Practical Neurology
Back Pain

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Some rules about back pain

- Completely unilateral neuro signs rarely arise from the spinal cord
  - Usually bilateral
  - Though may be more pronounced on one side
  - Monoparesis – think peripheral nerve disease first
- The first neuro deficit is:
  - Conscious proprioception
  - Then voluntary motor
  - Then superficial pain
  - Then deep pain

Does this dog’s back hurt?

Things that can look like Back Pain

- Referred abdominal pain
  - Abnormalities on abdominal x-rays, barium series, ultrasound or bloodwork
- Muscle pain
  - CPK high, Confirm with muscle biopsy
  - Immune mediated polymyositis
  - Beagle Pain Syndrome
- Orthopedic pain
  - Bilateral knees and hips
  - Complete musculoskeletal exam & x-rays
- Neuro exam normal on imitators

Does this dog’s back hurt?

Back Pain can look like something else

- Limb lameness
  - Root signature - limping on one leg
  - Extension of the limb does indeed hurt
- Abdominal pain
  - Pressure put on back when palpation abdomen
- Constipation
  - Dogs with lumbosacral pain don’t want to squat to defecate

Does this dog’s back hurt?

Back Pain can look like something else

- Lethargy
  - Can be confused with reluctance to move
- Orchitis, Epididymitis
  - Appear as if back hurts

DDx for back/neck pain

- Intervertebral Disc Disease
- Wobbler Syndrome
- Congenital spinal malformations
- Neoplasia
- Discospondylitis
- Meningitis
- Spinal arthritis & spondylosis
- Trauma
- Forebrain mass
DDx for back/neck pain

Uncommon Causes of Back Pain
- Extradural synovial cysts, arachoid cysts, dermoid cysts
- Myelodysplasia
  - Meningoceles/Myelomeningoceles
  - Syringomyelia/Hydromyelia
  - Spinal dysraphism
- Spina bifida
  - Failure of dorsal laminae to fuse
  - Associated spinal cord malformations

DDx for back/neck pain

Uncommon Causes of Back Pain
- Multiple Cartilagenous exostoses
  - Nodules of cartilage/bone proliferate from growth plates
- Hypervitaminosis A
  - Cats fed primarily liver
  - Vertebral exostoses
  - Prognosis poor
- Methionine deficiency
  - Hunting dogs fed primarily tripe (Europe)
  - T3-L3 progressive myelopathy
  - Prognosis good with proper diet

DDx for back/neck pain

Uncommon Causes of Back Pain
- Calcinosis Circumscripta
- Dural Ossification
- Disseminated idiopathic skeletal hyperostosis (DISH)
  - Periarticular ossification throughout the body

DDx for back/neck pain

Causes of Progressive Rear end Weakness without Pain
- LMN Reflexes
  - Degenerative Myelopathy
  - Hypothyroidism Polyneuropathy
  - Botulism
  - Coonhound paralysis
  - Tick paralysis
  - End stage myasthenia gravis
- UMN Reflexes
  - Rottweiler Leukoencephalomyelopathy
  - Hereditary Ataxia of Jack Russell Terriers
  - Afghan Hound Myelopathy

Intervertebral Disc Disease

Type I Disc Disease
- Annulus around the disk weakens
- Disc material acutely extrudes
- Acute pain
- +/- neuro deficits
- Small dogs

Type II Disc Disease
- Annulus gradually thickens
- Insidious weakness
- Neuro deficits > pain
- Large dogs

Intervertebral Disc Disease

Presentation
- Uncommon in cats
- Upper cervical extrusion (Type I)
  - “The Screaming Chihuahua”
  - C2-3 most common
  - Severe neck pain
  - Mild neuro deficits
  - Nose down posture with arched back
  - Neck muscle fasciculations
  - Thoracic limb root signature
Intervertebral Disc Disease

Presentation
• Type I TL Disc Disease
  – Acute presentation
  – Usually T11-L5
  – Rarely T2-T10
    • Intercapital ligament
  – Neuro deficits more common than with upper cervical type I
• Type II Disc Disease
  – Progressive weakness with some back pain
  – Larger dogs

Intervertebral Disc Disease

Diagnosis
• History and signalment
• Physical Exam
  – CP deficits tell you there is neuro disease
  – Neuro exam localizes the lesion
• CBC, panel, lytes, UA – normal
  – Urine culture if urine retention
• Radiographs
• Referral – myelogram, CSF tap, CT/MRI

