“Back” to the Basics - exam and treatment of neuro patient

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Providing the best quality care and service for the patient, the client, and the referring veterinarian.

Objectives
- Basic neuro exam
  - Localization
- Dr. Reichle spinal imaging
- Treatment and prognosis
  - Conservative vs. Surgical treatment
  - Common neuro problems

Neuro exam instruments
- Reflex Hammer
- Light source
- Hemostat
- Book

Localization
- UMN
  - brain
  - spinal cord
- LMN
  - peripheral nervous system
  - spinal cord caudal to L3-4
Localization - Brain

- evidence of disease involving brain
  - Nystagmus
  - Seizures
  - Irregular CN exam

Localization - Brain

- Nystagmus
  - Fast phase
  - Rotary
  - Vertical vs Horizontal

Localization - Brain

- CN exam
  - PLR
  - Blink
  - Menace
  - Swallow function

Localization - Cervical

- Tetraparesis
  - No evidence of brain involvement
- Neck pain
  - Caution if suspect A-A subluxation!!!!
- Reflexes
  - Biceps
  - Triceps
Localization - Cervical
- LMN to forelimbs, UMN to hindlimbs
  - C6-T3
- Unilateral forelimb involvement
  - Lateralized disk protrusion
  - Nerve root tumor
  - LMN disease

Localization - TL
- Hindlimb involvement only
  - Normal forelimbs
  - Unilateral vs. Bilateral
  - Orthopedic exam!!
- T3-L3
  - UMN signs
  - Increased reflexes
  - Good withdrawal, anal tone
  - Back pain, panniculus reflex

Localization - TL
- Reflexes
  - Patella
  - Sciatic
  - Cranial Tibial

  - Don’t forget to check cruciate ligament integrity!

Localization - Lumbar
- LMN signs
  - Poor withdrawal reflex
  - Diminished hindlimb reflexes
  - Decreased anal tone
- Pain on palpation of lumbar spine
Localization - Lumbosacral

- Often normal reflexes
- LS pain
  - direct palpation
  - movement of tail
  - rectal exam

Diagnostics

- Diagnostics
  - Neuro/ortho exam
  - Bloodwork
  - Survey Radiographs
- Treatment
  - Pain medication
  - Muscle relaxation
  - Steroids vs NSAID’s

Objectives

- Review how to obtain high quality spinal radiographs
- Demonstrate radiographic, CT, and MRI abnormalities
Great Reference!

amazon.com

Cervical Spine – Poor positioning

Cervical Spine – Proper positioning

- Pad under mid cervical spine
- Straighten head
- Secure forelegs caudally
Thoracic Spine
- Extend forelegs cranially
- Pad under sternum
- Collimate

Mineralized prolapsed discs at L3-4 and L4-5

Lumbar Spine
- Pad under ventral abdomen
- Extend hind legs caudally
- Collimate

LS Spine
- Pad under ventral abdomen
- Pad between stifles
- Hind legs extended caudally
ASEC: Intervertebral Disc Disease

- French Bulldog 22%
- Dachshund, small mixed breed: 20% each
- Maltese, Yorkshire Terrier, Jack Russell Terrier, Shih tzu: 4% each
- Males/Females: equal
- 80% diagnosed confidently on CT alone
  - 20% had myelogram w/ follow up CT

Disc disease

- Disc mineralization = degeneration
- Not all mineralized discs are herniated or protruding into spinal canal
- Not all degenerative discs are mineralized, therefore rads alone not diagnostic for surgery!


- 64 dogs w/cervical IVDD were evaluated.
- Survey spinal radiographs were obtained, followed by myelography.
- The overall accuracy rate for correct identification of the site(s) of disk extrusion for all survey rads was 35%.
- The use of survey radiographs alone is an inaccurate means for localization of cervical intervertebral disk extrusion or protrusion.


- Survey radiographs (lateral and VD) of 64 dogs with surgically-confirmed thoracolumbar intervertebral disc protrusion were reviewed.
- Accuracy of observers for determining sites of intervertebral disc protrusion using survey radiography was in the range 51-61%.
- No observer was accurate enough to justify targeted surgical treatment of intervertebral disc protrusion without myelography.
Computed Tomography (CT)  
Right sided L1-2 Disc Disease

CT Myelogram

MRI disc disease

Lateral Radiograph/Sagittal CT  
Neoplasia – T9 Osteosarcoma
CT Axial images
Normal vs T9 Osteosarcoma

