Critical Thinking: A Guide To Making Good Technicians Great

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Benefits of Critical Thinking

- Reduces risk of medical errors
  - If nurses are more actively engaged in their cases they are more likely to catch medical errors
- Improves patient outcomes
  - Encourages nurses to treat patients as a whole and allows for anticipation of medical problems and care suggestions
  - We catch changes in our patients faster than our doctors can because we are the ones that are hands-on
- Encourages growth of technicians and sets higher nursing care standards

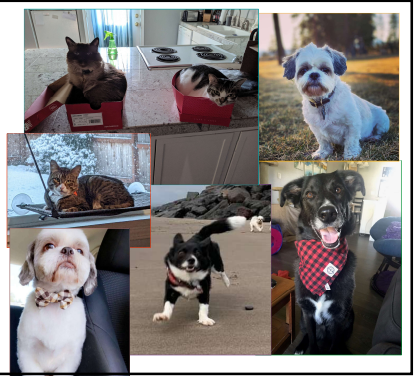
11 years in veterinary medicine

3 years in general practice/urgent care

1.5 years in shelter medicine

8 years in emergency and specialty medicine

Currently ER/ICU technician trainer at VCA Northwest Veterinary Specialists



Encouraging critical thinking in-clinic

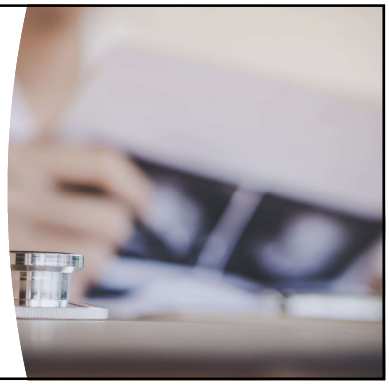
- Critical thinking training by mentors
- Maintaining detailed notes and record keeping in patient charts
- Triaging/prioritizing of tasks
- Disengaging autopilot
- Double-check systems (cosigner protocols, 5 Rights)
- Thorough patient rounds
- Focusing on patient trends
- Utilizing Kirby's Rule of 20

Methods of training critical thinking

Discuss	Format questions that are open-ended, with a goal of creating a discussion and not searching for a right or wrong answer
Guide	Guide thinking or problem solving in an open-dialogue format among peers so that we can learn by listening to each other
Encourage	Encourage training self-implementation where staff is taught to be inquisitive of doctors or senior nurses • Staff should be comfortable talking with any mentor

Importance of detailed record keeping

- Detailed recording helps us better evaluate how our patients are doing
  - Forgetting to log urine can greatly affect a patient's treatment plan
  - Being detailed of how walks went can provide significant information to our doctors
- Improper record keeping could contribute to medical errors and compromised patient safety



Veterinary Technician's Critical Thinking Toolkit

How to evaluate our patients as a whole

- Dedicating time to round patients
- Monitoring patient trends instead of isolated vitals signs
- Understanding how to employ Kirby's Rule of 20

Triaging tasks and patients

Nurses have to be prepared to triage and prioritize all tasks that are required of them

We triage incoming patients according to their stability

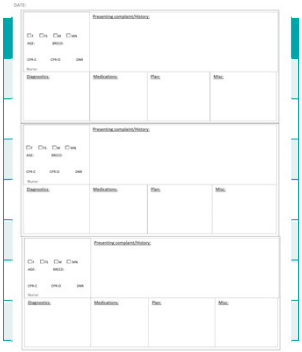
- We use critical thinking when regarding the consequences of delaying treatment in each case

Scheduled treatments also have to be ranked according to priority and stability of those patients

- Medications and labwork are always a higher priority than feeding, walking, and infrequent vitals checks

Patient Rounds

- Create habits of rounding case information to coworkers when they are new to patients, including diagnostic results
- This improves the quality and continuity of our care to patients and helps minimize errors



Work on disengaging autopilot

Autopilot leads to mistakes	Don't fall prey to becoming a box-checker, always provide as much detail on treatment sheets as possible and monitor them for accuracy	Treat your patient, not your treatment sheet
Constantly ask questions and strive to learn every day	Practice the five rights of medication administration every time	Develop a cosigner protocol

Vitals trends vs. isolated vitals signs

Canine
- HR - 150
- RR - 48
- T – 102.7
- BP – 140
- MM – Pink

Canine
- HR - 170
- RR - 42
- T – 101.0
- BP – 100
- MM – Pink

Canine
- HR - 170
- RR - 54
- T – 99.8
- BP – 80
- MM –Pale Pink

Feline
- HR - 200
- RR - 24
- T – 100.7
- BP – 110
- MM – Pink
- Weight – 3.8kg

Feline
- HR - 180
- RR - 36
- T – 100.2
- BP – 140
- MM – Pink
- Weight – 4.0kg

Feline
- HR - 180
- RR - 54
- T – 99.7
- BP – 160
- MM – Pink
- Weight – 4.3kg

Kirby's Rule of 20

A list of 20 parameters that are used multiple times a day to evaluate the patient as a whole