Intervertebral Disc Disease

Modified Frankel Scale
• Grade 0 – paraplegia, no deep pain
• Grade 1 – paraplegia, no superficial pain
• Grade 2 – paraplegia with normal pain sensation
• Grade 3 – nonambulatory paraparesis
  – Some voluntary motor
  – Can’t bear weight without support
• Grade 4 – nonambulatory paraparesis
  – Can stand but not walk
• Grade 5 – ambulatory paraparesis

Intervertebral Disc Disease

Radiographs
• Under sedation – GUARD THE SPINE!!
  – Positioning is everything (esp. traction)
  – Patient comfort
  – Slightest movement causes blurring
• Survey radiographs can identify the site of disc herniation in 50-60% of cases
• Radiographic signs of disc disease:
  – Narrowing or wedging of disc space
  – Decreased size of intervertebral foramen
  – Reduced space between articular facets
  – Mineralized disc material in vertebral canal or intervertebral foramen
### Intervertebral Disc Disease

#### When is it Surgical?
- **Emergency surgery**
  - Rapidly deteriorating neurologic function
  - Do twice daily neurologic exams
  - Non-ambulatory (can’t walk without assistance)
- **Scheduled Surgery**
  - Chronic severe pain
  - Moderate to severe neuro deficits that fail to improve

#### Emergency Treatment
- **Glucocorticoids**
  - High dose SoluMedrol widely used
  - Also dexamethasone
  - Little evidence that it changes outcome in dogs who proceed to surgery
  - Serious side effects are possible
    - 33% have GI side effects to MPSS
    - Dexamethasone can increase risk of colon perforation
  - Clinical experience tells us that it does help non-surgical cases
  - Use in moderation NOT WITH NSAIDs
    - 0.1 mg/kg SID-QOD
- **Free Radical Scavengers**
  - Fewer side effects than glucocorticoids
  - But no proven benefits
  - DMSO
  - Tirilazad
  - Polyethylene glycol
  - Poloxamer 188
  - Solcoseryl
  - Naloxone
  - Croctin
  - TRH
  - Mannitol was associated with harm in feline experimental model

#### Long Term Treatment
- **CAGE REST!!!!** (how long?)
  - At least 2 weeks
  - Some recommend 4-6 weeks
  - Crate size – can change positions but not walk around
  - Activity limited to leash walks
  - Gradually back to normal activity over 2-6 weeks after cage rest finished
- **Monitor for progressive neuro signs**
  - Weakness, paralysis
  - Difficulty urinating
- **Analgesics**

#### Emergency Treatment
- **Confinement**
- **IV fluid therapy**
  - Mediates ischemia
- **Analgesia**
  - Tramadol 3-5 mg/kg PO TID
  - NSAIDs
  - Opiates if needed

#### Long Term Treatment
- +/- Antiinflammatories (dose??)
  - Prednisone – 0.5 mg/kg PO BID x 5-7 d, then SID x 7d, then QOD 7 doses
  - NSAIDs (not both!!!)
  - DO NOT give anti-inflammatories without cage rest!!
- **Muscle Relaxants**
  - Methocarbamol 15-20 mg/kg PO TID
- **Acupuncture**
- **Glucosamine/chondroitin**
Intervertebral Disc Disease

Prognosis
• Very few outcome studies on medically managed dogs
• No deep pain
  – 40-50% will walk again with medical treatment
  – 60-80% will walk again with surgery
  – 33% of those that walk again will have intermittent incontinence
  – Recovery of deep pain within 2 weeks carries a good prognosis
• Length of time between loss of deep pain and surgery
  – Surgery sooner is better than later
  – 48 hour rule – no longer widely accepted

Intervertebral Disc Disease

Prognosis
• Non-ambulatory with pain sensation
  – 80-95% success with surgery
• Mean time from surgery to ambulation
  – 10-13 days for small dogs
  – Much longer for large dogs
  • Mean 7 weeks to ambulation
  • 62% walking in 4 weeks
  • 92% walking within 12 weeks
  • Longer for older, heavier patients
• Back pain alone without neuro deficits
  – 24 of 25 of dogs improved with surgery
  – No studies I am aware of on medical Tx

