Clinical reasoning in neurology: the 'five finger rule'

Tom Cardy

Clinical reasoning is the process of collecting and analysing information on a patient's history, creating a problem list, and constructing an accurate and prioritized list of differential diagnoses in order to allow rational decisions to be made in the formulation of a diagnostic and treatment plan. Clinical reasoning is recognized to be a fundamental skill for veterinary practitioners, regardless of their skill level or area of expertise. However, effective clinical reasoning can be extremely challenging to adopt and use in daily practice.

Neurology cases are a common presentation for veterinary surgeons but can frequently seem overwhelming. Many patients initially seem to have similar case histories, similar clinical signs and a similar neuroanatomical localization, making attempts at clinical reasoning feel like a lost cause. Studies in canine and feline spinal disease and epilepsy have shown that by systematically considering pertinent variables from the signalment, history and presentation, as well as the neurological examination findings, it is possible to develop simple algorithms that can be incorporated into clinical decision making on a daily basis. These algorithms have been statistically shown to produce a more refined and accurate list of differential diagnoses, ultimately leading to improved standards of patient care.

KEY LEARNING OBJECTIVES

- Be able to differentiate between approaches to diagnosis, including: pattern-recognition, 'fishing', and problem-based clinical reasoning and understand the rationale for an evidence-based approach to clinical reasoning
- Understand how the 'five finger rule' considers elements from the patient signalment, onset, progression, lateralization and pain of the presenting condition to improve clinical reasoning

- Recognize how clinical reasoning can be used to improve diagnosis and treatment of small animal neurology cases

MULTIPLE CHOICE QUESTIONS

1. How is clinical reasoning defined?
 - (A) Using information from a patient's history and physical examination to determine a likely diagnosis and make rational decisions on the treatment of that patient
 - (B) The process of collecting and analysing information on a patient's history and physical examination to create a problem list and construct an accurate and prioritized list of differential diagnoses in order to allow rational decisions to be made on the treatment of that patient
 - (C) The process of magnetic resonance imaging (MRI) scanning the patient to identify a lesion and best determine treatment options for that patient
 - (D) The process of performing a series of blood tests and imaging studies in order to determine the likely diagnosis for that patient
2. Which of the following variables from the history and clinical examination does the 'five finger rule' take into account to improve clinical decision making?
 - (A) Weight, age, lateralization, pain, neuroanatomical localization
 - (B) Onset, progression, lateralization, pain, neuroanatomical localization
 - (C) Onset, progression, lateralization, pain, lesion location on MRI
 - (D) Age, progression, lateralization, pain, neuroanatomical localization
3. What is the most likely diagnosis in a 3-year-old, medium-sized crossbreed dog with a peracute onset, rapidly improving, left lateralized and non-painful T3–L3 myelopathy?
 - (A) Intervertebral disc protrusion
 - (B) Intervertebral disc extrusion
 - (C) Fibrocartilagenous embolism
 - (D) Neoplasm

Neuromislocalization: when our examination confounds us

Patrick Kenny

Some animals may have true neurological abnormalities that can be normal for that individual and irrelevant and

distract from the real clinical problem. An accurate history is important to determine whether neurological abnormalities found on examination may be the residual deficits from a previous or pre-existing neurological problem (either known or suspected). Geriatric dogs may have a high-frequency tremor of the pelvic limbs while standing; these are clinically benign and do not require treatment. Older dogs (>10 years), that are otherwise clinically and neurologically normal, commonly have decreased patellar reflexes either unilaterally or bilaterally. Convergent strabismus and pendular nystagmus are a 'normal' finding in certain oriental breeds of cat such as the Siamese, Himalayan and Birman.