Fluid Balance	Oncotic Pull/Albumin Level	Glucose	Electrolytes	Acid-Base Balance
Oxygenation and Ventilation	Neurologic Status	Blood Pressure	Heart Rate, Rhythm, Contractility	Temperature
Coagulation	RBC/Hemoglobin Concentration	Renal Function	Infection Prevention and Identification	GI Motility and Mucosal Integrity
Drug Doses and Metabolism	Nutrition	Pain Control	Wound Care and Bandages	Nursing Care

Glucose

- Normal 80-120 mg/dL
- Severe hypoglycemia can be caused by sepsis, heat stroke, neoplasia, toxicities (xylitol), hypoadrenocorticism
  - Can cause hypotension, weakness/seizures

Electrolytes

- Na, K, Cl
- Electrolyte derangements can cause neurologic changes and cardiac dysfunction
  - Hypokalemia can also contribute to ileus

Fluid Balance

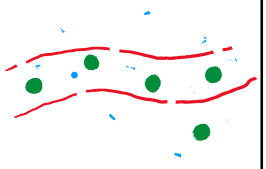
- Our goal is to provide adequate perfusion, fluid replacement, or diuresis without fluid overloading
- Fluid balance assessed by HR, MM quality, pulse quality, mentation, BP, urine output, lactate, weight changes, skin turgor, PCV/TS
- Consider that systemic illnesses can cause peripheral vasodilation, may require more fluid than expected
- Two kinds of fluid options: crystalloids and colloids

Acid-Base Status

- Rapid point-of-care bloodwork gives us information about a patient's acid-base status in the form of pH level, metabolic and respiratory components
  - Results can help us determine disturbances in a patient's acid-base status and identify underlying causes of illness
  - Metabolic acidosis happens from lactic acidosis due to poor perfusion and anaerobic metabolism
    - Treated with fluid resuscitation and maximizing blood flow/oxygen delivery
    - Sodium bicarbonate

Albumin/Oncotic Pull

- Albumin provides intravascular oncotic pull which helps the vessels hold onto fluid
- Animals can lose albumin with different disease processes that cause increased vessel permeability, which allows fluid to leak out of the vessel space
  - GI diseases, renal disease, systemic inflammatory response syndrome, blood loss
- Colloids consist of larger fluid molecules that stay in the vascular space longer
  - Our veterinary colloids include synthetic starches, plasma, concentrated albumin
  - Half-life of crystalloids is 20-40 minutes, half-life of colloids is 2-3 hours (Hahn 2016)



Oxygenation and Ventilation

- Respiratory compromise can come from pneumonia, thromboembolism, congestive heart failure, non-cardiogenic pulmonary edema
- Diligent prevention of aspiration pneumonia
  - Antiemetics, prokinetics (metoclopramide), nasogastric tubes
- Monitored with SPO2, end tidal, arterial blood gas
- If animals are unresponsive to oxygen supplementation mechanical ventilation may be necessary

Neuro Status

- Changes can be due to a change in glucose, pH, electrolytes, blood pressure
- Can also change due to increased intracranial pressure, drugs
  - Treat with diuretics, steroids

Blood Pressure

- Minimum goal MAP >60 or systolic >90 mmHg
- Hypotension treatment: IV fluid infusion of crystalloids vs. colloids
  - Band-aids: vasopressors
  - Persistence: hypoglycemia, arrhythmias, sepsis
- Hypertension: target organ damage

Renal Function

- Assessed with urinalysis (USG) and urinary output
- Normal output is 1-2 mL/kg/hr
- Track body weight trends
- Measure potty pads/litter boxes
  - 1mL=1gram, 1000mL=1kg

Infections

- "Reverse isolation" patients
- Nosocomial infections can develop 48 hours after hospital admission
- IVC monitoring

Cardiac

- Arrhythmias can be due to SIRS, splenic disease, GDV, electrolyte abnormalities
- Tachycardia can be treated with fluids, analgesia, antiarrhythmics
- Arrythmias only require treatment when they result in decreased cardiac output

Temperature

- Rectal temperature is gold standard, others are good for trends
- Increases due to infection, inflammation, environmental
  - Prolonged increases can lead to disseminated intravascular coagulation, SIRS, multiorgan dysfunction

GI Motility

- Aware of potential for ileus or GI ulceration
  - Treat with prokinetics (metoclopramide, cisapride, erythromycin)
  - Additional GI support: pantoprazole, sucralfate, ondansetron, NGT

