The urinary and reproductive systems

13

13.1 Examination and diagnostic aids for the urinary tract

History

A complete history should be taken in order to gain a broader understanding of the problems underlying a presenting sign.

Owners will readily report changes in the colour or frequency of urination as this is an obvious clinical sign, but may not initially describe general changes such as lethargy and weight loss. Urinary tract disorders are more likely to present with non-specific signs. Signs such as haematuria, polydypsia and polyuria can be caused by non-urinary diseases, so it is important to include general history questions.

Typical urinary system related questions

- When did the equid last drink?
- How often is water offered in a day? How much/often does the equid drink in a day?
- Does the equid appear to strain or attempt to urinate frequently?
- How often does the equid urinate?
- What is the approximate volume of urine? (Urine output can be difficult to estimate but owners may have noticed recent changes.)
- What is the colour of the urine? Is the urine a light yellow colour or darker? (This gives an indication of the hydration status.) Is it red/pink/brown? (Pigmenturia is discussed later in this chapter.) Are there any blood clots?
- If there is blood in the urine does it appear at the beginning, throughout or at the end of the urine stream?
- Has the equid lost weight or had colic symptoms recently?
- Is there a history of respiratory disease or abortion?

Physical examination

A full clinical examination should be conducted.

The following conditions may be observed in an equid with a urinary tract disorder:

- Oral examination: signs such as ulcers, halitosis and plaque can be observed as the result of uraemia in chronic renal failure.
- Hair loss on the inner hind legs or ulceration of the perineum due to urine scalding may indicate incontinence.
- Observe urination if possible.
- Check for ventral oedema which may develop in cases of protein-losing nephropathy.

Following a general examination, a more detailed urinary tract examination can be conducted. Refer to this paper (Wilson 2007) for a thorough review of examination of the urinary tract; some of the techniques are advanced and not applicable to field situations.

Urinary tract physical examination

Male equids Examine the prepuce and penis for swellings or oedema, wounds, discharge and evidence of tumours or habronemiasis (red skin ulcerations).

Sedation with ACP or xylazine will result in penile protraction and ease of examination (see Section 7.1 Sedatives and anaesthesia for appropriate dosages).

Remember the very small reported risk of prolonged or permanent penile prolapse with the use of ACP in stallions (Driessen et al. 2011).

Female equids Examine the vulva and perineum, both visually and manually, to check for urine scalding, vaginal urine pooling, wounds or abnormal discharge.

In extreme circumstances, a rectal examination can be carried out to assess the bladder for wall thickness, evidence of calculi (stones) or presence of abnormal masses. The pelvis can be palpated for evidence of trauma such as fractures. The caudal pole of the left kidney can be palpated to assess for size and pain. Remember the risks involved in rectal examination (see Chapter 11 The gastrointestinal system).

Catheterisation of the bladder

This is useful for the collection of sterile urine samples for bacteriology. If the equid is having difficulty urinating (stranguria) then this technique can be used to ascertain the patency of the lower urinary tract.

Procedure

1. Ensure the safety of the animal and operator; use stocks if available.
2. Sedate geldings/stallions with an alpha-2 agonist (see Section 7.1) to encourage relaxation of the penis so the catheter can be inserted.
   a. Male equids
      a.i. Holding the penis in one hand, wash the glans with dilute povidone-iodine.
      a.ii. Wearing sterile gloves take the male urinary catheter out of the packaging (sterile) and lubricate.
      a.iii. Gently insert the catheter into the urethra and push upwards. After approximately 60 cm the catheter should be in the bladder. Urine does not always flow freely; apply suction to the end of the catheter using a syringe or inject 60 ml of air from a sterile syringe.
   b. Female equids It may be necessary to sedate mares, mule mares and jennies prior to catheterisation.
      b.i. Wash the perineum with dilute antiseptic.
      b.ii. Insert a lubricated gloved hand into the vagina and locate the urethral opening on the floor of the vagina, about 10 cm inside.
      b.iii. Using the index finger, guide the tip of a sterile, lubricated catheter into the urethra and advance gradually.

Haematology and serum biochemistry

In field situations it is often not possible to carry out blood analysis as the machinery is expensive and difficult to maintain. Reporting results and providing further treatment may also be problematic in some contexts when individual animals cannot be traced.

Outlines of the expected changes

Haematology Increased white blood cells (WBC)/globulins indicates infection. A Packed Cell Volume (PCV) count or haematocrit is useful if presented with a patient with blood-stained urine.

Serum biochemistry Azotaemia is defined as an increase in urea nitrogen and creatinine. The kidney has a huge reserve capacity and around 75% of function is lost by the time azotaemia is diagnosed in horses (Wilson 2007).

1. Pre-renal azotaemia Primary cause is 'before the kidneys'; often secondary to dehydration or hypovolemia.
2. Renal azotaemia Primary cause is 'within the kidney' such as tubular damage.
3. Post-renal azotaemia Primary cause is 'after the kidney' within the urinary tract itself, including obstruction (urolithiasis) or a ruptured bladder (most commonly occurs in foals).

