SECOND EDITION

Clinical Signs in Small Animal Medicine

CRC Press
Taylor & Francis Group

Michael Schaer

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Michael Schaer
University of Florida, College of Veterinary Medicine, USA


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Contents

Preface

This 2nd edition of *Clinical Signs in Small Animal Medicine* is written to share the visual experiences of the author spanning the period from 2007 to 2015. It continues with its primary basis of instruction that "one picture is worth 1,000 words". It has served my students well and the same is intended for my veterinary colleagues who are outside the boundaries of my classroom. Quoting one of my graduates from the University of Florida (UF) Class of 1980: "Dr. Schaer, the other day a dog walked into my clinic with the exact physical abnormalities of one of the dogs you showed me during your student slide rounds, and I nailed that diagnosis strictly because of the impression that image left in my memory bank 25 many years ago." Because of this and similar feedbacks that have confirmed the effectiveness of the visual teaching method, I have continued that exercise right to the present day – 40 years later. It stimulated me to publish the 1st edition of *Clinical Signs in Small Animal Medicine* in 2007 and continued to motivate me to compose this second edition.

Having progressed into the digital age of photography after the year 2000, assembling my clinical images has been a lot more efficient. Nobody was more delighted for this than my wife, MJ, who had scanned nearly 30,000 slide images into digital format. In order to maintain my organized filing system, I have disciplined myself to download any new images from my camera on the same night that the pictures are taken and to label them for reference to be used at a later date. These images are then edited and stored in an alphabetically arranged computer folder system until such time as they are needed for my lectures, publications, or for a colleague who needs them for his/her academic development. The images are captured as they appeared through the author's lens on a chance basis as they came to the clinics. Thus the background for the 'photobiography' of my wonderful clinical experiences from 1971 to 2015. To complement the images and legends, I have added phrases from my "Uncle Mikey's Maxims" and "Clinical Pearls" lectures that will add just the right amount of take-home messages for you to dwell on for the remaining parts of your career. These basically represent my clinical philosophy of medicine. I hope that you find them of value.

The reader will note that these first two editions do not represent every possible clinical disorder and their various types of presentations – an impossible objective for sure. However, if used together, both volumes complement the deficiencies of the other because much effort was made to avoid repeating any images that appear in any one textbook. The topics, on the other hand, will be duplicated in order to cover the various forms of the disorder that are not represented in the other edition.

It would be unfair to take credit for all of the images in this textbook. Those acquired through the radiology section image library at The University of Florida College of Veterinary Medicine (UFCVM) have been an important source of information throughout this textbook. It is through the expertise of the radiology staff and faculty that the images have been made available in our hospital digital imaging library for

other faculty members to access. I thank them immensely for all of their wonderful efforts, which occur daily at UFCVM. The same gratitude extends to my small animal medicine and surgery colleagues, clinical pathology, and pathology faculty members, house officers, and alumni who have shared their specimens and images with me during my career at Florida. It has been through their assistance that clinicians such as me have been able to take each valuable piece of clinical information and use it as a valuable teaching tool.

The period spanning 2012 to 2015 at Florida offered a new experience for me. Those of you who have known me over the years have seen me in the role as a small animal internist, but a few years ago, I was given the most fortuitous opportunity to make the section of Emergency and Critical Care (ECC) my new home. This transition has been an amazingly exciting experience for me because it immersed me directly into a group of highly intelligent colleagues who patiently accepted my internist kind of thinking and found that our efforts complemented each other for the unified outcome of enhanced patient care. Besides, they made each day a new learning opportunity for me. So to my ECC colleagues – I thank you.

To all of my house officers, students, support staff, administrators, and colleagues at UF, I extend my continued gratitude for your support toward providing me with so many wonderful moments during my career as a faculty member. I am a seeker of constant inspiration, and it was you who energized me on a daily basis to be the best doctor and teacher that I could be. As I continue with this last lap of my career, I pledge my constant efforts to further the missions of education and quality medicine at The University of Florida.

In closing, my failure to recognize the staff at CRC would be an unforgiveable sin, for it is they who have made all my publishing efforts possible. The expertise of Kate Nardoni, Jill Northcott, Peter Beynon, and Paul Bennett will unfold as you read the *Clinical Signs* textbooks, and because of this, I am forever grateful.