Intervertebral Disc Disease

Prognosis
• More acute paralysis carries worse prognosis
  – Those that go from walking to paralyzed in less than one hour don’t do as well
  – Those who go down gradually (1-2 days) have better prognosis
• Respiratory compromise
  – Prognosis same with a ventilator
  – Prognosis grave without ventilator
• Dogs non-ambulatory from type II disease over weeks to months have worse prognosis than type I

Intervertebral Disc Disease

Prognosis
• 20% of dogs who have back surgery will have another episode of back pain with neuro deficits
  – Most do not require surgery
  – Re-operate rate is <10%
  – 40% recurrence when treated medically
• Dogs with 5 or more mineralized discs at surgery have 50% recurrence rate

Lucky

• 17 year old male cocker spaniel with:
  – Hypothyroidism (Soloxine)
  – Glaucoma & prostheses
  – Cognitive Dysfunction Disorder
  – Hip Dysplasia (Rimadyl PRN, glucosamine)
  – Carcinoma L ear canal – debulked twice
• HPI - Started showing behavioral changes a few weeks ago
  – Episodic of panic
  – DDx
  • Pain
  • Cerebral Disease
    – Cognitive Dysfunction
    – Brain Tumor (ear tumor met??)
    – Infectious, Inflammatory, Metabolic
  • Hypertension

Lucky

• Review of record shows BUN creeping up over past year (40-50)
• PE & Neuro Exam
  – Can’t assess vision ;-
  – Short stride rear legs
  – CP deficits worse on L
  – Hip pain bilateral
  – Very brisk bilateral patellar reflexes
• Lesion – forebrain, cervical, TL, LS
• CBC – normal
• GHP/lytes – BUN 54
• UA – SG 1.017, culture negative
Lucky

- Dx Plan – Episodes of Panic
  - Look for pain
    - No new pain found on PE
  - Abdominal US - normal
  - Look for metastasis
    - Chest x-rays and Abd US normal
  - Blood Pressure 220/110
  - CSF tap/MRI discussed
    - Spinal films – cervical and TL normal
      - No sedation
      - IVDDx L6-L7 L7-S1, LS instability, severe hip dysplasia

- Tx Plan – New Problems
  - CRF
    - K/D diet
    - Fish oil
  - CCD
    - Antioxidants and fish oil
    - LS Instability – no new treatment
    - Hypertension
      - hydralazine & rechecks of BUN and BP
  - Despite controlling hypertension, episodes of panic continued
    - Referring vet tried short course of decreasing pred in case of brain tumor

Lucky

- New Diagnoses:
  - acute exacerbation of CRF
  - Regenerative anemia
- Further diagnostics:
  - Chest x-rays & abdominal US normal
  - Coagulation profile normal
  - Urine culture negative
- Tx:
  - Whole blood transfusion, IV fluids 2x, IV ampicillin, Aluminum hydroxide PO, Omeprazole, sucralfate
  - That afternoon – profuse black stools
  - Dx – GI blood loss

A few weeks later….
- CC – acute collapse – lifeless and pale
- PE – very pale mucous membranes, weak pulses, can’t do neuro exam
- CBC – HCT 11%, retics 8% (>100,000)
- GHP & lytes – BUN 280, creat 7, phos 11, albumin 1.4, globulins 1.6
- UA – SG 1.017, sediment quiet, protein negative
- Fecal – no evidence of blood
- 1 drop blood + 1 drop saline – no autoagglutination

Three days later…
- Lucky needs another transfusion
- He is still passing melena
- Surgery/endoscopy to resect/cauterize the ulcer declined
- Barium PO

Over the next week…
- BUN falls to 100ish, creat 4ish, phos normal
- Bleeding stops, PCV low 30’s
- Remains anorectic
Lucky goes home…
Lucky

- Owner force feeds for 2 weeks
- Lucky starts eating
- Lucky lives a happy life again
- 6 months later...
- Lucky starts having seizures, and is euthanized
- No Necropsy

Don’t give Pred and NSAIDs together, especially when there is CRF

Lucky

Things that could have avoided this problem...
- Don’t do this on purpose
- Tech review medications at the beginning of each visit
- Always get updated records when seeing a client that also uses another vet
- Always give drug handouts listing side effects when new drugs are prescribed

Intervertebral Disc Disease

Progressive Myelomalacia
- 5-10% of dog who lose deep pain
- Hemorrhagic necrosis and softening of the spinal cord
- Ascends and descends through the spinal cord (first sign?)
- HINT: cranial migration of panniculus
- Flaccid abdominal muscles
- Migrating flaccid paralysis
- Eventual respiratory paralysis
- Grave prognosis