Acute renal failure (ARF) – hypocalcaemia and hyperphosphataemia are reported.

Chronic renal failure (CRF) – hypercalcaemia and hypophosphataemia are reported.

Hyperkalaemia – with ARF, obstruction and uroperitoneum (foals) is reported.

Hyponatraemia and hypochloraemia are also reported with renal disease (Wilson 2007).

Metabolic acidosis is common with renal failure.

Urinalysis

What to consider when collecting a urine sample

Samples can be collected as a 'free catch' (collect urine when the animal is naturally urinating) or via catheterisation (which will require sedation). Catheterisation is necessary for the collection of a sterile sample for culture and also in cases of suspected obstruction.

Consider the cost versus benefit to the welfare of the animal when deciding whether a catheterisation procedure is necessary.

Place the urine straight into a sterile container. Note the colour of the urine; normal equine urine is often cloudy due to the presence of calcium carbonate crystals.

The urine sample can be used to assess kidney function and to identify abnormalities of the urine including cells, pigments or bacteria.

1. Normal urine pH 7.5–8.5 (adults) (Robinson and Sprayberry 2009), and 5.5–8.0 (foals). The pH decreases with starvation and can be acidic after exercise (Wood et al. 1990).
2. A urinary dipstick is a semi-quantitative method for the detection of several conditions such

as proteinuria, haematuria and pigmenturia. The dipsticks should be stored correctly and used within the recommended lifespan. Normal urine should not contain protein, glucose or bilirubin; however, false positives are common with protein due to the alkaline urine of equids.

Positive pigment results can indicate overt blood (whole erythrocytes), haemoglobin (heme pigments secondary to haemolysis) or myoglobin (muscle breakdown). In order to distinguish haemoglobinuria and haematuria, centrifuge the sample or leave it to stand for at least an hour. In the case of haematuria the red blood cells will settle to leave a clear urine sample; in haemoglobinuria the protein will remain suspended in the sample which will continue to appear as a red/pink colour.

There is no test to differentiate haemoglobinuria from myoglobinuria. Assess the case to reach a diagnosis. If there is a history of trauma or myopathy it is more likely to be myoglobinuria. If the equid has pale mucous membranes and a low and/or decreasing PCV (packed cell volume/haematocrit) then the discolouration of the urine is more likely to be the result of haemoglobinuria.

3. Cytology This will require a centrifuge for urine sedimentation.

   Pyuria = > 5 WBC per high power field

   Haematuria = > 5 RBC per high power field

4. Sediment examination Normal findings are calcium carbonate (common in adults), calcium oxalate in foals, mucus strands and transitional epithelial cells (Wilson 2007).

5. Specific gravity (SG), measured with a refractometer, is used to estimate the solute concentration of the urine. The SG may be inaccurate in the presence of high levels of glucose or albumin.

   Hyposthenuria (urine less concentrated than plasma) < 1.008

   Isothenuria (similar concentration to plasma) 1.008–1.012

   Hypersthenuria (urine more concentrated than plasma) > 1.012

   Normal adult horses should have hypersthenuric urine.

If azotaemic and hypersthenuric = Pre-renal. Water is retained by the kidneys in cases of dehydration and hypovolaemia.

If azotaemic and hyposthenuric = Renal. The kidneys are unable to concentrate urine.

6. Bacterial culture The urine sample must be collected aseptically. (See Catheterisation of the bladder, page 331.)

13.2 Diseases of the urinary tract

This section describes some urinary tract disorders encountered in equids, and is not exhaustive. Refer to other equine veterinary texts for a comprehensive review.

Cystitis and pyelonephritis

Bacterial urinary tract infections (UTI), also described as cystitis with bladder involvement, are generally caused by contamination from skin or gut flora. UTIs are uncommon in equids and are usually associated with disorders that disrupt urinary flow, such as bladder paralysis or urolithiasis.

Pyelonephritis is the term used for bacterial infection which has spread from the lower urinary tract to affect the kidneys. Septicaemic foals may develop a septic nephritis. The likely organisms involved in UTI/cystitis and pyelonephritis include E.coli, Enterococcus spp., and Streptococcus spp. (Clark et al. 2008). The samples for the Clark study were collected from cases at a Canadian University clinic; the bacterial spectrum may differ in other contexts although faecal contaminants are likely to dominate. Note that contaminating bacteria may be cultured from free-catch samples collected from healthy horses (MacLeay and Kohn 1998). Therefore a definitive diagnosis should be based on the culture of > 10,000 colony forming units/ml (Reed, Bayly and Selon 2004) and ideally samples for culture should be collected by sterile catheterisation.