CT Normal vs abnormal
Left Nerve sheath tumor

MRI: Best soft tissue resolution
Intramedullary spinal cord tumor

Discospondylitis
Discospondylitis vs Spondylosis

- Discospondylitis
  - Infection of the disc and adjacent endplates
  - Bacterial (Staph, Strep, Brucella)
  - Fungal (Aspergillosis - German Shepherds)
  - Blood and urine cultures, long term Tx
- Ventral spondylosis deformans
  - Smooth bone proliferation ventral +/- lateral to disc
  - Common and rarely significant

Atlanto-axial subluxation/instability, Dens agenesis/hypoplasia

- Young, toy breed dogs
  - Absence of transverse ligament
  - +/- Trauma
  - Ataxia, +/- non-ambulatory, pain
- Radiographs: Increased distance between C1 dorsal arch and C2 spinous process
  - Avoid flexion!
- MRI: spinal cord edema/syrinx, compression

Atlanto-axial subluxation/instability, hypoplastic dens (3 yr Chihuahua FS)

Obliqued lateral views without flexion: Normal vs abnormal dens
Aplastic dens
- 11 mo Terr-X FS

Severe Atlanto-Axial Subluxation
Aplastic Dens

MRI: Severe Atlanto-Axial Subluxation w/ Aplastic Dens
- Severe cord compression
- Secondary obstructive hydrocephalus

Hemivertebrae
- Common in Bulldogs, Pugs, Boston Terriers
- Thoracic > LS spine
- Rarely clinical
LS transitional vertebrae ... predisposing cause of cauda equina syndrome in German shepherd dogs, JAVMA 1993 Jun 1;202(11):1877-82.

Treatment - Cervical

- AA subluxation
  - Pain only
    - Conservative with pain medication
    - +/- splint
  - Persistent pain, neurologic deficits
    - Surgical stabilization

Treatment - Cervical

- Disk disease
  - Pain only
    - Conservative treatment
  - Recurrent pain, neurologic deficits
    - Ventral slot surgery
    - Dorsal laminectomy

Any Questions?

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Providing the best quality care and service for the patient, the client, and the referring veterinarian.
Treatment - Cervical
- Cervical Vertebral Instability
  - "Wobblers"
  - Progressive hindlimb signs
    - Surgical stabilization affected vertebrae
    - +/- ventral slot

Treatment - TL
- Disk disease
  - Back pain only
    - Conservative treatment
  - Recurrent back pain only
    - Hemilaminectomy
    - Neurologic deficits
      - Surgical emergency!!

Treatment - LS disease
- Cauda equina disease
- Back pain only
  - Conservative treatment
- Recurrent back pain
  - Dorsal laminectomy
  - Stabilization?
- Neurologic deficits
  - Incontinence
  - Dorsal laminectomy +/- stabilization

Conservative treatment
- REST!!!!
Conservative treatment

- Medical therapy
  - Steroid vs NSAID
    - Prednisone
      - 1/2 mg/kg BID for 5 days, then 1/2 mg/kg SID for 5 days, then 1/2 mg/kg EOD for 10 days
    - Solu-Medrol
      - 30 mg/kg initially, 15 mg/kg 2-3 hrs later, then 15 mg/kg q 6 hrs for 24 hours
    - Dexamethasone
      - unwanted side effects
    - NSAID
      - shown just as effective
  - Gabapentin
  - Tramadol - 2-4 mg/kg q 4-6 hours
  - Methocarbamol

Conservative treatment

- Adjunctive medical therapy
  - Gabapentin
  - Tramadol - 2-4 mg/kg q 4-6 hours
  - Methocarbamol

Conservative treatment

- Adjunctive alternative therapy
  - Acupuncture
  - Laser therapy
  - Physical therapy

Prognosis - A/A luxation

- Conservative treatment
- Surgical treatment
Prognosis - Cervical disk disease

- Neck pain only
  - conservative treatment
  - surgical treatment
- Neurologic deficits
  - surgical treatment

Prognosis - TL disk disease

- Pain only
- Ambulatory
  - ataxia, loss of CP reflex
- Non-ambulatory
  - Positive deep pain
- Non-ambulatory
  - Negative deep pain
    - <12 hrs
    - >12 hrs

Prognosis

- Withdrawal ≠ Deep Pain!!
  - Withdrawal - sciatic
    - If no withdrawal - LMN
  - Deep pain
    - How long?

Prognosis

- Schiff-Sherrington
- Crossed extensor reflex
Prognosis - LS disease

- Conservative therapy
- Dorsal laminectomy
  - Stabilization

When to refer?

- Non-responsive to medication
  - Recurrence of worsening of pain
- Any neurologic deficit
  - We will get in immediately!
- Owner request
  - Inability to exercise restrict
  - Proactive
    - Excellent prognosis with surgery before neurologic deficits!!