Michael Schaer

Abbreviations

ACTH	adrenocorticotropic hormone
ADH	antidiuretic hormone
BUN	blood urea nitrogen
CPR	cardiopulmonary resuscitation
CRT	capillary refill time
CSF	cerebrospinal fluid
CT	computed tomography
DI	diabetes insipidus
DIC	disseminated intravascular coagulation
DMSA	dimercaptosuccinic acid
DOCP	desoxycorticosterone pivalate
ECF	extracellular fluid
ECG	electrocardiogram
FeLV	feline leukemia virus
FIV	feline immunodeficiency virus
GABA	gamma-aminobutyric acid
GH	growth hormone
GI	gastrointestinal
H&E	hematoxylin and eosin (stain)
ICU	intensive care unit
IGF	insulin-like growth factor
IMHA	immune-mediated hemolytic anemia
ITP	immune thrombocytopenia
LRS	lactated Ringer's solution
MRI	magnetic resonance imaging
NSAID	nonsteroidal anti-inflammatory drug
PAS	periodic acid–Schiff (stain)
PCO_2	partial pressure of carbon dioxide
PCV	packed cell colume
PD	polydipsia
PICC	peripherally inserted central catheter
PPD	pyschogenic polydipsia
PTH	parathyroid hormone
PU	polyuria
RBC	red blood cell
SCC	squamous cell carcinoma
SG	specific gravity
TCO_2	total carbon dioxide
TP	total protein
TSH	thyroid-stimulating hormone
WBC	white blood cell

Dedication

To all of my patients, pet owners, students, and house officers, I thank you for the true inspiration you have given me. Unfortunately, the height of any clinician's 'bone pile' bespeaks of years of painful experiences and the everlasting stings of mistakes. Forgive me for those that I have committed, but rest assured that I have done everything possible to make sure they are not repeated. Thank you all for allowing me to honestly say that "If I had to do my career all over again, I would follow in the paths that you have guided me".

Introduction

The knowledge explosion has done much to advance the science of veterinary medicine. This manuscript will attempt to fill in the large gap left behind despite the high technology that we use – this being the Art of Veterinary Medicine. After 40 plus years of practice, I would like to share some of the painful lessons of the past and present, otherwise known as "Uncle Mikey's Maxims".

1. Treat for the treatable
This very important statement forms the basis of the optimistic approach to the sick patient. Many clinicians will periodically find themselves confronted with a very distressed or moribund patient during the 'off-hours' when important diagnostic facilities and personnel are unavailable. The patient is dying, you don't know the diagnosis, yet something must be done to stabilize the animal until certain definitive answers are known. Another scenario occurs when the work up must be limited for any number of reasons. The answer – 'treat for the treatable'. This is clearly illustrated in the situation where a puppy is examined for an acute onset of dyspnea. The history rules out chest trauma but the physical examination findings include an oral commissure ulceration and moist rales heard especially over the dorsal caudal lung lobes. Without using any diagnostic tests, the clinician begins immediate treatment for neurogenic pulmonary edema resulting from an electric cord bite and saves the puppy's life. This is only one of many examples where it is important to 'treat for the treatable before the treatable becomes nontreatable'.

2. Assumptions lead to trouble; therefore don't assume
Perhaps we can extract this lesson from many that we have already learned in everyday life. The main reason for being aware of this common judgment error with our patients is that assumptions can sometimes lead to misdiagnosis and perhaps even the animal's demise. Why assume that a sick, polydipsic, polyuric, middle-aged female dog does not have a pyometra just because the recently recorded signalment of the new patient record denotes previous neutering? Isn't it best to verify this fact verbally with the owner in order to turn an assumption into a certainty, or obtain an abdominal radiograph anyway?

3. Always interpret clinical information within the context of the patient's presentation
Today's veterinarian has access to various forms of advanced medical technology, and in the majority of instances our patients benefit from the data that is generated. Sometimes, however, clinicians become overly dependent on the laboratory tests and diagnostic instrumentation and come to accept the results at face value without interpreting the information within the context of the patient's presentation or weighing the test results against the degree of evidence-based medicine available. This can result not only in misdiagnosis and in mistreatment of the patient, but also it can lead to added expense and emotional distress for the client as well. This situation can result from sample collection errors, laboratory or instrument errors, or the clinician's

unfamiliarity with certain clinical disorders. There are a few instances in the text where images are used in more than one chapter. This is because of their pertinence in the respective chapters.

4. Avoid tunnel vision

This all too frequent human mistake might very well qualify for being the main pitfall of the diagnostician. This is a trap that constantly awaits each of us, and its avoidance requires the utmost vigilance and discipline. It is so easy to focus our minds on an obvious problem while simultaneously losing sight of the rest of the animal. Take, for example, the middle-aged Poodle that is examined for rapid-onset cataracts and the clinician who either forgets to inquire about the presence of polydipsia and polyuria or fails to weigh the significance of these important historical facts, which might contribute to the diagnosis of diabetes mellitus.

5. Treat your patient, not just its disease

These words of caution are closely related to the tunnel vision problem. The emphasis here, however, is therapeutics, not diagnostics. All medications should be adjusted according to each patient's individual needs and the clinical setting in which they are required. It would be unwise to treat an abscess with aminoglycoside antibiotic injections if the animal who owns the abscess has chronic renal insufficiency and a serum creatinine level of 6 mg/dl (530 µmol/l).

