

Practical management of seizures in cats

DAN HICKS, DVM, MS, DACVIM (NEUROLOGY)



Today's Roadmap

- Introduction
- Pathophysiology
- Seizure classification
- Clinical Features
- Diagnostic Evaluation
- Antiepileptic Drugs
- Take Home Messages

Introduction

- 2 – 3% of feline cases
- Client communication is essential
 - On-going blood work
 - Drug adjustments
 - Trips to ER
- Differentiating seizures from “seizure-like” activity
- Treat underlying disease when known
- Manage seizures

Seizure look-a-likes:

Seizure look-a-likes:



Seizure



Seizure – generalized tonic/clonic



Terminology

Epileptogenesis: Sum of electrical activity tilted toward excitation

- Regionally = **Generalized seizure**
- Focally = **Partial seizure**

Ictogenesis: Initiation, amplification, propagation of a seizure

Cluster: 2 + seizures in 24-hour period

Status epilepticus: Continuous seizure activity

Ictus: during seizure

Post-ictus: immediately following seizure; dysfunction may persist during this period

Inter-ictus: Period between seizures

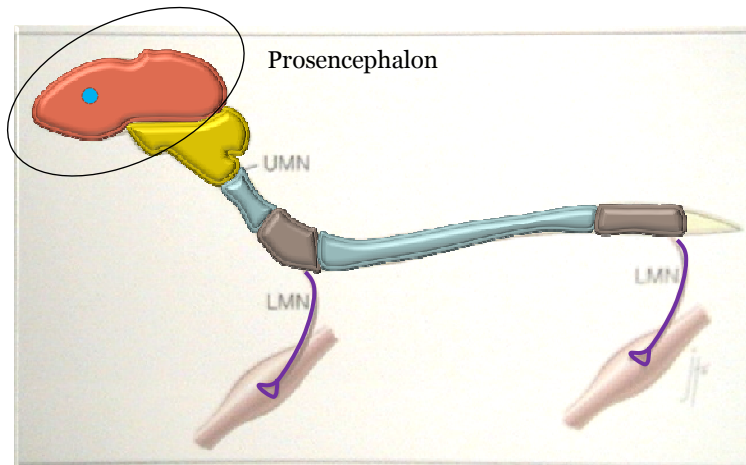
Pathophysiology

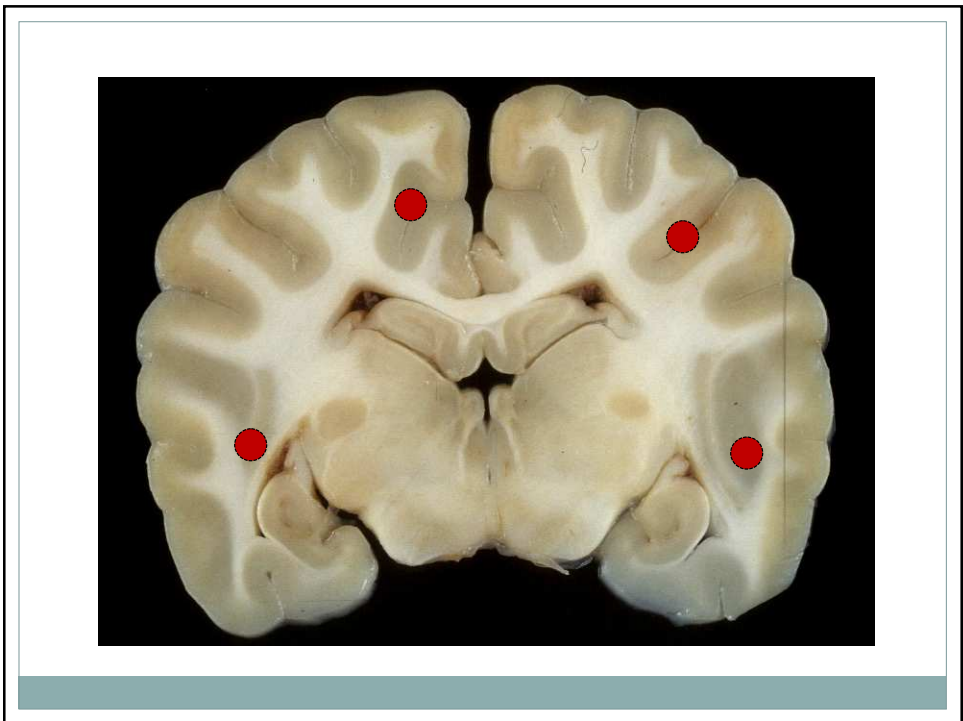
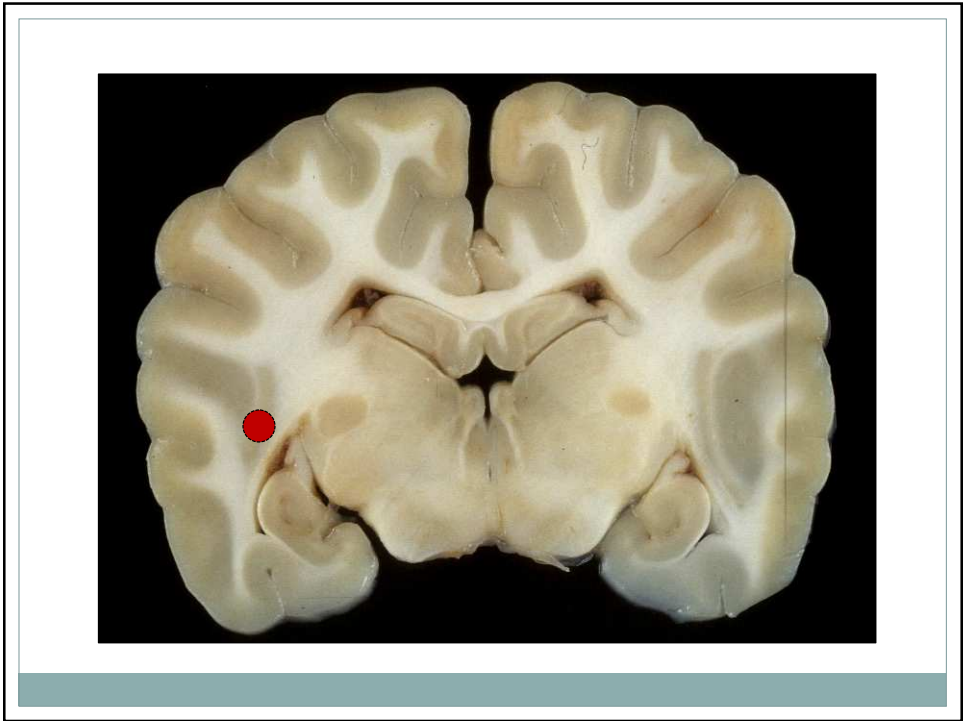
- Decrease
GABA, glycine
- Channelopathy



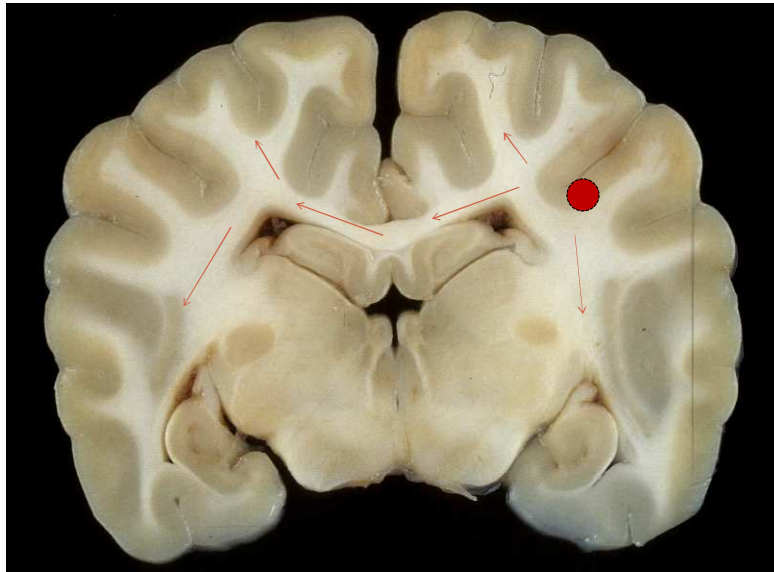
- Increase glutamate, aspartate, ACh
- Increase permeability cell membranes
- Decreased NT uptake
- Channelopathy

Neuroanatomical Localization





“Jacksonian March”



Type/severity of seizure does not
predict underlying disease or
prognosis

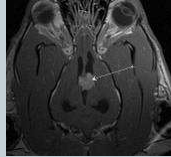


Causes of seizures...