Intervertebral Disc Disease

Spinal Walking
- dogs can begin walking reflexively, with no spinal cord recovery
- Ambulation with no deep pain
- Toes are subject to injury from dragging
- Usually remain incontinent

Intervertebral Disc Disease

Post-Operative Care
- Physical Therapy – 5 Steps
  - Step One – TID until weight bearing
    - Cold pack incision 10 minutes TID
    - Until incision cool to touch
    - Passive range of motion exercises
    - Massage affected limb muscles
  - Step Two – TID until limb motion
    - Standing exercises
    - Neuromuscular stimulation
  - Step Three – BID until walking
    - Weight shifting exercises
    - Assisted walking
    - Swimming, underwater treadmill

Intervertebral Disc Disease
Intervertebral Disc Disease

Post-Operative Care
- Physical Therapy – 5 Steps
  - Step Four - BID
    - Sit to stand exercises
    - Balance and coordination exercises
    - Walks of increasing length
  - Step 5 - SID
    - Increased intensity walking and swimming
    - It can take 6 months to get to 100% recovery
Intervertebral Disc Disease

Post-Operative Care

- Bladder management
  - UMN bladder (drugs?)
    - Alpha blockers to relax the sphincter
      - Phenoxybenzamine 5-15 mg PO SID-BID
      - Prazosin 1 mg/30 lbs PO SID-TID
    - Skeletal muscle relaxants
      - Diazepam
      - Dantrolene
    - Bethanechol only if bladder flaccid
      - 2.5-25 mg PO TID
      - 3 days after phenoxybenzamine
    - Express or catheterize TID-QID

Intervertebral Disc Disease

Post-Operative Care

- Bladder management
  - LMN bladder
    - Bethanechol
    - Alpha blocker if needed
    - Express or catheterize TID-QID (which?)
  - Intermittent catheterization carries no more risk for UTI than manual expression
  - Indwelling catheter only if no other option
    - Large female with bladder difficult to express
    - Aggressive dog
    - To manage urine scalding

Intervertebral Disc Disease

Post-Operative Care

- Bladder management
  - Monitor for UTI
  - UA once monthly until urinating on own
  - Then q4-6 months until spinal cord disease resolves
  - Urine culture q6months

Intervertebral Disc Disease

Post-Operative Care

- Analgesia
  - Preventing pressure sores
    - Padded beds (where?)
    - DogLeggs.com
    - Sling
    - Turn every 4 hours
    - Avoid urine leakage, keep skin dry
  - Watch for neurologic deterioration

Wobbler Syndrome

Aka Caudal Cervical Spondylomyelopathy
Aka Cervical Vertebral Instability

- Presentation
  - Middle aged to older large dogs
  - Onset & progression usually chronic
  - Occasionally acutely down
  - Cervical Myelopathy (neuro exam?)
    - Sensory ataxia, Postural deficits
    - Low neck carriage
    - Mild to moderate neck pain
    - UMN all 4 – pelvic worse
    - May have UMN bladder
Wobbler Syndrome

**Diagnosis**
- Usually depends on myelography/CT/MRI with stress
  - Flexion, extension – make lesions worse
  - Perform with caution
- Linear traction - relieve lesions

**Treatment**
- Medical therapy may or may not work
- Condition is usually progressive
- Surgery may or may not work

Wobbler Syndrome

**Prognosis**
- Generally good with surgery and intensive care
  - But not as good as type I disc
  - More like type II
  - Better if ambulatory
  - Worse if more than once disc space
  - 71% get worse for 2 days after surgery
- Time to ambulation can be prolonged
  - 2.5 months to ambulation
  - 3.6 months to optimal results
- Stabilizing and distracting one disc space may aggravate another
  - "domino effect"
  - Recurrence 20-30%

Congenital Spinal Malformation

**Hemivertebrae**
- wedge shaped

**Butterfly vertebrae**
- Central vertebral body fails to form
- Block vertebrae
- Fusion of two or more vertebrae
- Stenotic vertebral canal
- Transitional vertebrae
- vertebrae of one spinal segment take on characteristics of another
- Lumbarization of S1 & vice versa

Congenital Spinal Malformation

**Presentation**
- Puppy to middle age
- Hemivertebrae in “Screwtail breeds”
  - Bulldogs
  - Boston terriers
- Some malformations are incidental findings
- Much like Type II Disc Disease or Wobbler
  - Usually progressive
  - Occasional acute decompensation

