

The Brachycephalic patient

Mini Series

Session Three: Other common conditions of the brachycephalic patient

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Other conditions of the brachycephalic patient

This session will discuss the other conditions to which brachycephalic patients are predisposed and which must be taken into consideration during management, then focussing in particular upon those where surgical options are present. The conditions that brachycephalic breeds are predisposed to are numerous and an extensive review of all the literature is beyond this two-hour webinar, however an outline, with some tips for surgery in more depth on some topics, is covered in these notes.

Dermatological disorders

The Pug and the English bull dog are prone to development of intertrigo. Intertrigo is dermatitis that occurs due to contact of the skin within folds. Due to the skin trauma from abrasion of haired skin surfaces, and the moist poorly ventilated environment, the development of bacterial, fungal and yeast infections is common. Both the Pug and English bulldog have prominent facial folds. Intertrigo associated with screw tail conformation is seen typically in the English bulldog. Regular cleaning of the facial fold may allow this area to be managed without medical intervention and medical management with topical treatment can be used if intertrigo develops. The mobility of the facial skin fold means that cleaning and medical management are more feasible than the intertrigo that develops associated with the screw tail conformation. Caudectomy or partial caudectomy is often indicated for surgical management of the intertrigo associated with screw tail conformation. This is not a typical tail amputation as it is required to be a high caudectomy. An elliptical incision is made around the tail and the amputation is performed at a level that will ensure there are no remaining folds present once wound closure has been performed. It can be challenging to maintain the meticulous haemostasis that would normally be achieved because of the altered anatomy. The risk of wound infection is significant and the wound should be lavaged following amputation of the tail as adequate clipping of the ventral surface of the tail and skin preparation will not have been feasible in this area. A bacteriology swab or skin sample for culture is taken and appropriate post-operative antibiotics is used to treat chronic deep pyoderma if this is present.

Pugs have a predisposition to development of mast cell tumours and when they do occur they often have multiple mast cell tumours develop de novo throughout their life time. Clients should be warned to monitor their dogs regularly if there is a history of mast cell tumours. The mast cell tumours do typically have a more benign behaviour, generally being low to intermediate grade, compared to other breeds, however histopathological analysis and grading should always be performed.

Gastrointestinal disorders

As previously discussed in the first session, regurgitation commonly occurs associated with the increased negative airway pressures that occur due to brachycephalic obstructive airway syndrome (BOAS). It has been demonstrated that following treatment of BOAS the regurgitation is generally very much improved, in particular in the French bulldog. Treatment of BOAS first is therefore typically the recommended approach, unless the dog has presented with regurgitation has a predominant clinical signs and has failure to gain weight. In this circumstance further investigations of regurgitation, such as a barium swallow study and other imaging, would be prioritised.

Hiatal hernia

Hiatal hernia is seen occasionally in cats and dogs and can be congenital or acquired. Sliding (axial) hiatal hernia (type I) is the most common and is the type seen in brachycephalic dogs; occasionally a rolling (paraoesophageal) hiatal hernia is seen. Acquired hernia may be seen as an incidental finding in patients with increased negative intrathoracic pressures due to upper airway obstruction; treatment of the underlying cause will often lead to resolution of the hernia. Surgical management is more often indicated for congenital hiatal hernia. Chinese Shar Pei, English Bull dogs and Boston terriers are prone to congenital sliding hiatal hernias. Clinical signs include regurgitation, hypersalivation, weight loss and potentially cough and depression due to aspiration pneumonia. Surgical management involves an approach through a routine ventral midline incision. Oesophagopexy, closure of the oesophageal hiatus and placement of a left sided tube gastropexy (detailed below) prevent recurrence of the sliding hernia. Herniation of the cardia may not be appreciated at surgery; however the phrenico-oesophageal ligament appears lax. Closure of the oesophageal hiatus should be performed over a stomach tube to prevent excessive narrowing and care must be taken to preserve the vagus nerves.

