscultation to include bilaterally ventral and dorsal quadrants, digital pulses, mucous



Figure 3. Exteriorised bowel



Figure 4. Patient being administered plasma and crystalloids

membrane colour and condition (such as dry, moist or tacky), capillary refill time and demeanour. The patient's ability to eliminate should be monitored; this should include faecal consistency, frequency and amount and urine colour, volume and frequency.

Most horses require crystalloid intravenous fluid therapy (IVFT) following surgery, given through a coiled fluid line to prevent the patient getting tangled when alone in the stable. Patients should be given at least the maintenance rate of 50–60 ml/kg/24 hours for at least 24–48 hours post-operatively; however, in some cases such as post-operative diarrhoea or large volumes of gastric reflux, the patient may require increased fluid rates of up to twice maintenance.

In some cases such as endotoxaemia resulting in vasodilation and vascular

leakage of fluid and protein resulting in hypovolemia, hypoproteinaemia and oedema, routine IVFT is often inadequate to maintain tissue perfusion and alternatives such as hypertonic saline or colloids (either synthetic such as gelofusin, hetastarch, penastarch or biological such as plasma or whole blood) may be required (see Figure 4). Care must be taken when administering plasma or whole blood; a giving set with an in-line filter should be used, plasma and blood should be administered slowly (0.1 ml/kg) for the first 10 minutes and the patient should be monitored closely for increased heart rate, respiratory rate, muscle tremors, restlessness, urticaria and collapse; if no adverse reactions are seen after the first 10 minutes, the rate could be increased to 20 ml/kg/24 hours. If any reactions do occur, glucocorticoids could be administered as per the VS's instruction (Boys Smith & Millar, 2012).

Each patient should have a fluid therapy chart. This allows documentation of total volume of IV fluids required over a 24-hour period, the drip rate required, any additional electrolytes which need to be added to the crystalloids. This chart should be completed by the VN every time the IVFT is checked with the amount administered so far, and this will allow the VN to alter the drip rate if required (IVFT ahead or behind schedule) to prevent under- or over-perfusion of IV fluids. Initially the patient's hydration status is monitored by performing a PCV and TP four times daily. A haematology, peripheral lactate and electrolytes may also be monitored daily.

Colic patients are more likely to suffer from thrombophlebitis due to suffering from endotoxaemia, so the VN must ensure that meticulous care is taken with the patient's IV catheter. Catheters should be checked every time the patient undergoes a colic observation and daily the catheter and insertion site should be checked for the patency of the vein and the catheter's patency by flushing with heparinised saline every 6 hours. The catheter site should be checked and scored between 0 and 3 for any signs of heat, pain, swelling or exudate. If any of these signs are present, the VN should inform the case VS and remove the catheter and perform a culture and sensitivity on the tip of the catheter. The catheter should also be checked for any damage to the catheter itself or extension sets or injection caps and change if damaged or contaminated (Boys Smith & Millar, 2012).

Medication

Medication is usually started pre-operatively. Non-steroidal anti-inflammatory drugs (NSAIDs) such as flunixin meglumine have many positive effects on post-operative colic patients which include reducing the effects of endotoxaemia, providing analgesia and reducing inflammation. Antimicrobials such as gentamycin and penicillin given in combination prevent and treat infections, and in cases where an anaerobic infection is suspected, metronidazole is used per rectum at a dosage of 30 mg/kg every 8 hours (Knottenbelt, 2006) to prevent inappetence caused when given per os. Some patients may have reduced gut motility, and in these cases prokinetics such as lidocaine, metoclopramide or erythromycin may be administered (Boys Smith & Millar, 2012).

Abdominal dressing

The patient's incision should be covered by an abdominal dressing to reduce the incidence of incisional discharge or infection and to reduce ventral oedema around the site (see Figure 5) (Findley & Archer, 2014). The bandage should be changed every day or more frequently if there is copious discharge. The VN must ensure that the bandage is checked at every colic observation to ensure that there is no slippage or strike through; care must also be taken with geldings or stallions as they are prone to contaminate the bandage with urine.

Feeding

For the first 6–24 hours following surgery food is usually withheld, and surgery-dependant (for example, horses that have undergone surgical correction of a large colon displacement may be able to return to normal levels of feed within 3–4 days of surgery. However, those horses which have ileus may be fasted for 48 hours or longer and may take a number of days to resume normal intake of feed). Patients are usually offered handfuls of picked grass or are hand-walked for a pick of grass. Small handfuls of soaked fibre pencils could be given four times daily (Findley & Archer, 2014).

Hospitalisation period

Most patients following exploratory laparotomy recover without major complications, and are discharged from the hospital around 6–9 days following surgery, depending on their surgical



Figure 5. Abdominal bandage

lesion. However, patients which have encountered complications will require a longer period of hospitalisation (Findley & Archer, 2014).

Horses suffering from endotoxaemia are at an increased likelihood of jugular thrombophlebitis, due to either long-term IV catheterisation or repeated venepunctures, as these increase the risk of damage to the vein. Clinical signs include a palpably thickened vein, with a lack of patency when the vein is raised, there could also be purulent discharge or localised swelling at the site of catheter insertion; when palpating the vein there may be heat or pain, and some patients may have compromised venous drainage leading to facial swelling on the affected side of the head (Boys Smith & Millar, 2012).

Ileus (inhibition of the bowel to regain its normal peristaltic movements) is predominately a result of small intestinal lesions. The clinical signs include elevated heart rate, reduced or absent gut sounds,

distension of the small intestine and consequently the stomach caused by fluid build up, which needs to be relieved by passing a nasogastric tube to empty the stomach. A significant amount of gastric reflux is more than 1–2 litres, which is consistent with gastric overfilling indicating ileus. Patients with ileus have an increased likelihood of repeat laparotomy (Salem, Proudman, & Archer, 2015).

Patients who have undergone a contaminated surgery such as pelvic flexure enterotomy are more likely to have peritonitis as a complication. This could lead to the patient being pyrexia, dull and inappetent.

Patients with strangulating lesions are susceptible to endotoxaemia, as endotoxins are absorbed into the bloodstream through the strangulated intestine. This condition could then predispose the patient to laminitis. VNs should manage laminitis by applying frog supports and ensuring that the patient is stabled on a deep conforming bed. Analgesia should

be administered, and the VS may request for the VN to radiograph the patient's feet to monitor for evidence of sinking or rotation of the third phalanx.

Due to antibiotic usage in patients following exploratory laparotomy, the antibiotic therapy could lead to the patient getting diarrhoea and colitis.

Five to 10 days following surgery, patients may have a plaque of oedema around the incision and then become dull, inappetent or pyrexia, usually prior to evidence of strike through of wound discharge through the patient's abdominal bandage. These clinical signs would indicate the patient having an incisional infection. The VN may be required to perform a culture and sensitivity on the patient's wound discharge to ensure that the infection is treated with the correct antibiotics. Patients with incisional complications have increased discomfort, prolonged hospitalisation and increased cost (Salem et al., 2015).

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