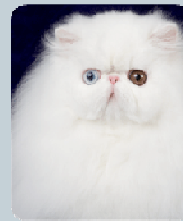
1. Reactive



2. Symptomatic



3. Idiopathic



Schriefl, et al. JAVMA 2008, 233:1591

- 91 cats
- Reactive 22% Symptomatic 50% Idiopathic 25%
- Misclassified (syncope) 3%
- Partial 52% vs. Generalized 48%
- Age: significantly younger (3 years vs. 8) in idiopathic
- Idiopathic: 1 year survival = 82% vs. 50%

Differential diagnoses

Reactive

- Metabolic
 - Liver
 - Kidney
 - Heart
 - endocrine
- Toxic

Symptomatic

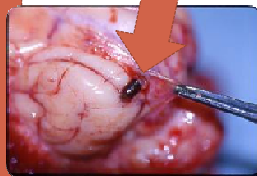
- Organic CNS disease
 - Neoplasia
 - Encephalitis
 - Trauma
 - stroke
 - Acquired hydrocephalus

Encephalitis

Infectious



Toxo
FIP
Crypto
Bacterial
Parasitic
Rickettsial



Non-infectious

MEU

?

Clinical Features

- Post-ictal : 50% cats have deficits
 - Not a predictor of etiology
 - Menace, ataxia, altered mentation, anisocoria, postural deficits
- Inter-ictal period: Deficits suggest reactive or symptomatic

Inter-ictal signs: Think Symptomatic

Circling - wide/pacing



Head pressing

Prosencephalon Signs

- Altered Behavior or Consciousness
- Head turn/ head pressing
- Propulsive pacing; circling
- Central blindness
- Facial sensation (decreased response)

Test your theory

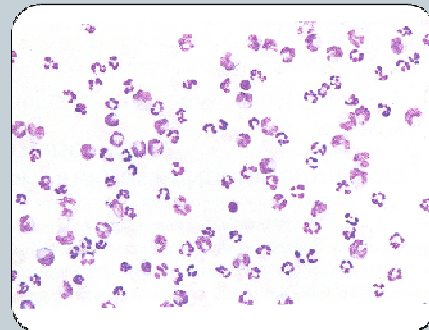
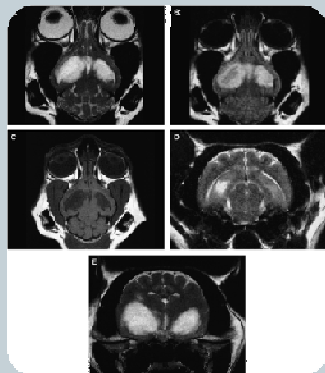
- Structural problem –
 - Imaging
 - ✦ Radiographs
 - ✦ Computed tomography
 - ✦ Magnetic resonance imaging
 - Cerebrospinal fluid
- Metabolic problem –
 - Blood work
 - Toxin history