Congenital Spinal Malformation

**Treatment**
- Medical treatment if pain only or ambulatory with mild to moderate neuro deficits
- Surgery if non-ambulatory
- Because of abnormal anatomy of hemivertebrae, some surgeons think that surgery carries increased risk of destabilization
- Some surgeons won’t cut as long as there is voluntary motor, unless medical therapy has failed for a really long time
Zoey

- Sig – 3 year old SF Pomeranian
- Comes in for dental
- Pre-A exam and bloodwork NSF
- Dental and anesthetic recovery go fine
- Between afternoon appointments, you tech takes you aside to let you know that Zoey can’t walk
- Neuro exam
  - Mentation & CN normal
  - all 4 limbs inc tone with hyperreflexia, rear worse
  - No deep pain (lesion?)

Zoey

- Diagnostic Plan
  - Go to the restroom to vomit & have diarrhea
  - Take upper & lower cervical films
    - Lower cervical film appears normal

Zoey

Congenital Spinal Malformation

Atlantoaxial instability

Presentation
- Toy breeds
- Neck pain to tetraplegia
- UMN reflexes all 4 legs, worse rear

Diagnosis
- Survey radiography
  - Increased space between C1 and C2
  - Hypoplastic or absent dens
  - Dens not attached to floor of C1
- DO NOT perform flexed view
- Confirm with CT/MRI

Atlantoaxial instability

Treatment
- Medical treatment if just pain or ambulatory with mild to moderate neuro deficits
- Surgical stabilization if prolonged neuro deficits that don’t respond or non-ambulatory
Congenital Spinal Malformation

Atlantoaxial instability

Prognosis
- Fair to good for mild to moderate neuro deficits
- Guarded if tetraplegic
  - 13% do not survive surgery
  - Respiratory arrest
  - Dysphagia & aspiration pneumonia

Take care with Toy Breed necks during anesthesia
Especially if history of neck pain

Petunia

• Sig – 10 year old brown tabby cat, outdoor
• CC – can no longer jump up to reach food bowl, seems wobbly
• PE and Neuro
  - Hyperreflexive femoral and ischiatic reflexes
  - She bites you hard when you palpate TL spine
• DDx
• Dx Plan – TL films normal

Petunia

• Owner declines referral, but approves lumbar CSF tap
  - Increased microprotein, normal cell counts
  - Culture negative
• Dx – likely neoplasia
  - LSA most likely
• Tx
  - Prednisone 10 mg daily
  - Declines chemo or oncology referral
• Asymptomatic for one month
  - Then symptoms return
  - Euthanized
  - Necropsy confirms SC lymphoma

Neoplasia

Primary Spinal Cord Neoplasia
• Glioma
• Meningioma
• Nerve sheath tumors
  - Hemangiopericytoma
  - Schwannoma
  - Blastoma - rare
• Lymphoma
Metastatic Spinal Cord Neoplasia
• Lymphoma
• Carcinoma (mammary, prostate)
• Melanoma

Neoplasia

Spinal Cord Neoplasia
• Dx
  - Radiographs usually normal
  - Unless tumor is mineralized
  - Or invades bone
  - Or is a nerve sheath tumor, enlarging the IV foramen

Suzy

• Sig – 10 year old SF Chiuhua mix
• CC – coughing again
• Hx – chronic bronchitis
  - PDA coil placed 10 years ago
• PE – TL spinal pain
• Neuro – CP deficits rear legs
• Dx plan
  - CBC, GHP, lytes, UA – normal
  - TL spine radiographs
  - DDx – osteomyelitis, neoplasia
  - Thoracic radiographs
  - Large Solitary lung mass
  - PDA coil
Suzy

- Dx Plan
  - US guided aspirate of lung mass
  - Cytology and culture
  - Squamous cell carcinoma
  - No growth

  The same symptoms can develop a new cause

  Unless the owner tells you not to, always take 2 views

Neoplasia

- Primary Vertebral neoplasia
  - Osteosarcoma
  - Chondrosarcoma
  - Myeloma (plasma cell tumor)
  - Fibrosarcoma
  - Hemangiosarcoma

- Metastatic Vertebral Neoplasia
  - Distant metastasis
    - Carcinoma (prostate, mammary, lung)
  - Local invasion
    - Bladder carcinoma
    - Anal sac tumor