Drugs/Metabolism

- Nurse's responsibility to be careful of interactions
- Aware of renal or hepatic compromise, drug doses may need to be decreased
- Sudden weight changes

Coagulation

- DIC is the systemic activation of the coagulation cascade in the body
  - Goal is to detect in early stages to slow or prevent progression
- Hypercoagulable state with certain diseases: neoplasia, hyperadrenocorticism, SIRS/sepsis

Red Blood Cells

- Anemia combined with tachycardia/hypotension requires transfusion
  - Packed RBC's or whole blood
- Because decreased RBC's cause decreased oxygen carrying capacity, oxygen may need to be supplemented

Nutrition

- Appetite stimulants
- Nasogastric/esophageal feeding tubes
- Beware refeeding syndrome
  - Start at 25% daily caloric requirement

Pain Control

- Analgesics with reversals (opiods)
- Cerenia
- Local pain relief

Wound care

- Don't forget wound care!
- Frequent changing of bandages
- Changing dressings when soiled

Nursing Care

- Recumbent animal rotate
- Physical therapy (PROM)
- Physical activity can improve GI motility and peripheral edema
- Urine/fecal soiling maintenance
- Consolidating treatments, turning lights off at night
- Cat-friendly houses

Practicing Kirby's Rule Checklist

- HR: 120
- RR: 24
- MM: Pink
- T: 100.1
- BP: 150
- Wt: 4.9 kg
- Mentation: Lethargic

Current treatments:
- IVF 2x maint
- Doxycycline
- Cerenia
- Ondansetron BID
- Entyce
- Proviable
- Gabapentin
- Chemistry/PCV q 24
- RR/E q 1

- HR: 102
- RR: 42
- MM: Pink
- T: 99.8
- BP: 164
- Wt: 5.1 kg
- Mentation: Obtunded, weak

Treatments added:
- Metoclopramide
- Ondansetron TID
- KCl
- Rectal Foley catheter
- Increased weight checks

Kirby's Rule of 20

⊗ Fluid balance	⊗ Oncotic Pull/Albumin Level	⊗ Glucose	⊗ Electrolytes	⊗ Acid-Base Balance
⊗ Oxygenation and Ventilation	⊗ Neurologic Status	⊗ Blood Pressure	☐ Heart Rate, Rhythm, Contractility	☐ Temperature
☐ Coagulation	⊗ RBC/Hemoglobin Concentration	☐ Renal Function	⊗ Infection Prevention and Identification	⊗ GI Motility and Mucosal Integrity
☐ Drug Doses and Metabolism	⊗ Nutrition	⊗ Pain Control	☐ Wound Care and Bandages	⊗ Nursing Care

Practicing Kirby's Rule Checklist

5yr MI German Shepherd HBC
- HR 180, RR 66, BP 90, T 98.2, Unresponsive mentation

- Treatments started:
  - IVC placement
  - Oxygen flow-by
  - Crystalloid fluid bolus
  - POC Bloodwork
  - Survey radiographs
  - Hospitalization for stabilization
  - Cerenia
- Treatments added:
  - Analgesics
  - Hypertonic saline
  - Active warming
  - Wound care

Kirby's Rule of 20

⊗ Fluid balance	☐ Oncotic Pull/Albumin Level	☐ Glucose	☐ Electrolytes	☐ Acid-Base Balance
⊗ Oxygenation and Ventilation	⊗ Neurologic Status	⊗ Blood Pressure	⊗ Heart Rate, Rhythm, Contractility	⊗ Temperature
☐ Coagulation	⊗ RBC/Hemoglobin Concentration	☐ Renal Function	☐ Infection Prevention and Identification	⊗ GI Motility and Mucosal Integrity
☐ Drug Doses and Metabolism	☐ Nutrition	⊗ Pain Control	⊗ Wound Care and Bandages	☐ Nursing Care

Higher patient care standards start with us

- Document and share patient information in detail
- Better patient outcomes come from careful monitoring of the whole patient
- Strive to learn constantly
- Quality nursing only happens when you turn off autopilot

Practicing Kirby's Rule Checklist

3yr MN Pug Chocolate Ingestion
- HR 200, RR 200(?), BP 180, T 102.6, Typical (hyperactive) pug mentation

- Treatments started:
  - Emesis induction
  - Cerenia
  - IVC placement for hospitalization
  - POC Bloodwork
  - Crystalloid fluid bolus
  - Propranolol/Esmolol
- Treatments added:
  - Sedatives (Acepromazine)
  - Oxygen
  - Metoclopramide
  - Telemetry
  - Frequent walks

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☐ Drug Doses and Metabolism	☐ Nutrition	☐ Pain Control	☐ Wound Care and Bandages	⊗ Nursing Care

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