Certain problems will predispose an equid to a UTI

- Late gestation/post-partum infection
- Repeated urinary catheterisation (iatrogenic)
- Secondary to a bladder/urinary tract problem such as an obstruction
- Neurological (atonic bladder) – signs of dysuria/stranguria also present

Clinical signs

- Frequent attempts to urinate. (Stranguria is not frequently observed in cases of pyelonephritis.)
- Blood-stained urine (haematuria)
- Pyuria (neutrophils in the urine) observed in severe pyelonephritis
- Dribbling or urine scalding of the perineum and back legs in the mare or front legs in the stallion
- Equids with pyelonephritis will be pyrexic, depressed and anorexic.

Diagnosis

- Clinical signs are not always indicative; collect urine for analysis. A small bladder with a thickened wall may be palpated during a rectal examination, and other signs may be present such as neurological signs or anuria.

Treatment

- Treat the primary underlying disease.

- Consider hydration status – in dehydrated animals the 'flushing effect' that clears bacteria will be diminished.
- In mild cases resolution of the primary cause may be sufficient to treat the UTI/cystitis.

- Antibiotic treatment should be based on urine culture and sensitivity. Trimethoprim-sulphonamide treatment is the first-line treatment, followed by penicillin if this is unsuccessful. These antibiotics are preferable as the active ingredient is excreted in the kidney and concentrated in the urine.

Haematuria, haemoglobinuria and myoglobinuria

Haematuria is the presence of whole red blood cells in the urine.

Haemoglobinuria is found when a pathological process has induced a breakdown of red blood cells and the haemoglobin is excreted in the urine.

Myoglobinuria is found when a pathological process has caused a breakdown of muscle and the myoglobin is excreted in the urine.

The latter two conditions can be classified as pigmenturia and may be difficult to distinguish.

Causes of haematuria

- Haemorrhage in the urinary tract: If the blood originates in the kidneys, ureters or bladder, haematuria is voided throughout the urine stream. Haematuria is observed at the start of urination if haemorrhage occurs from the bladder neck or distal urethra; and at the end of urination if there is haemorrhage from the proximal urethra. Urethral tears in stallions and geldings will present with haematuria; these defects may resolve without treatment.
- Bleeding after exercise frequently occurs with cystoliths (see later in this chapter).
- A severe case of pyelonephritis or cystitis will result in haemorrhage from the urinary tract (see the case study Section 13.5).
- Urinary tract neoplasia is a rare cause of haematuria.
- Habronema infestation of the urethral process will cause haematuria. Ivermectin and corticosteroids can be used for treatment (see Section 16.1 Internal parasites).
- Verminous nephritis is a very rare condition and is the result of parasitic invasion of the kidneys by Halicephalobus gingivalis or Strongylus vulgaris. This may present as haematuria due to damage induced by the parasites. Cases of H. gingivalis are often associated with neurological disease (Pathology in Practice 2012).

Causes of haemoglobinuria

This is often associated with a haemolytic anaemia; the haemoglobin is filtered by the kidneys, which excrete it in the urine.

- Babesiosis Haemolysis of infected RBCs results in haemoglobinuria. Diagnosis is by microscopic examination of a blood film. Treat with imizol (see Section 17.7 Blood-borne parasites).
- Leptospirosis In equids this infection more commonly presents as abortion or uveitis.

Both babesiosis and leptospirosis are zoonotic infections.

Causes of myoglobinuria

If there is access to blood biochemistry this condition can be distinguished from other forms of pigmenturia if the muscle enzymes are very elevated above the reference range.

Equine Rhabdomyolysis/Tying up Equid presents with stiffness and pain. (See Section 14.9 Common conditions affecting the muscles of working equids.)

Trauma to large muscle mass or prolonged recumbency may also cause myoglobinuria; include relevant questions when taking the history.

Bladder prolapse

Causes

Bladder prolapse is almost exclusive to mares after foaling as the result of vaginal trauma. The bladder is visible on the outside of the vulva, the surface will be shiny and smooth. There is a risk of bladder rupture and in these cases the intestines may prolapse through the bladder wall. Mares will show signs of colic and straining.

> How to differentiate a prolapsed bladder and a prolapsed uterus?
>
> The bladder will be smaller and with a smoother surface, usually the urethral opening can also be observed.
>
> Both of these conditions can occur after foaling (see Section 13.4 Common reproductive disorders experienced in working equids).

Treatment

- Sedate and administer a caudal epidural (see Section 7.2 Local anaesthetics).
- Clean the mucosal surface of the bladder with saline solution.
- Drain the bladder of urine by aspiration.
- Place a Foley catheter to avoid contamination of the peritoneal cavity with urine.
- Replace bladder in normal position, starting at the urethra. Apply gentle pressure.
- Administer post-operative antibiotics for 5–7 days.
- In cases of bladder rupture it will be necessary to euthanase the mare.
- Straining and re-prolapse is a common complication.

Acute renal failure

Acute renal failure is the sudden and rapid decrease in the glomerular filtration rate with a resulting azotaemia.