Pyloric stenosis

Gastric dysfunction due to pyloric stenosis is seen in young, male Boxer dogs and Boston terriers. They are generally less than six months old at presentation. The presenting clinical signs include vomiting, which may be projectile, and weight loss; regurgitation may also be present. Investigations reveal gastric distension and a functional delay in gastric outflow associated with pyloric stenosis. Concurrent megaesophagus is often present and whilst primary megaesophagus is suspected, it can be unclear if this is due to secondary oesophagitis. Some dogs have been successfully managed medically with postural feeding and gastroprotection, however when delayed gastric emptying or pyloric stenosis are documented, pyloroplasty is warranted. As this appears to be largely a functional obstruction pyloromyotomy or Y to U pyloroplasty are likely to be sufficient; a Bilroth procedure is not warranted. Tube gastrostomy is recommended due to the potential for altered gastric motility following pyloroplasty in a patient where gastric motility may already be abnormal.

Outcome is likely to be influenced by presence of megaesophagus, however the prognosis for resolution of megaesophagus is unclear until resolution of vomiting has been achieved, together with an appropriate period of medical management for oesophagitis.

Chronic pyloric hypertrophic gastropathy

This condition appears to be restricted to the Shih Tzu and Maltese terrier and in particular in male dogs. This is an acquired condition that occurs due to progressive thickening of the mucosa at the pylorus and pyloric antrum, such that it becomes obstructed and leads to gastric retention and vomiting. Often dogs present with very poor body condition associated with chronic weight loss. Due to the circumferential thickening it is most appropriate to perform surgical correction with a pyloric resection (Bilroth I) and anastomose the stomach to the duodenum, however a pyloromyotomy is also described in cases that present with less severe thickening. A tube gastrostomy is placed routinely to provide nutrition and manage gastric retention should that occur.

Tube gastrostomy technique

- Choose an appropriate position for the tube gastrostomy between the body of the stomach and the left body wall, approximately one third of the distance from ventral to dorsal along the body wall and just behind the last rib.
- Make a stab incision through the body wall with a No 10 or 15 blade.
- Pass the external end of the mushroom tipped tube through the body wall using Kelly artery forceps (note the tube is not tunnelled at all). Now bung the end of the tube to prevent contamination of the surgical field.
- Place a purse-string suture in the gastric body at the site where the tube will enter, prior to creating the stab incision.
- Insert the mushroom tube via the stab incision. The mushroom tip must be folded within the jaws of a pair of artery forceps to achieve this.
- Once the tube is inserted, withdraw it until the mushroom abuts the gastric wall and tie the purse string suture tight.
- The stomach is then secured to the body wall using four horizontal mattress sutures between the stomach wall and the body wall, placed around the tube in sequence to create a box of sutures.
- Omentalise the stoma site by drawing some omentum around the tube and 'box of sutures'.
- Secure the tube externally using a finger trap suture.
- Additional fixation of the tube is essential prior to recovery from anaesthesia to prevent inadvertent removal.

Vaginal oedema and vaginal fold prolapse in the bitch

(previously known as vaginal prolapse (but note it is not a true prolapse) or vaginal hyperplasia)

Brachycephalic breeds are predisposed to this condition.

Note that in other species (cattle, goats and sheep) true vaginal prolapse occurs, in which the entire vaginal wall is prolapsed. This is not a true prolapse as it is only the oedematous mucosal portion of the vaginal wall that is prolapsing.

Occurs in the first or second follicular phase under oestrogen influence and reoccurs at each subsequent oestrus.

Dysuria rarely occurs, despite the fact that the external urethral orifice is always displaced distally due to the weight of the massively oedematous tissue hanging dependently. The ventral part of the vaginal mucosa is involved in the majority of vaginal fold prolapses. In some cases the lateral and dorsal portions of the vaginal mucosa is also prolapsed, so the whole circumference is exteriorized.

Vaginal oedema and vaginal fold prolapse can be confused with a tumour, in particular if it is just the ventral portion that is exteriorised, however if the edematous tissue is exteriorised circumferentially it has a classical doughnut appearance.

The exteriorized tissue can become traumatised or self-mutilated and on some occasions necrotic. Whilst dysuria is not common with this condition, it is possible. The presence of the prolapsed fold can interfere with mating.

Treatment depends upon the extent of the vaginal fold prolapse. It is important that exposed tissue is kept moist with lubricant and self-trauma should be prevented.