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Peracute spinal cord injury (SCI) will often produce examination findings that confound our conventional rules of neurolocalization. The Schiff–Sherrington posture (rigid extension of the thoracic limbs) occurs with damage to border cells in the thoracolumbar spinal cord segments that would normally ascend to inhibit thoracic limb extensor tone. This posture may be misinterpreted as indicating a cervical spinal lesion. Spinal shock is the loss of muscle tone and spinal reflexes caudal to the site of peracute SCI, even though the reflex arcs are physically intact. The initial hyporeflexia may be interpreted as a 'lower motor neuron sign', when the lesion is in fact of the upper motor neurons innervating that limb. In dogs and cats this phenomenon is short lived, with reflexes returning within hours (up to 2 hours for patellar reflexes and 12 hours for flexor reflexes). In most cases of vestibular syndrome the head tilt is towards the side of the lesion, however if the flocculonodular lobe of the cerebellum or the caudal cerebellar peduncle is affected then the head tilt will be towards the contralateral side, so-called paradoxical vestibular syndrome.

Non-neurological problems may affect function in a way that looks like a neurological abnormality or deficit on examination. Animals with bilateral lameness due to musculoskeletal or orthopaedic disease, such as bilateral cruciate ligament rupture, bilateral coxofemoral osteoarthritis, polyarthritis or iliopsoas muscle injury can appear 'ataxic' as the animal sways, shifting weight from lame limb to lame limb. Reluctance to bear weight on bilaterally painful limbs may also be interpreted as weakness. A musculoskeletal examination in combination with proprioceptive paw positioning while the patient is well supported is usually a reliable way to differentiate between neurological and bilateral orthopaedic conditions. Toxins or metabolic derangements may cause encephalopathic signs – signs produced tend to be diffuse/symmetrical in nature and often wax and wane. Conditions of the eye may cause apparent neuro-ophthalmological abnormalities. Mydriasis or a poorly responsive pupil may be caused by iris atrophy, glaucoma or cycloplegic drugs. Miosis may be caused by uveitis or corneal pain due to an ulcer.

KEY LEARNING OBJECTIVES

- Understand that true neurological abnormalities may be 'normal' for an individual and may be irrelevant to the clinical problem
- Recognize that certain neurological syndromes are exceptions to our conventional rules of neurolocalization and may confuse efforts to neurolocalize if not recognized
- Understand that many non-neurological problems may mimic neurological abnormalities on examination

MULTIPLE CHOICE QUESTIONS

1. Which of the following would not cause a mydriatic pupil?
 - (A) An oculomotor nerve lesion
 - (B) Glaucoma
 - (C) A corneal ulcer
 - (D) Iris atrophy
2. You examine a 4-year-old blue-eyed Himalayan cat as part of routine check-up and vaccination. It is otherwise healthy, but you notice fine side-to-side oscillatory movements of both its eyes. Which is the most likely cause?
 - (A) Pendular nystagmus due to congenital misrouting of visual pathways
 - (B) Otitis media/interna causing vestibular syndrome
 - (C) A thalamic infarct
 - (D) Cerebellar abiotrophy
3. You are examining a 6-year-old Staffordshire Bull Terrier that has just been hit by a car. It is lying in lateral recumbency. It has no observable voluntary movement in its pelvic limbs. Its thoracic limbs are rigidly extended compared to the pelvic limbs, but some voluntary movement is observed. Which is the most likely neurolocalization?
 - (A) Cerebellum
 - (B) C1–C5 spinal cord
 - (C) C6–T2 spinal cord
 - (D) T3–L3 spinal cord

Odd episodes: when is a seizure not a seizure?

Tom Cardy

Dogs and cats presenting with abnormal episodes provide some of the most challenging and frustrating cases for veterinary surgeons of all abilities. Veterinary surgeons are frequently presented with owners describing vague and often transient clinical signs that make it challenging to define the presenting problem precisely and construct a list of differential diagnoses. In veterinary

neurology these episodes can be defined as 'paroxysmal episodes' with a defined start, defined end and relatively short duration. There are relatively few causes of paroxysmal episodes in dogs and cats including: seizures, syncope, vestibular syndrome, paroxysmal dyskinesia (movement disorders), narcolepsy/cataplexy, neuromuscular disease and idiopathic head tremors.

Accurately classifying the paroxysmal episode is dependent on taking a thorough and systematic history that includes: a description of the event, the clinical status between episodes, asking if there is impairment or loss of consciousness, presence or absence of autonomic signs, description of muscle tone and lateralization of presenting clinical signs. Where possible videos of the events should be reviewed with the owner.

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