Causes

- Exposure to nephrotoxic substances – most commonly aminoglycoside antibiotics (gentamicin) and NSAIDs, especially if the animal has been suffering from dehydration or diarrhoea before treatment commences (see Chapter 5 Medicines) Other examples include exposure to heavy metals (lead poisoning) or to local toxic plants, and haemoglobinuria/myoglobinuria secondary to blood parasites or rhabdomyolysis.

- Haemodynamic – shock with secondary renal failure such as with acute diarrhoea, bacterial septicaemia from pneumonia or endotoxaemia from other causes
- Obstructive – urolithiasis, neoplasia, trauma, infection, dehydration

Clinical signs

- Signs of a primary disease which may compromise the cardio-vascular system; acute diarrhoea, colic, endotoxaemia
- Depression, anorexia
- A history of exposure to toxic substances
- Signs of a urinary tract disorder or severe dehydration (straining, etc.)
- Reluctance to move (myopathy, colic, laminitis, etc.)
- Haematuria may be present in cases of NSAID toxicity.

Diagnosis

- USG 1.008–1.012 (isothenuric = same concentration as plasma)
- Definitive diagnosis can be difficult in the field without access to blood biochemistry. A presumptive diagnosis can be made with the support of clinical signs and evidence from the history.

Treatment

- Remove or treat the primary cause (if known).
- Correct fluid deficits and maintain urine production. Administer IV or nasogastric tube fluid therapy 20–50 ml/kg/day until the animal begins to eat and drink voluntarily.
- Ensure that there is no overload to the kidneys, especially if anuria is suspected due to urine blockage/ bladder rupture.

Prognosis

- Toxicities have the best response to treatment.
- The prognosis is usually determined by assessing the response to fluid therapy. If a positive response is seen within the first 24–48 hours the prognosis is good otherwise the prognosis is guarded.

Urethral concretion

Smegma accumulates in the penis sheath. This generally does not create problems but, if it becomes hard and causes inflammation or difficulty urinating, then it requires removal. Please note that urethral concretion is a problem within the sheath only; however, the clinical signs can appear similar to urolithiasis (obstruction of the urethra).

Clinical signs

- Adult males show frequent attempts to urinate and may extend penis while urinating.
- Urine staining/scalding is present.
- Sedate with xylazine, (remember the risks of parphimosis; see Section 7.1 Sedatives and anaesthesia) and examine the penis. Accumulations of foul-smelling concreted smegma can be palpated around the sheath and urethral orifice.
- Differential diagnoses include habronemiasis, injury (stallions) or neoplasia.

Treatment

While the animal remains sedated, gently clean the penis, prepuce diverticulum and around the urethral orifice to remove the smegma, including any concreted 'peas' within the small spaces around the urethral orifice. A diluted antiseptic such as chlorhexadine or povidone-iodine may be used. Regular cleaning may be required to prevent recurrence.

Urolithiasis

Calculi can be found in the kidneys, bladder, ureter and urethra, usually resulting in urinary tract obstruction. Urolithiasis is more common in males, attributed to the anatomical differences between the male and female urethra. Urethral obstruction is described; calculi in other locations are problematic to diagnose and treat in the field.

Causes

- Urinary component High crystalluria, high mucoprotein concentrate, high mineral content $CaCO_3$
- Diet Feed/water high in mineral content may predispose equids to this condition.
- Other Urinary stasis, decreased water intake, bacterial infections

Clinical signs

- Usually occurs in male equids; the uroliths pass through the female tract more easily.
- Restlessness, colic – more severe in cases of complete obstruction
- Straining – small amounts and increased frequency of urination
- Unusual stance
- Discoloured urine or blood in urine, haemorrhage from urethral orifice
- Hindlimb lameness
- Anuria present in cases of complete obstruction
- In severe cases of obstruction the bladder or urethra can rupture. Signs of colic and discomfort will subside and the equid will become depressed and anorexic.

Diagnosis

- Clinical signs
- Obstruction to passage of urinary catheter (see below)

> When passing a urinary catheter in cases of urethral blockage, the urethra may rupture if excessive force is applied.

Treatment

Calculi may be expressed manually if palpated in the distal portion of the urethra. The equid must be sedated, and an epidural may be required, as this is a painful procedure. To expel the calculi use gentle manipulation and flush sterile saline through the urinary catheter. In mares it may be possible to remove stones from the bladder manually. Small calculi may be flushed out in a normal urination stream if the equid is sufficiently hydrated. Bladder lavage is indicated in cases of sabulous urolithiasis (accumulations of crystalloid material in the bladder).

Euthanasia should be considered if the obstruction cannot be removed.

Complications of urethral obstruction include urethral scar formation, a persistent cystitis or a ruptured bladder (this can be diagnosed by rectal examination or a peritoneal tap).

Examination of the reproductive system 13.3

History

Determine if the animal has been used for breeding and, if so, obtain a full breeding history. Enquire about any previous problems with the reproductive system and treatments.

