VET 433B GI: Dysphagia (Swallowing Impairment) and Regurgitation

Classifying Dysphagia *three categories

Oropharyngeal	Esophageal *most common*	Gastroesophageal
Oral: Cleft Palate, Dental Disease/Pain, tongue disorder Pharyngeal: Severe pharyngeal weakness due to a polyneuropathy or polymyopathy, myasthenia gravis (junctionopathy) Cricopharyngeus: Muscle in the upper esophageal sphincter Swallowing impairment will begin within seconds of swallowing the bolus	Megaesophagus Stricture Neoplasia Esophagitis	Sliding hiatal hernia

Breed Predisposition

Bouvier: Congenital laryngeal paralysis, muscular dystrophy (crazy high CK – hyperCKemia)

German Shepherd

Shar Pei

Brachycephalic: French Bulldog, Boston Terriers, English Bulldogs Pugs

- Hiatal hernia *made worse with BOAS due to increased negative intrathoracic pressure (vacuum effect)
- Brachycephalic Obstructive Airway Syndrome (BOAS)
    - Stenotic nares
    - Elongated soft palate
    - Everted laryngeal saccules
    - Hypoplastic trachea
    - Persistent laryngeal tissue
    - Macroglossia (big tongue)

Newfoundland and Boxers: Inflammatory myopathy (high CK)

What should you ask about when evaluating a dysphagic patient?

Dog Swallow Assessment Tool (DogSAT)

1. Difficulty with solids vs liquids
    - Regurgitates with kibble: probably a stricture in the esophagus (structure/anatomical) could be a bone that caused trauma or reflux under general anesthesia > esophagitis > stricture
        - Can likely drink water normally
    - Regurgitates with water, ok with kibble: functional or motility disorder

2. Is the dysphagia intermittent or progressive
3. Temporal pattern with swallowing
    - Explained in detail by owner, videos are great for this!
4. Recent general anesthesia
    - Regurgitation leading to esophagitis and the formation of a stricture
5. Age of onset
    - Congenital vs acquired
6. Dysphonia
    - Change in pitch of bark
    - Polyneuropathy, polymyopathy, junctionopathy
7. Odynophagia
    - Painful swallowing
    - Severe esophagitis *top differential
    - Esophageal or pharyngeal foreign body
8. Medications
    - Doxycycline, clindamycin: can cause strictures
    - NSAIDS in human literature

Diagnostic approach

1. Observe the animal eating and drinking
2. Physical exam
3. Neurological exam +/- especially if there is dysphonia
4. CBC and chemistry panel (including CK)
5. Survey radiographs (3v thorax, 1v cervical)
6. Esophagram vs videofluoroscopy
    - Dynamics and timing of the swallow
    - Videofluoroscopy: Allows us to evaluate function
    - Esophagram evaluates structure not function
        - Falls short in the evaluation of timing, dynamics, and coordination of sphincter opening

7. +/- Esophagoscopy
    - Downside is that the patient has to be under general anesthesia
    - Risk benefit ratio needs to be evaluated
    - Does not evaluate function, only structure
8. CT, MRI
9. Electrodiagnostics (EMG, NCV)
10. Muscle biopsy

Don't forget the importance of a thorough Oral Exam!

Large tongue in puppy – May be muscle dystrophy (causes macroglossia)

Glossitis: Systemic Lupus Erythematosus

Cleft Palate

Case: MMM

Dog presents for not being able to open his mouth

TMJ with severe osteomyelitis, OSA, chondrosarcoma

Masticatory muscle myositis

- Fibrosis and scarring of the muscles of mastication
- Under GA, dog's mouth will not be able to be opened

DIFFERENT than a trigeminal neuropathy – Dog would have an open mouth that doesn't want to close

Muscles of mastication

Pterygoid

Masseter

Temporalis

Digastricus

These muscles have type 2M myofibers *antibody test can test for antibodies against these fibers and help with the diagnosis of masticatory muscle myositis

Can have a negative test in the late stage of this disease due to the lack of measurable antibodies, you only have fibrosis/sacring left of the muscles

Gold standard is biopsy of the muscles of mastication – helps with prognosis depending on the degree of muscle fibrosis/scarring. You may be able to help with some of the inflammation

Acute phase: Sever pain, swollen muscles due to inflammation – can treat and have an ok prognosis

Chronic phase: fibrosis and muscle scaring – poor prognosis

Immunosuppressive therapy prednisone with cyclosporine

- Helps mitigate the pred side effects (muscle atrophy etc.)
- Cyclosporine takes longer to kick in so the pred helps get things under control faster