Neoplasia

- Presentation
  - Usually middle aged to older
    - Young dogs or cats
      - Lymphoma (median age 2-3 year)
      - Blastoma (6 months to 3 years)
        - GSD
        - Labrador Retrievers
  - Onset usually progressive
    - Lymphoma sometimes acute
  - Severe pain precedes motor deficits for cord tumors
  - Neuro deficits come earlier for vertebral tumors
Neoplasia

Diagnosis
• Signalment
  – Cats with severe TL pain progressing to neuro deficits - LSA
• Hyperglobulinemia and proteinuria with myeloma
• Bony tumors seen on survey rads
• CSF tap
  – Very rarely see neoplastic cells
  – Increased protein without increased cells
• SC often tumors require advanced imaging
  – Myelogram, epidurogram, CT, MRI

Neoplasia

Treatment
• Anti-inflammatories for cord edema
  – Prednisone 0.5 mg/kg PO BID
• Analgesics
  – Opiates or Tramadol
• Chemotherapy for LSA or myeloma
  – Palliative piroxicam for carcinomas
• Decompressive surgery
• Palliative radiation

Neoplasia

Prognosis
• Grave for bony neoplasia
• Poor for cord neoplasias treated supportively
  – Short term can be good
  – Days to weeks to months
  – Grave long term
• Long term remissions sometimes possible with surgery
  – Prognosis may not be determined without histopath

Belle

Sig – 3 year old female Pit Bull Terrier
CC – laying around, eating fine, owner has $100
PE & neuro exam – mid-thoracic pain
DDx –
Dx Plan – lateral radiograph thoracic spine without sedation - normal
Tx Plan –
  • Dermaxx SID x 7 days and cage rest x 2 weeks

Belle

3 day follow-up call – back to normal, still doing cage rest
10 days after first visit – laying around again refuses to move, won’t eat
PE & neuro – pain at same spot is worse
DDx –
Dx Plan – T spine films with sedation
Dx – discospondylitis

Radiographs can be normal early in the course of discospondylitis
Discospondylitis

Infection if the intervertebral discs & vertebral end plates

• Bacterial
  – *Staphylococcus* spp.
  – *Brucella canis*
  – Many others

• Less commonly Fungal
  – L7-S1 most common
  – If ambulatory, prognosis good for all but *Brucella*
  – relapsing, chronic discospondylitis

• Diagnosis – radiographs, urine culture, *Brucella* serology, CSF culture, LS aspiration cytology & culture

Belle

• Tx Plan –
  – Baytril 5 mg/kg PO BID x 3 weeks
  – Follow-up call in 2 weeks – Belle back to normal
  – 3 months later – Belle won’t move again
  – PE & Neuro – Temp 104F, LS pain
  – DDx
  – Dx Plan – lumbosacral radiograph with sedation, *Brucella* titer, urine culture
  – Tx Plan – OHE, Streptomycin and tetracycline x 30 days, then recheck spinal rads

Belle

Marti – “Doc’s Spicy Martini”

• Sig – 4 month old female golden retriever
  – Stiffness, sore, was fine yesterday
  – PE & Neuro – neck pain – rest of neuro exam normal, possible muscular pain, possible joint pain
  – CBC – grans 20600/ul, monos 2000/ul, HCT 30%
  – GHP/Lytes – phos 8.1
  – UA – USG 1.003
  – DDx
  – myositis, polyarthritis, meningitis, unnoticed trauma, neoplasia

Marti – “Doc’s Spicy Martini”

• Dx Plan
  – Cervical rads with sedation – normal
  – CPK – normal
  – DDx
  – Meningitis, polyarthritis, neoplasia
  – Rickettsial disease
  – Immune mediated
  – Bacterial
  – Fungal
  – Neospora/Toxoplasma
  – Lymphoma
  – (Hepatozoon)

Marti – “Doc’s Spicy Martini”

• Tx Plan
  – Doxycycline 10 mg/kg divided BID x 3 weeks
  – Clindamycin 15 mg/kg PO BID x 3 weeks
  – Tramadol 3 mg/lb qhrs PRN for pain
  – Deramaxx 1 mg/lb PO SID
3 days later….
  – Marti is laterally recumbent & unwilling to move, but neuro exam normal, Temp 103.5F
  – Immobility due to pain, neck pain suspected
  – Joint pain can not be ruled out
  – CBC, GHP, lytes, UA – no change
Marti – “Doc's Spicy Martini”

• Dx Plan
  – CSF Tap
    • Grossly normal
    • Culture negative
    • Cytology – neutrophilic pleocytosis, hypersegmented segs, increased protein
  – Joint Taps of stifles and elbows
    • Urine culture – negative
    • Hepatozoon PCR – negative
  – Tick Panel – RMSF, Lyme, Ehrlichia – neg
  – Toxoplasma/Neospora Titors – negative (Dx?)