External examination

Male equids Sedation will assist safe and thorough examination of the penis and scrotum/testes. (Remember the risks of paraphimosis, see Section 7.1 Sedatives and anaesthesia). Note any swelling, injury, tumours, cutaneous habronemiasis or vesicles/pustules (Colahan et al. 1999). Palpate the testes for swelling or pain.

Female equids Examine the external genitalia. The vulval mucous membranes will vary depending on the stage of oestrus: pink-red and moist during oestrus, pale and dry throughout anoestrus. Red mucous membranes indicate inflammation.

Internal examination

Male equids Rectal examination (with adequate restraint) can reveal abnormalities in the region of the inguinal rings and the accessory glands (prostate and vesicular). Describe these abnormalities.

Female equids Rectal examination can reveal abnormalities within the ovaries, uterus and cervix; stages of the oestrus cycle or pregnancy can be ascertained with this examination. Vaginal examination may reveal injury/trauma or tumours/cysts (Colahan et al. 1999).

Sampling

Pre-breeding tests can be used in the diagnosis of bacterial diseases such as Streptococcus, E. coli, Pseudomonas, Klebsiella and Taylorella equigenitalis (Contagious Equine Metritis). The Horserace Betting Levy Board produces a voluntary code of practice setting out recommendations to prevent and control specific diseases in horses (HBLB Code of Practice). Taylorella asinigenitalis has been isolated from male donkeys and horse mares and stallions. It has not been demonstrated that this bacterium causes disease and it is only possible to differentiate T. asinigenitalis from T. equinigenitalis by PCR (OIE Terrestrial Manual 2012).

13.4 Common reproductive disorders experienced in working equids

Although equine reproduction is unlikely to form a large part of practice with working equids, there are some communities who breed equids and also individual owners with animals who may need assistance. The following conditions have been highlighted as those most common in the field of working equine medicine:

Pregnancy diagnosis

Pregnancy diagnosis is not an emergency intervention, although in certain circumstances it will be necessary to determine whether a mare or jenny is in foal, for example prior to the use of certain teratogenic or abortive medications. The detection of pregnancy by rectal palpation is accurate at 60 days' gestation when the size of the embryonic vesicle is 10–13 cm (Davies Morel 2008).

Rectal examination should only be attempted for pregnancy diagnosis in (mares) horses.

Do not attempt rectal examination in ponies or donkeys as the potential harm far outweighs any benefit of diagnosis. See Section 11.5 for indications and care when carrying out rectal examinations for any reason.

External signs an animal is pregnant

- Enlarged abdomen (differential diagnosis includes parasitism or oedema)
- Mammary enlargement and slight ventral oedema (usually in the last 48 hours but can occur for up to 2 weeks before foaling)

Rectal examination

Knowledge of normal reproductive anatomy in the mare is essential as the signs will be difficult to differentiate in the early stages of pregnancy.

- Increased uterine and cervical tone may be palpable in the early stages of pregnancy (15–20 days' gestation). However, this is not a definitive sign of pregnancy and so it would be preferable to conduct a single rectal exam on day 60 for an accurate diagnosis.
- Unilateral distension of a uterine horn – The degree of distension will depend on the stage of the pregnancy and, as the foetus grows, the uterus will descend over the pelvic brim and may be difficult to palpate. In the later stages of pregnancy (from 200 days' gestation) the foetus and uterus will become palpable within the pelvis once again.

The workload in pregnant mares and jennies should be decreased or stopped, especially in the last 3 months. Good nutrition is important for foal development and lactation; owners should be informed of this at the time of diagnosis.

Abortion investigation

Abortion (Figure 13.4.1) can be associated with single or common occurrences in an individual mare or a group.

Reasons for abortion

- In a particular mare Age, bacterial endometritis or ascending infection, chronic fibrosis in the uterus affecting the mare's ability to carry a foal to term, twinning, nutritional problems/deficits, overwork, stress
- In a group of animals Infectious disease such as EHV (see Section 12.6) causing abortion in the last trimester, or leptospirosis. Poisoning or toxicity is another potential cause, e.g. from plants, contaminated feed. (Single animals can also be affected, but suspect these causes if many owners from a particular area are complaining of abortion.)

Figure 13.4.1 An aborted mule foetus at 7 months gestation. The placenta is thickened and haemorrhagic.

Abortion investigations start with an in-depth history of the animal, both in terms of reproductive history (age, how many foals, healthy foals, etc.) and general history (nutritional status, feeding of pregnant mares, workload and stress). Host factors which impair reproductive defence mechanisms will predispose to pathogens. In groups of animals, a holistic approach must be taken with examinations of the group/community management as a whole; for example, when naïve animals have been recently mixed with a new population.

Infectious causes of abortion in equids

Refer to relevant texts for diagnosis of the following conditions (Givens 2008):

Streptococcus zooepidemicus, Taylorella equigenitalis, brucellosis, leptospirosis, equine herpesvirus, equine viral arteritis, mycotic abortion, Trypanosoma equiperdum (dourine), T.evansi (surra), Babesiosis (See Section 17.8 Blood borne parasites for further description of the last three conditions.)