Esophageal Disorders

- Motility
  - Megaesophagus *most common
  - Esophageal dysmotility
    - Myopathy, Polyneuritis, Junctionopathy
  - Esophagitis (severe)
- Anatomic and Structural
  - Vascular ring anomaly
  - Strictures
- GERD
  - Gastroesophageal Reflux Diseases
- Infectious *not common
  - Pythium
  - Candida
- Neoplastic
  - More common in brachycephalic dogs due to reflux

Case Study: Miniature longhaired Dachshund with a lifelong history of severe dysphagia with gagging, repeated attempts to swallow, coughing, and nasopharyngeal reflux. Worse when drinking water

Cricopharyngeus Muscle Dysfunction: Disorder of the Upper Esophageal Sphincter

Oropharyngeal category of dysphasia

- Achalasia – Failure of the upper esophageal sphincter to completely relax/open
  - Idiopathic hypertrophy of the cricopharyngeal muscle

    - Breeds
        - Miniature longhaired Dachshunds, Maltese, Toy Breeds
- Asynchrony- Inappropriate timing in opening of upper esophageal sphincter in relation to pharyngeal contraction
    - Idiopathic, thought to be a neuropathy
    - Breeds
        - Golden Retrievers
- Clinical signs
    - Dysphagia within seconds of swallowing
    - Repeated swallowing attempts
    - Dysphagia usually worse with water
        - FYI: If it was worse with food, it would more likely be structural
    - Nasal reflux
        - Cleft Palate may be a ddx
    - Coughing
    - Bloating
        - Gulping down massive amounts of air
- Diagnosis
    - Video fluoroscopy swallow study
    - Cannot diagnose with an esophagram, you need a dynamic study
- Treatment
    - Open surgical myotomy
        - Not a benign surgery, complex and can make the issue worse if done incorrectly
        - Does not have a great outcome, even when done by qualified surgeons
    - Botox injection of CP muscle
        - Not a permanent solution and requires anesthesia
        - Causes temporary weakness of the CP muscle
        - 15 Units injected in 3 sites directly in the CP muscle
        - Dog can become tolerant to Botox over time
    - Balloon dilation of UES
        - Done in some dogs but is not the go-to procedure
    - Enteral feeding tube
        - Bypasses the esophagus
        - Not fixing the problem, bypassing the problem and patient can still have issues with the saliva

Case Study: Onset of acute dysphagia, regurgitation, ptyalism, and dysphonia

Megaesophagus seen on thoracic radiographs

- Acquired due to age of onset
- Now think primary vs secondary
    - Primary cause / Idiopathic
        - Idiopathic ~ 52%
        - One in two dogs!
    - Secondary
        - Myasthenia Gravis ~ 24%
            - Most common by far as the secondary cause of megaesophagus
            - Ach receptor antibody test is the gold standard
            - Done in RTT or SST great test!
            - If the test is normal but >0.3, test again in a week or few to see if it raises! Don't need to retest if 0.1 or 0.2
            - Cat reference range is different than in the dog (0.3 vs 0.6)
            - Treat with pyridostigmine
            - Megaesophagus may not go away (~50% have persistent megaesophagus) even if the other clinical signs of MG resolve
        - Neuromuscular Disease ~ 9%
        - Esophageal Foreign Body ~ 7%
        - Vascular Ring Anomaly ~ 3%
        - Esophageal Neoplasia ~ 2%
        - Addison's Dz ~< 1%
        - GDV ~1%
        - Hiatal Hernia ~ 1%

Megaesophagus and Myasthenia Gravis

- Two forms: Congenital vs Acquired
    - Congenital
        - Rare, do not usually see focal megaesophagus
        - Not autoimmune
        - Deficiency in receptors, need a muscle biopsy to diagnose, NOT serology
    - Acquired
        - Autoimmune
        - 40% only have megaesophagus or dysphagia in the absence of other MG signs (generalized weakness etc)
        - 45% have severe generalized megaesophagus with weakness
        - 10% have mild generalized MG without megaesophagus
        - 5% acute fulminating

- Treatment
    - Modify consistency of diet and water
    - Feed from elevated position (gravity-assisted feeding)
        - Bailey Chair
            - Some dogs have abnormal relaxation of the LES causing profound retention of the bolus (hours on end)
            - Can regurgitate hours after a meal
    - Gastrostomy feeding tubes with intractable aspiration
        - Bypasses the esophagus
    - Fenestrated esophagostomy tube
        - Suction up saliva and secretions sitting in the esophagus
    - Pharmacological agents to reduce LES tone
    - Surgical options to reduce LES tone
        - More common in human medicine

Review on Approaching Megaesophagus

- Congenital vs Acquired
- Acquired is much more common
    - Is it primary or secondary?
    - ACh receptor antibody testing! Increase can lag so you may need to retest
- 40% of dogs with MG have acquired mega esophagus have that as the only sign
- 45% have both megaesophagus and clinical signs (weakness etc.)