• Diagnosis – Steroid Responsive Meningitis-Arteritis

Marti – “Doc’s Spicy Martini”

• Tx Plan
  – Prednisone 1 mg/lb (30 mg) PO divided BID x 2 weeks
  – Prednisone 10 mg PO SID x 4 weeks
  – Prednisone 10 mg PO QOD x 4 weeks
  – Prednisone 5 mg PO QOD x 2 weeks
  – If only partial response to 1 mg/lb divided BID, go to 1 mg/lb PO BID x 1-2 weeks
  – Wean off pred very slowly over 3-4 months
  – If any relapse of symptoms, inc. to previous dose, repeat interval and try again to reduce
  – 50% will need lifelong pred at some dose, or intermittently
  – If incomplete response to pred, can try Imuran or other immunosuppressives

Immune Mediated Meningitis

Similar CSF results
• Culture negative
• Neutrophilic pleocytosis
• Elevated protein
All respond to immunosuppression
Different histopath on necropsy

Steroid Responsive Meningitis-Arteritis (SRMA)
Aka Aseptic Meningitis
• Nova Scotia Duck Tolling Retrievers (“Tollers”)

Immune Mediated Meningitis

Necrotizing vasculitis
• Prognosis not as good as SRMA
• Bernese Mt Dog, Beagle, GSP
Pygranulomatous ME
• Rapidly progressive, neck pain, brain stem lesions, seizures, vomiting
• Pointers
Aseptic meningitis/polymyositis of Akitas
Granulomatous Meningioencephalitis (GME)
• Lesions throughout the CNS
• Focal or multifocal
• Prognosis varies
• Particular appearance on MRI

Rose

• Sig – 5 year old spayed female Labrador Retriever
• CC – Rear limb paralysis actue yesterday, referred for back surgery
• Neuro Exam
  – No spinal pain detected
  – Cutaneous trunci stops R T8 T11 L
  – CPR 0 RR 1 LR
  – Voluntary motor – 0 RR 1 LR
  – Patellar Reflex – 4 R 3 L
  – Ischiatic Groove Reflex – 3R 3L
• Lesion?
  – Mid-thoracic lateralized right

Rose

• DDx -
• Dx Plan
  – TL Spinal Films – normal
  – Myelogram - normal
  – CBC - normal
  – GHP/lytes – glucose 1500
  – UA – glucosuria, no ketones
• Referring Vet Record says Rose was given 10cc Dexamethasone SP and 1 cc Banamine
• cPLI – strong positive
• Abdominal US – edematous pancreas
Rose

- **Dx** –
  - Pancreatitis with possible Diabetes Mellitus
  - Fibrocartilagenous Embolism
- **Tx Plan**
  - Tx pancreatitis – IV fluids, pain meds, NPO x 24 hours, antiemetics, low dose heparin
  - Rose developed GI ulcers and sterile bloody urine over the next 2 days
  - Pepcid, Carafate
  - Insulin for 2 days, then no longer needed
  - Began physical therapy immediately
  - Rose walked out of the clinic 10 days later

Glucocorticoid Doses

<table>
<thead>
<tr>
<th></th>
<th>Pred</th>
<th>Dex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immunosuppressive</td>
<td>1.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Anti-inflammatory</td>
<td>0.5</td>
<td>0.1</td>
</tr>
<tr>
<td>Anti-pruritic</td>
<td>0.25</td>
<td>0.05</td>
</tr>
<tr>
<td>Physiologic Replacement</td>
<td>0.1</td>
<td>0.02</td>
</tr>
<tr>
<td>Duration of action</td>
<td>12-36 hours</td>
<td>36 hours +</td>
</tr>
</tbody>
</table>

Fibrocartilagenous Embolism (FCE)