> Leptospirosis and brucellosis can cause infections in humans; they are zoonotic.

Leptospira are predominantly spread via the urine but contact with infected abortion material may also result in human infection. An equid infected with leptospirosis will often suffer from 'moon blindness', recurrent uveitis, 2–4 months following the initial infection (see Section 9.6 Common eye diseases of working equids).

Brucellosis is a rare cause of late term abortion in equids. Exposure to the aborted material and also consumption of infected milk may transmit the infection to humans. Equids with a brucellosis infection will more commonly present with 'fistulous withers' or 'poll evil' (see Section 14.10 Common conditions affecting the synovial bursae of working equids).

It is important to wear gloves and dispose of the abortion material appropriately when dealing with these cases.

Treatment

In an individual mare, abortion due to a primary problem with the reproductive tract is neither diagnosable nor within the scope of field operations. The exception is a purulent discharge from the vulva indicating a uterine infection which could be treated with lavage and antibiotics. Where a placentitis is suspected, treat as for Retained foetal membranes (see later in this chapter).

For groups of affected animals, the aim is to diagnose and manage the cause of abortion. By applying knowledge, of population health and disease epidemiology to advise communities, it may be possible to reduce the number of abortions.

If many mares are aborting, consider a herd health approach to attempt a diagnosis and control plan. Examine other animals in the area (including non-pregnant, other species and males) to observe for signs of respiratory or other systemic disease or toxicities. Isolate the affected equids, particularly from other pregnant mares and jennies.

Dystocia

Unlike in cows, the second-stage labour in equids is rapid (15–20 minutes) so there is limited time to correct dystocias in equids.

It is best to examine a suspected dystocia by sedating with alpha-2 agonist and butorphanol (if available). Animals sedated with xylazine are still capable of kicking violently. General anaesthesia may be required for lengthy and involved procedures. Clean the perineum and vulva with antiseptic and lubricate well.

- Retained forelimb It may be possible to reach in and pull the forelimb out, or to use rope placed below the fetlock.
- Retained head Position a rope through mouth and back around foal's ears.
- Oversize is rare. If both shoulders don't fit through the vulva it is likely that the foal cannot be removed without damaging the mare or jenny.
- Dog sitting position This occurs when both hindlimbs are flexed and lying under the foetus, the pelvis forms a wedge preventing extraction of the foal. The head, two front legs and chest can be exteriorised but parturition does not progress past this stage. In these cases the foal is rarely delivered alive; manipulation of the foal during attempted delivery may result in uterine rupture and death of the mare. This malpresentation may be corrected by repelling the foetus and, if there is adequate space, repositioning the hindlimbs into a normal extended position. Heavy sedation or general anaesthesia is essential. Clenbuterol should be administered as a uterine muscle relaxant. Adequate pain relief must be provided to the mare. Euthanasia should be considered if attempts to deliver the foal are unsuccessful after 30 minutes.

Dystocia correction is difficult – prolonged manipulation frequently results in metritis and laminitis and any manipulation over 30 minutes should be reassessed. Euthanasia should be considered if the foal cannot be removed, particularly if there is a lack of hospital facilities and adequate infection control.

Fetotomy may be attempted if the foal is dead (Frazer 1997). This procedure carries a huge risk of uterine tears and infection and should only be employed if the operator is experienced in the technique and the correct equipment is available.

Uterine torsion

The presenting signs of a uterine torsion may include initiation of parturition but a failure to progress past the first stage; the mare may then stop trying to foal. Evidence of labour may not be observed at all (this is highlighted in the following case study) (Barber 1995). If the torsion occurs prior to parturition there may be signs of colic, depression and anorexia. A uterine torsion can be palpated on rectal examination; a taut broad ligament is palpable coursing transversely. During a per vagina examination the cervix appears to remain partially closed and the vaginal wall is twisted round into a corkscrew.

Non-surgical correction is feasible (Wichtel, Reinertson and Clark 1988). The method involves rolling the anaesthetised mare to correct the torsion. This technique is used frequently in cattle. If the torsion is clockwise the mare should be placed in right lateral recumbency and rolled on her back over to the left. If the torsion is counter clockwise initiate the procedure on the left. Refer to Yorke, Caldwell and Johnson (2012) for further guidance and helpful diagrams.

It is not appropriate to attempt a caesarean section if limited resources are available; the operation is unlikely to be successful and may result in particularly poor animal welfare.

The risk of mortality in both the mare and the foetus is high in cases of uterine torsion.

Uterine prolapse, rupture and haemorrhage of uterine arteries

These conditions are all sequalae to complicated foal deliveries.

A uterine prolapse is observed as severe straining and a soft, red, wrinkled mass extending from the vulval opening (can be distinguished from a bladder prolapse where the surface is smooth and pale).