6. Avoid overmedicating

This error in medical management usually occurs as a result of the clinician's good intentions to do something helpful. The several problems that result from this practice include toxic drug reactions, excess expense, and sometimes interference with the correct interpretation of laboratory test results and the patient's progress.

It is only after many years of practice, studying, and objective thinking that the clinician would hopefully learn when not to use certain medications that he/she might have used with reflex reaction in the past.

7. Be honest with yourself

We have all been anointed with these words of wisdom before. In medicine, there is a special place for this advice in our day-to-day practice situations because our patients' lives depend on our objectivity. Perhaps the best judge and jury of them all is the necropsy.

8. Don't postpone today's urgencies until tomorrow

This advice is easily accepted when you think that the main consequence might be a 'no tomorrow' for the patient. Diagnostic and therapeutic delays might occur because we are fatigued at the end of a busy day, the patient presents during the off-hours emergency period, or the patient's arrival conflicts with other commitments. Although we might not consciously mean to be neglectful, our subconscious desires might deter us from our professional obligations. Why should a dyspneic animal with severe pleural effusion be forced to agonize overnight until its diagnosis becomes a convenience for his doctor on the following day? Let us never forget that 'our patients can die waiting'.

9. Think that common things occur commonly
Remembering this will help you to Treat for the Treatable, especially when certain logistics or restraints impede an expedient diagnosis. This is illustrated in the middle-aged dog that presents during a 3-day holiday weekend (a time when most laboratories are closed) with a peracute onset of weakness, anemia, icterus, hemoglobinuria, and hemoglobinemia. Here it is important to recognize that these signs are compatible with an acute hemolytic event, and that autoimmune hemolytic anemia is the most common disease in this type of clinical setting. This line of reasoning allows for the immediate treatment of the treatable until proven otherwise.

10. Look closely at your patient; it will usually tell you what is wrong
The essence of the seasoned diagnostician is having the ability to (1) first recognize that the animal is sick, (2) then be able to localize the exact source of the problem, and (3) plan an initial judicious therapeutic strategy while the diagnostic test results are pending. Obviously one cannot proceed to steps 2 and 3 unless step 1 is realized. This is illustrated in the case of the anorectic and depressed cat that is sick because of pyothorax. This patient cannot be appropriately helped until the clinician first recognizes that the cat has an abnormal respiratory pattern.

This is also illustrated in the dog that postures with an arched back from spinal radicular pain, and the examining clinician misinterprets the signs as abdominal in origin or perhaps even fails to recognize the abnormal posture.

11. Never let your patient die without the benefit of the silver bullet (steroids)
Most of us tend to find this token bit of philosophy humorous or perhaps potentially dangerous. Although there are many diseases that can worsen as a result of repeated doses of glucocorticoid drugs, there are few (if any) that will progress to the patient's demise from one or two doses of this medication. This is not to imply that the indiscriminate use of glucocorticoid drugs is recommended; it is rather a reminder that animals can die of certain disorders such as nonseptic meningitis, autoimmune thrombocytopenia, immune-mediated hemolytic anemia, and acute adrenocortical insufficiency if they do not receive glucocorticoid treatment. Certain empirical therapeutic judgments have their place in medicine, especially when we are practicing under various economic, emotional, and diagnostic constraints.

12. When you hear hoof beats look for horses, but don't forget about the zebras
We can effectively practice medicine by remembering that common diseases occur commonly. However, there are those occasional situations when that extra amount of knowledge or index of clinical suspicion will facilitate the diagnosis of a not so common disease and consequently lead to the patient's cure.

Take, for instance, the dog from Portugal that presents with moderate anemia, fluctuating fever, hyperglobulinemia, and splenomegaly. How many of you can suspect that the zebra in this scenario is leishmaniasis?

13. Never sell the basics short
There is no substitute for the thorough history and physical examination. When the clinical hypothesis cannot be substantiated, go back to 'square one' beginning with the basics. As Sir William Osler taught: 'Trying to practice medicine without a strong foundation is like navigating a ship without a compass in uncharted waters'.

14. If you don't think it, you won't find it
This is easily illustrated in the mature vomiting cat with acute pancreatitis. All too often the clinician will think of many other etiologies, but if he/she doesn't consider acute pancreatitis in the differential diagnosis, the condition will easily be missed.

15. Never let a biological specimen go to waste
How many times have we admitted a sick patient only to find 8–24 hours later (when the laboratory results become available) that the animal is a ketoacidotic diabetic? Imagine how beneficial it would have been if we had tested that patient's urine, which was available on the cage floor, soon after admission. The same applies to other biological specimens such as feces, sputum, etc.