If the vaginal fold prolapse is largely within the vulva, the oedema will generally resolve once the bitch is in the luteal phase and ideally the bitch should then be neutered during anoestrus, therefore preventing a later reoccurrence.

In bitches with a vaginal fold prolapse extending outside the vulval lips, amputation is the treatment of choice.

Treatment with a GnRH analogue will trigger premature ovulation and bring about a quicker transition into the luteal phase, however this will only be a couple of days earlier.

Dystocia and Caesarian section

Normal pregnancy and labour in the bitch

First stage labour – This typically lasts 6-24 hours (maximum 36 hours). Bitches will show signs of inappetance, panting, shivering and occasional vomiting. During this stage uterine contractions are occurring.

Second stage labour – The onset is marked by abdominal straining or the appearance of fetal fluid or a neonate. Pups are produced every 30 minutes but the interval can be 5 minutes to 4 hours. Overall second stage labour can last 2-12 hours (maximum 24 hours).

Third stage labour – This involves expulsion of the placenta, usually within 15 minutes of the birth of a puppy. Several puppies can be passed before their placentas but often the bitch will have alternating second and third stage labour as the pup is passed followed by a placenta.

In the queen the duration between first and last kitten is less than 6 hours in 86% of queens, however in a small number live kittens have been born after an extended pause in second stage labour (48 - 72 hours). This should be remembered when considering any intervention. In the majority of cases, the queen delivers her young uneventfully and does not require intervention.

Dystocia in the bitch

Dystocia is the inability to deliver fetuses during labour. Dystocia can be caused by maternal or fetal factors. Some breeds are predisposed, such as the brachycephalics. Causes of dystocia can be divided into maternal and fetal factors. Maternal factors typically include physiologic failure of myometrial contractions, either as a primary or a secondary problem, or a morphologic obstruction of the birth canal. Fetal factors are most commonly relative foetal oversize but other problems such as fetal malposition or abnormality may prevent normal birth. The diagnosis of dystocia and hence the requirement for a caesarean section can be challenging.

Some guidelines for diagnosis of dystocia include:

1. Strong frequent abdominal straining and no puppy within 30 minutes
2. Signs of systemic illness in a pregnant bitch
3. Weak straining and no puppy in 2-4 hours
4. More than 2-4 hours since birth of last puppy
5. Prolonged gestation – no signs of labour more than 63 days after ovulation.
6. Retained puppy visible at vulva
7. Presence of normal and abnormal discharge – greenish / black discharge produced but no pup within 2-4 hours

Once it has been established that the bitch has dystocia based upon these criteria, it is important to determine the cause to help guide treatment. It is important to take a full history, to estimate the duration of gestation and to perform a full physical examination.

Establish the stage of labour.

Digital examination of the vagina may detect a fetus lodged in the birth canal. Check for the presence of the Ferguson reflex (i.e. digital pressure on the ventral or dorsal vaginal wall results in abdominal straining). No reflex suggests that the dog is not in labour or that uterine inertia is present.

It is sensible to check electrolytes and metabolites, especially calcium and glucose. Hypocalcaemia and hypoglycaemia have both been implicated as causes of uterine inertia. However, hypoglycaemia is rare and bitches can have uterine inertia with normal calcium levels.

Radiography is very useful to assess any abnormalities in the bitch's pelvis and the number, size and position of the fetuses. Signs of fetal death can be detected by gas accumulation 6 hours after death.

Ultrasound can be used to identify fetal viability and / or distress. The normal heart rate of a canine fetus is 180-240bpm. A fetal heart rate of <150bpm at full term is an indication for intervention.

Medical therapy for non-obstructive dystocia

Oxytocin can be used with non-obstructive dystocia when uterine inertia is not complete. Oxytocin increases the frequency and strength of uterine contractions. Guideline – 0.25-4 iu intramuscularly every 30-60 minutes. Uterine rupture is unlikely if non-obstructive dystocia is present. If oxytocin fails to improve contractions and/or if the bitch is hypocalcaemic then 10% calcium gluconate solution, 20 mg/kg subcutaneously or slowly intravenously may be administered. Ideally give calcium gluconate 15 minutes before oxytocin.

Medical therapy is reported to be effective in approximately 30% of bitches with dystocia.