Treatment

- Keep the uterus moist, and clean thoroughly using a sugar/dextrose solution to decrease oedema.
- Sedation and an epidural are mandatory.
- Administer tetanus anti-toxin and broad-spectrum systemic antibiotics.
- Replace the uterus gently, avoiding tearing the delicate inner surface.

> - Do not attempt to replace a uterus if it has been out for more than 2–3 hours, or if it has been damaged in any way, as equines are extremely susceptible to metritis (unlike bovines) and it is unlikely an infection will be controlled after this time.

Causey et al. 2007 describes a case study of uterine prolapse in a mare.

If the uterus is ruptured either during foaling or following a prolapse, euthanasia will be necessary.

Postpartum haemorrhage of the uterine artery is another, often fatal, consequence of foaling and will usually require euthanasia if haemorrhage cannot be alleviated. There is no treatment

for this condition but, if the mare or jenny is kept quiet and still, a clot may form and the haemorrhage cease.

Retained foetal membranes (RFM)

Retained foetal membranes (RFM) is less common in equids than in cows although it is often a sequel to abortion or to other birthing difficulties. The membranes are normally rapidly expelled in equines and, if this does not occur within 3 hours of foaling, treatment should be initiated.

> RFMs for longer than 6–8 hours is an emergency in equids as endotoxaemia and laminitis are common – systemic signs are very serious.

Treatment

In the first instance use oxytocin at 20IU IM or IV and wait 30–60 minutes to see if the placenta is expelled. Repeat the dose up to 3 times. Large boluses (more than 100 IU) cause abdominal discomfort, sweating and colic, so a good alternative is to administer oxytocin as an IV infusion. Place 100 IU of oxytocin into a one-litre bag of saline and infuse slowly (1 drop/3 seconds) over an hour, via a catheter. Decrease the flow rate if signs of discomfort are observed; usually only about 500–750 ml is required to expel the placenta.

What to do if oxytocin is unsuccessful in expelling the membranes?

- If over 1–2 hours the membranes are not expelled, manual removal will be necessary. This must be done carefully as any portion of membrane, however small, left internally may cause infection or haemorrhage. Never pull membranes forcefully, it is better to twist the external part around a long object held horizontally then gently rotated, wait for the tension to decrease, and rotate again to detach safely.
- Always give systemic NSAIDs and antibiotics such as trimethoprim, penicillin and gentamicin, especially if membranes have been retained for over 6 hours. Complications of RFMs include metritis, septicaemia and laminitis. Indications of a metritis include a foetid chocolate-coloured discharge, depression, pain, increased HR and RR.

Prognosis

Good if treated early and membranes are expelled with oxytocin. Guarded if membranes have been retained for longer than 6 hours, and extremely poor if there are signs of endotoxaemia or the membranes have been retained for longer than 12 hours. It will be necessary to discuss euthanasia with the owner in these cases.

Castration

The surgical technique for castration is out of the scope of this manual so please refer to equine surgical texts. Castration has nevertheless been included here to highlight a number of points pertaining to the welfare implications of poor technique and some considerations before undertaking this procedure.

- Castration of donkeys should never be attempted using the standing technique since their tendency to bleed requires the spermatic vessels to be tied off (Sprayson and Theimann 2007).
- Stallions > 3 years of age must also be castrated under GA, never standing, as they too have a tendency to bleed once mature.

- Burdizzo castrators used for cattle castration are not acceptable for equines as they will not stem the blood flow sufficiently; only attempt castration if equine emasculators are available.

Complications of castration include:

- Excessive haemorrhage A small amount of blood dripping from the castration wound normally stops within 30–60 minutes upon completion. If this is in a steady stream, or is prolonged, it requires further exploration. If packing of the scrotum is unsuccessful, it is essential to locate the source of the haemorrhage and ligate the vessel (Railton 1999).
- Scrotal swelling Inadequate post-operative care by the owner is a large contributing factor to scrotal swelling. It is more common after standing castrations; a large incision will allow drainage. It is important to provide clear post-operative instructions to include 10–15 minutes of daily exercise and NSAIDs SID for 5–7 days.

  - It is imperative that the animal does not start work again for 3 weeks. If owner compliance is unlikely it may be necessary to decline to perform the surgery.

- Local infection requires BID trimethoprim-sulphonamide or procaine penicillin; the infection can progress to scirrous cors (ascending infection from spermatic cord) swelling, purulent discharge and possible spread to the intra-peritoneal section of the spermatic cord causing lameness and colic – a condition which may ultimately result in euthanasia.
- Eventration is a rare occurrence. It is seen as small intestines appearing from the inguinal canal within a few hours to a few days of surgery. Euthanasia is necessary.

As can be seen from the above considerations, equine castration is more complex than in other species and should never be undertaken lightly. It involves particular equipment, good owner communication and a certain amount of risk – always weigh up the harm versus benefits and only operate if there are serious, multiple welfare implications of leaving the animal entire.