- Fibrocartilage from nucleus pulposis of the disc plugs up blood supply to or from the spinal cord
- **Presentation**
  - 80% Large to giant dogs
  - Also schnauzers
  - Young to middle aged
  - Peracute to acute onset
  - Progresses and peaks in 6-24 hours
  - Cry out in pain during exercise
  - May show some pain on presentation, but quickly non-painful within 24 hours
  - Neuro lesions depend on location
    - Usually lateralized

Fibrocartilagenous Embolism (FCE)

- Diagnosis
  - Neuro exam localizes to spinal cord, usually lateralized
  - Often no significant pain
  - Rads, CSF analysis and myelogram normal
- **Treatment**
  - Anti-inflammatory glucocorticoids, decreasing
  - Physical therapy
  - No exercise restriction needed

Fibrocartilagenous Embolism (FCE)

- Prognosis
  - Variable – depends on ischemic damage
  - Good if ambulatory within 2 weeks
  - Poor Px related to
    - lack of deep pain
    - severe LMN damage
    - lack of PT provided

Porsche

- Sig – 1 year old spayed female Boxer
- CC – Hit by Car yesterday, doesn’t want to move her head or neck, screams when you touch her
- **Neuro Exam**
  - Severe upper neck pain
  - CP deficits all 4 limbs, worse rear
  - Increased muscle tone all 4 limbs
  - Patellar Reflex – 3 R 3 L
  - Ischiatic Groove Reflex – 3R 3L
  - Can walk reasonably well
- **Lesion?**
  - Upper cervical
Porsche

- **Dx Plan**
  - Upper cervical radiographs with sedation
  - Fx C1 and C2
- **Tx Plan**
  - Cage rest for 3 weeks
  - Deramaxx 50 mg PI SID PRN for pain
  - Porsche healed well within 1 month

Spinal Trauma

- **When to do surgery?**
  - Acute worsening of neurologic signs
  - Moderate to severe displacement of spinal fragments
  - Severe neurologic function or pain
    - Non-ambulatory
    - Especially no deep pain
  - Evidence of spinal cord compression on myelogram, CT, MRI

Sonny

- **Sig** – 12 year old CM Golden Retriever
- **Med Hx** – Hypothyroidism (soloxine), Hyperlipidemia
- **CC** – Rear end weakness, severe, onset over 1-2 months
- **PE & Neuro** –
  - Crepitus palpable in the hips
  - No spinal pain
  - Patellar & ischiatic reflexes – 1 R 1 L
  - CP deficits all 4 limbs, rear worse
- **DDx** – LMN disease caudal SC
  - Degenerative myelopathy
  - Hypothyroidism
  - Hip arthritis

Sonny

- **Dx Plan**
  - LS spinal films
  - VD pelvis
- **Review of the Record**
  - Thyroxine dose was increased from 0.3 to 0.6 PO BID last year when hyperlipidemia began, and T4 was 0.4
  - T4 after 4 weeks of increased dose was in normal range
  - For the past 6 months, T4 has been refilled at 0.3 mg PO BID
- **Dx**
  - Vertebral Spondylosis
  - Clinical Hypothyroidism
  - Hip Dysplasia
Sonny

- **Tx Plan**
  - Increase thyroxine to 0.6 mg PO BID
  - Recheck T4 and neuro exam on month
  - Glycoflex III per label instructions
  - Deramaxx 50 mg PO SID PRN for pain
- Rear end weakness much improved within 3-4 weeks
- Neuro exam normal in 3 months

DDx Multifocal CNS Disease

**Degenerative**
- CNS atrophy of old age
- Lysosomal Storage Disease
- Various Leukodystrophies
- Various abiotrophies

**Anomalous**
- Dandy Walker Syndrome
  - Cerebellar hypoplasia, hydrocephalus

**Neoplastic**
- LSA
- Metastatic neoplasia (prostate CA, ammary CA, melanoma, etc.)

DDx Multifocal CNS Disease

**Nutritional**
- Thiamine deficiency

**Infectious**
- Bacterial – many, including Lyme
- Fungal – esp. Cryptococcus neoformans and Coccidioides immitus
- Viral – FIP, CDV
- Rickettsial – RMSF, Ehrlichia
- Protozoal – Toxoplasma gondii, Neospora caninum
- Algal – Prototheca spp.
- Parasitic – Dirofilaria, Cuterebra, Bayliscaris
- Prion – Feline Spongiform Encephalitis

DDx Multifocal CNS Disease

**Inflammatory**

**Vascular**
- Ischemic encephalopathy