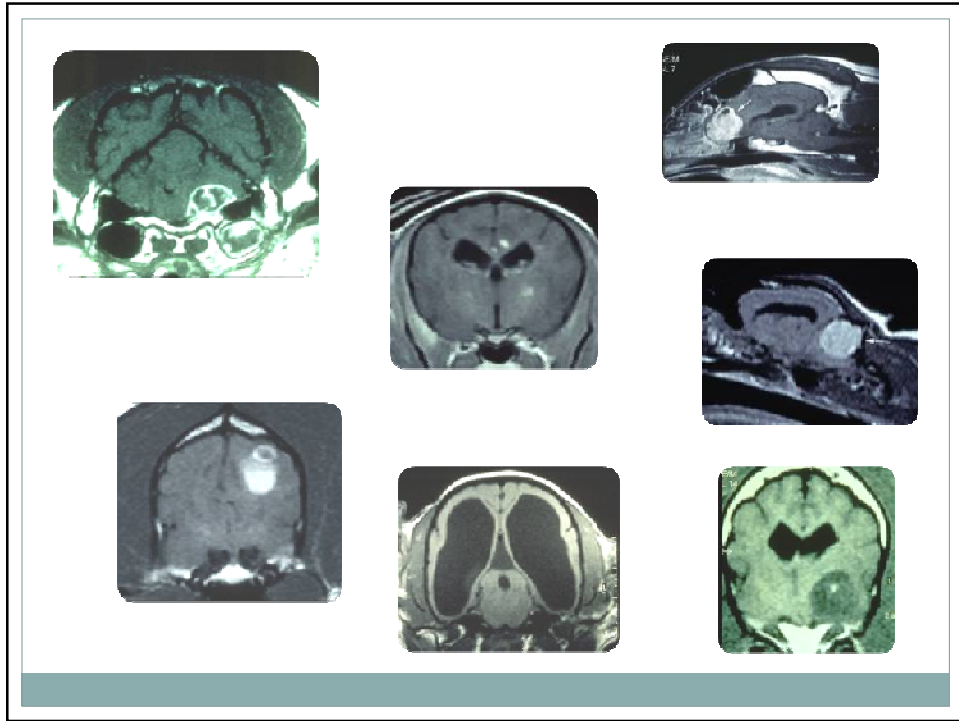


Diagnostic Plan – Reactive seizures



Diagnostic Plan – Symptomatic seizures





Idiopathic



- Excluded others
- Cryptogenic seizures: aka Presumptive symptomatic
- Not proven inherited in cats

Treatment

- Treat underlying problem first



Treating Seizures -

- Goal:
 - Stop all seizures?
 - Decrease severity/frequency?
 - **Owner expectations** – Set goals early!!!!
- Consequences of seizures: BRAIN DAMAGE (gliosis, necrosis, atrophy)

What to treat with??

- Acutely??
- Longer-term??

Status Epilepticus

- Diazepam #1
 - How much? Whatever it takes!!!
 - Rectally, Intranasally, IV
 - CRI (protect from light, binds plastic)
 - Side-effects – hypoventilation, sedation (especially with shunts)
 - × Reverse w/ flumazonil – rare!
- Pentobarbital – slowly IV to effect; neuroprotective?
- Levetiracetam- start 20 mg/kg IV
- Propofol – IV, ictus termination not evaluated
- Inhalents??

Ancillary Treatment



- High intracranial pressure
 - Mannitol
 - Lassix
- High temperature
 - Stop seizure
 - Fluids/Cooling
- Metabolic

When to start long term drugs?

1. Diagnosis of Symptomatic epilepsy
2. Status epilepticus event
3. >2 isolated seizure events within a 6-9 month period
4. >2 isolated cluster seizure events (cluster = two or more seizures within a 24-hour period)
5. Seizures develop after severe exogenous trauma
6. Post-ictal deficits are severe or prolonged

Maintenance anticonvulsant drugs



- Stop all seizure activity; economical
 - DOES NOT EXIST
- Mono-therapy preferred

Maintenance anticonvulsant drugs



- Phenobarbital – Drug of choice
 - Enhances GABA, inhibits glutamate receptors, inhibits Na & Ca channels
 - Induces liver enzymes increasing metabolism
 - Therapeutic drug monitoring required
 - × 10-14 d after starting or changing dose
 - × “trough” level not required
 - × 15-45 ug/ml
 - × Liver enzymes/bile acids 6-12 months at minimum
 - × Blood dyscrasia (anemia, thrombocytopenia, neutropenia)
 - × Mimic hypothyroidism

Maintenance anticonvulsant drugs

- Diazepam –
 - Hyperpolarizes neuron via increased Cl influx
 - Longer T_{1/2} in cats; therefore can be used orally
 - Idiosyncratic hepatic necrosis –RARE
 - Longer acting benzodiazepine - Clonazepam

Maintenance anticonvulsant drugs

- ~~• KBR~~

Novel drugs - ??

- Levetiracetam – good reports; evaluated in safety study; recommend 20 mg/kg PO q 8 hours
- Zonisamide – seems to be safe
- Gabapentin – seems to be safe

- Currently used for refractory cases
- Not well evaluated
- Costly

Other therapies

- Diet – ketogenic; effective in children
- Acupuncture
- Vagal stimulation – future direction
- Surgery – future direction



Take Home Messages

- Feline seizures = common problem; ongoing monitoring; dynamic care
- Partial vs. generalized seizure not correlated with cause/prognosis
- Reactive, symptomatic, idiopathic
 - age correlated with cause
 - Idiopathic may have better long-term prognosis
- Treat underlying cause AND seizures
- Variety of drugs available may improve life quality

Questions?