Managing Esophageal Achalasia-Like Syndrome

- LES opens when you initiate a swallow
- In dogs with esophageal Achalasia-Like Syndrome this sphincter doesn't relax normally
- Smooth muscle in the canine esophagus is only present in the lower esophageal sphincter, the whole esophageal body is striated muscle
    - Drugs are used to relax this muscle
- In the cat, the distal 1/3 and lower esophageal sphincter are smooth muscle
- Drugs to reduce LES tone
    - Sildenafil @ 1mg/kg q 8hrs
        - Bioavailability is all over the map because we don't know when the medication will reach the stomach if the esophagus is not functioning correctly
        - Also true while giving abx
    - Botulinum toxin injection into LES

        - Dog needs to be anesthetized every tx and you need special instruments
    - Avoid metoclopramide and cisapride
        - Drugs that tighten the LES!
        - Super counterintuitive
        - Should only used for sliding hiatal hernias

Chronic history of "bringing up food"

What would you do?

- Vomiting vs Regurgitation
    - Regurgitation seen in video of Boston Terrier
        - Likely a hiatal hernia
        - LES should be below the level of the diaphragm
            - Diagnosed via video fluoroscopic swallow study
                - More likely to capture event since this process takes about 20 min
            - Can't rule out if radiographs are normal
                - 7-20% of survey radiographs may catch a view that shows a hiatal hernia (nanosecond snapshot of the chest)
            - Can also do endoscopy of the stomach and perform a retroflexion and look up at the opening of the hiatus
        - Esophageal dysmotility
            - ESOPHAGITIS is a common cause

Surgical management of Hiatal Hernia

- L-sided gastropexy
- Esophagopexy
- Diaphragmatic hiatal plication
    - Outcome post-surgery is not great, usually see an improvement but not a complete resolution
    - Likely due to the fact that the mechanical surgery does not alter the stomach anatomy at the gastroesophageal junction
    - Antiquated procedure

Esophagitis

- Most common causes of esophagitis
    - Secondary to general anesthesia
        - Median 7.5 days post-anesthesia
        - Presumed GRE

        - Incidence of GRE in dogs during anesthesia varies from 16-55%
        - Reduction of LES pressure, dependent on the type of medications used
        - Morphine, atropine, acepromazine, thiopental, xylazine, isoflurane
        - Loss of swallow reflux, saliva contains bicarb which helps neutralize acid
        - Loss of peristalsis, refluxed contents stay in the esophagus and can cause irritation, especially when the pH is below 4.0
        - pH below 4.0 conducive to converting pepsinogen to pepsin, pepsin + acid is catastrophic
        - Should pretreat all dogs with PPI before surgery, especially brachycephalics
            - Not much of a downside but can save patients in the long-run
    - Pill-induced esophagitis
        - Doxycycline
        - Clindamycin
        - NSAIDS
    - Vomiting gastric contents
    - Secondary to foreign body injury
    - Secondary to ingestion of caustic material
        - Not super common in animals, more common in people ingesting lye super basic and very caustic to the esophagus

Goal is to prevent esophageal strictures!

- Treatment
    - Esophageal Balloon Dilation
        - Success rate of 70-80%
        - Median of 2-4 dilation procedures
        - Each time requires general anesthesia
        - Triamcinolone injection in four quadrants
            - Corticosteroid can help reduce fibrosis / scarring and decrease the frequency of restructure
- **Management of esophagitis**
    - Gastric acid suppressants
        - Proton pump inhibitors
            - Omeprazole, esomeprazole, pantoprazole, etc
            - Much better than H2-receptor antagonists
        - H2-receptor antagonists
            - Famotidine
        - Sucralfate
            - Not routinely used in people!

        - Dissociated into sulfated sucrose and polyaluminum hydroxide in an acidic environment
        - Bind to proteins electrostatically
        - Stimulates PG production
        - Absorption of bile salts
        - Inactivation of pepsins
        - May cause constipation and inhibit the absorption of other drugs
        - Suspension is much better than the tablets crushed and put in water
            - Viscosity is different and the suspension is much better at sticking to the stomach mucosa
            - Need to study retention times!
- Prokinetics
    - Cisapride
        - 5HT-4 agonist (more potent than metoclopramide)
        - Increased LES sphincter tone – works on smooth muscle
        - Stimulates gastric emptying
        - Stimulates distal esophageal motility in cats, humans, and guinea pigs (smooth muscle in distal esophagus)
        - Gastroesophageal reflux
        - Esophagitis
    - Metoclopramide
    - Goal is to **tighten** LES and prevent reflux from the stomach into the esophagus
    - Assuming the dog does NOT have megaesophagus
- Dietary fat restriction
    - Fat can delay gastric emptying in the dog
- PEG tube
    - Not placed consistently
    - Usually try to alter food consistency first
    - Vicious lidocaine jell to help with pain +/- opioids