Cryptorchidism There is a 2–8% prevalence of cryptorchidism in horses, and cryptorchidism also occurs in donkeys. Both testicles should be located within the scrotum when the colt foal is born (Amann et al. 2007), although some surgeons advise waiting at least 18 months prior to cryptorchid surgery to allow ample time for the cryptorchid testicle to descend. A single testicle should never be removed if the other cannot be located; the animal may remain fertile and this could lead to serious welfare implications if mares and jennies are impregnated.

Cutaneous habronemiasis

Larvae burrow into the urethral process and can look like a squamous cell carcinoma with swelling and discharge around the prepuce and a granulomatous reaction/ulceration if chronic. Treat with ivermectin (see Sections 9.6 and 16.1).

Hydrocoele

Causes

This condition is common in working equids as it is often seen in hot weather and can be

secondary to infection and malnutrition. It is a non-painful abnormal amount of fluid in the testes resulting in a swollen appearance (Figure 13.4.2).

Diagnosis

Scrotal palpation reveals a large fluid-filled area which is not painful.

Treatment

Attempts to drain the fluid have only a limited success as the fluid soon accumulates again. Allow the swelling to subside. This condition may interfere with breeding ability.

Figure 13.4.2 Swelling of the scrotum in a working horse, observed in the hot humid months in Northern India.

Penile paralysis

Prolonged penile protrusion can result in paralysis, e.g. that seen with trauma, or after ACP or xylazine administration in stallions. The penis appears engorged, partially erect, with oedema due to congestion of blood. Observe for other neurological signs.

Treatment

Local anti-inflammatory therapies such as massage, 'sling' support and cool hosing. A sling prevents blood stasis. Slings can be created using a soft mesh/netting material so that the stallion should still be able to urinate. Systemic NSAIDs are indicated if the stallion is in pain, and antibiotics if infection or necrosis is evident. The animal may require urethral catheterisation if anuric.

Prognosis

Good if the penis can be returned into the prepuce and there are no secondary complications. Poor if it remains prolapsed for a number of days causing serious swelling and anuria. Euthanasia should be considered.

Testicular torsion

Cause

If the torsion is only 180˚, diagnosis is usually only incidental during examination. Acute 360˚ torsion is rare and causes signs of severe colic and scrotal swelling. Differentiate this condition from tumours and injury.

Treatment

Castration is recommended for 360˚ torsions or if clinical signs are evident. If it is an incidental finding on clinical examination, there is no need to castrate the animal initially but inform the owner to watch for signs of discomfort.

Case study – Urinary tract infection

13.5

Area Meerut, India

Attending veterinarian Dr Amit Pandey

Summary

This report describes the diagnosis, treatment and outcome of a horse that presented with loss of condition, stranguria and subsequently discoloured urine.

History

The mare had previously been successfully treated for babesiosis. After 3 weeks the animal started showing symptoms including frequent urination of a small quantity, a reduced appetite, reduced water intake, loss of body weight and apathy.

Clinical findings

Temperature 37.8˚C, heart rate 36–40 beats/minute, pale and dry mucous membranes, CRT 2 seconds, respiration rate 30 breaths/minute

Urinalysis: The colour of the urine at the beginning was straw-coloured but progressed to red.

Laboratory findings: Neutrophilia (92% in Differential Leucocyte Count), blood urea 57 mg/dL (ref range 8–27), serum glutamic oxaloacetic transaminase (SGOT or AST) 806U /L (ref range 205-555)

Figure 13.5.1 The mare at presentation.

Diagnosis

Acute bacterial infection of the urinary tract

Treatment

Antibiotics (trimethoprim-sulphonamide 30mg/kg), IV fluids (lactated Ringer's solution), oral and nasogastric hydration (oral rehydration salts – ORS) for 5 days

Outcome

The animal responded to treatment from the second day and recovered after one week.

Figure 13.5.2 Discolouration of urine from the mare.

Discussion

In this report a case of suspected urinary tract infection has been described. This

has not been confirmed by urinary culture but is assumed based on clinical signs and the subsequent response to antibiotic treatment. This horse had been treated for babesiosis previously. A babesiosis infection also presents with discolouration of the urine as the consequence of haemoglobinuria. In the case of a UTI the discoloured urine is due to red blood cells in the urine (haematuria) as the result of bleeding from the inflamed surface of the urinary tract. These conditions can be differentiated by centrifuging the urine sample or leaving the sample to stand for at least an hour as described in Section 13.1.

It is possible that the previous infection with babesiosis predisposed this mare to pyelonephritis as the result of kidney damage when filtering the heme protein, or that reduced urine flow allowed contaminating bacteria to establish an infection in the urinary tract. The prior babesia infection would have resulted in a general debilitation which would be likely to affect the immune system leading to opportunistic infection.

Figure 13.5.3 Administration of rehydration fluids by nasogastric tube.

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