Indications for a Caesarian section:

1. Complete primary uterine inertia i.e. no second-stage labour and bitch past term
2. Incomplete primary uterine inertia refractory to medical management (i.e. second-stage labour starts but the uterine contractions fail and do not respond to medical treatment)
3. Secondary uterine inertia (i.e. uterine muscles become exhausted after prolonged contraction against obstruction or after efforts to expel large litter). There is a lack of Ferguson reflex and this is unresponsive to oxytocin.
4. Relative or absolute fetal oversize
5. Anatomical abnormality of pelvic canal. e.g. pelvic malunion
6. Foetal monsters
7. Non-correctable fetal malposition
8. Fetal distress
9. Fetal death with putrefaction
10. Previous dystocia / caesarean section
11. Systemic illness
12. Uterine torsion, rupture or prolapse

Anaesthesia

Anaesthesia should be tailored to increase the chance of fetal survival and to enable a rapid recovery for the bitch. Pregnant animals are vulnerable to hypoxaemia due to decreased functional residual lung capacity and lung volume, from compression by their full abdomen, and it is advisable to provide oxygen prior to induction of anaesthesia. The bitch has an increased blood volume and cardiac output and in order to maintain these adequately during surgery and avoid hypotension intravenous fluid therapy must be given. It is important to select anaesthetic drugs that will have minimal effects on the fetuses and to use them at low doses. In many bitches premedication may not be needed. Acepromazine and medetomidine are avoided; a low dose of opioid such as morphine or methadone is preferred. Propofol has a limited effect on the fetuses and is therefore commonly used as an induction agent. Anaesthesia can be maintained with isoflurane or sevoflurane in oxygen. Nitrous oxide should be avoided as it can cause diffusion hypoxia in the fetuses after birth. The use of local anaesthetic agents such as lidocaine can provide additional analgesia used as a line block or epidural. Postoperative analgesia can be provided with additional opioids, ensuring that the bitch is not too sedated.

Surgical technique

A ventral midline incision is made through the skin and linea alba from the umbilicus to the pubis. A ventral midline incision in the body is the best approach to the uterus. The puppies should be gently milked towards the incision and manually removed. The puppies are gently but firmly pulled away from the uterus and the amniotic sac is ruptured and the umbilical cord clamped or tied. It is important to check the pelvic canal for any puppies stuck there. The placenta should come away with the puppy or with gentle traction. If the placenta has not separated from the endometrium then it should be left rather than cut or torn as this will result in excessive haemorrhage. Uterine involution should begin following removal of the puppies. If this is not the case then oxytocin can be administered; this may also help reduce haemorrhage from the uterine wall.

Many suture patterns have been advocated for closing the uterine wall. I prefer a two layer closure with an absorbable monofilament suture material in a simple continuous pattern to appose the uterine wall, followed by a double layer closure with an inverting suture pattern. En bloc ovariohysterectomy is reported to reduce surgical times in cases of dystocia in debilitated dams. For this technique the ovaries and broad ligament are ligated and separated. At this stage the uterus and contents rely on the uterine artery. The uterus is then rapidly triple clamped and resected between the clamps. A non-sterile assistant then opens the uterus and revives the neonates. The uterus is then ligated as normal at the cervical stump prior to closure. This technique was studied in 63 animals (37 dogs and 26 cats) and the neonatal survival rate was 75% for dogs and 42% for cats, which is reported to be similar to previous studies suggesting that en bloc ovariohysterectomy is a safe and effective technique to Caesarian section in dogs and cats, however this would require an increase in experienced personnel present. No problems associated with lactation have been reported with ovariohysterectomy.

Post-partum diseases

- Puerperal hypocalcaemia
- Metritis
- Haemorrhage
- Retained placenta and fetus
- Mastitis

Spinal malformation predisposes to intervertebral disc disease.

Thoracic vertebral malformations with kyphosis and scoliosis are often incidental findings on diagnostic imaging studies of screw-tailed brachycephalic breeds and it is quite rare that the scoliosis can cause spinal cord compression, it has been demonstrated that these malformations interfere with spinal biomechanics and predispose to intervertebral disc degeneration. Clients should therefore be advised of the importance to monitor their dog carefully for signs of pain or neurological deterioration.

Further reading

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