16. Disaster lurks whenever a patient's problem is 'routine'
The incident that taught me this painful lesson involved a 2-year-old Poodle that went into fulminating anaphylaxis immediately following its yearly vaccination. The patient died. Same for my own kitten that died during a 'routine' spay under a surgeon's supervision at the Teaching Hospital. How about the endoscope that perforated a cat's stomach during 'routine' gastroscopy under the purview of an experienced endoscopist or the cat that arrests during a bronchial lavage? The saga continues……..

17. If it's not getting worse, give it a chance to get better
Although this is the 'quick serve' period in our society, there are many medical disorders that simply will not commit themselves to our quick-fix mentality. Take, for instance, the patient with hemorrhagic pancreatitis who might very well require up to 4–5 weeks of a rather stormy convalescence. This insight is essential before calling certain disorders nontreatable.

18. Don't stray too far from the patient – the diagnosis will eventually appear
A lot of different conditions can fall into this situation. Take, for instance, the dog with waxing/waning episodes of restlessness, hyperventilation, and peripheral vasodilatation that might someday be explained when its pheochromocytoma is diagnosed. Remaining close to the patient and the pet owner will often give you that important opportunity to go back to square one and perhaps eventually realize the true diagnosis. If these measures fail to diagnose the patient - REFER IT.

19. Don't give your patient a disease it doesn't deserve to have
Think about it. It is you and the patient, with you having the power to apply any label to the signs that you detect. Now stop and ask yourself if you are satisfied with the accuracy of your interpretation and the logic of your mental processing. Quoting Dr. Peter Mere Latham:

'*Truth in all of its kinds is most difficult to win, and truth in medicine is the most difficult of all.*'

20. Don't let technology make you decerebrate
With the availability of advanced medical technology, transtelephonics, and e-mail, how easy it is for clinicians to let go of their basic skills and leave the

diagnosing and prescribing to those who haven't even looked at the patient. To keep your skills sharp you must use them. Only then will your patient benefit the most.

21. The necropsy is the clinician's trial by jury
The necropsy is often the pinnacle in the search for truth in medicine, for it usually holds the definitive answers for the patient's maladies. Although it might yield the pain of a misdiagnosis, let it be the source of a lesson well learned and one that best not be repeated.

22. The wisdom of experience should never be ignored
Let the fear of aging be offset by the confidence gained from knowing. It is the result of an enormous data processing punctuated by the corrected mistakes of the past. Let the wisdom be complemented with evidence-based medicine to maximize the benefit to our patients.

23. The diagnostician should always ask him/herself these two questions: where am I with this patient, and where am I going?
These two questions will function as a system of checks and balances during the management of any given patient and hopefully avoid the pitfalls of blind pursuit in search of a diagnosis.

24. If the patient isn't going where you expect it to be going, then go back to square one
So often the outcome of a misdiagnosis could have been avoided with a heightened awareness by the clinician in charge. Seek not the false comfort brought about with tunnel vision by allowing each new day to call for a complete reassessment of the clinical findings at hand.

25. In order to successfully treat a cat, you must think like a cat
The cat is such a unique creature who takes great offense when we mistakenly handle them as 'small dogs'. You must respect their independence while simultaneously provide them with the utmost of tender loving care. Always try to deal with them on their terms! Failing to remember this will be an experience not to be forgotten.

26. Avoid the pitfalls of the red herring
Laboratory errors will cost you and the owner time and expense if you pursue nonsensical results. When in doubt, repeat the test or speak with the lab technician.

27. If they can't afford a 'caddy', then offer them a 'chevy'
All too frequently the most expensive tests and treatments are not the sole means of an optimistic outcome.

28. Know thy patient
It is essential that you remember all historical and clinical details about your patient so that no vital information is forgotten. This includes a physical examination done with the patient out of the cage on each day of hospitalization.

29. Nobody wants to pay a big bill for a dead animal
This especially applies to the emergency doctor who frequently has situations and issues that need immediate attention. Bottom line is to get compensated as soon as possible or be prepared to suck-up the loss.

30. What matters is not so much what you say to a concerned client, but how they perceive what you said
The absence of eye contact, the pressures of ongoing catastrophes, and the mounting build up of fatigue all contribute to the misunderstandings that might end up before an ethics review board. Never forget that your pet owners demand compassion and respect – always.

31. Diagnostic cloudiness will soon be replaced by clear skies – be patient
The difficult to diagnosis patient can lead to frustrations and sometimes wrong decisions. If it is not a life-threatening problem, give the disorder time to unveil or refer the patient to a specialist, if possible.

32. Better that the dying patient expire in the hospital than during the car ride home
This is to avoid the horror that this can cause the pet owner who has no idea what to expect. Such memories last forever, especially in the mind of the child.

33. You must have cognition to be a competent clinician
This is an essential requirement, especially in emergency medicine where time is critical to the patient's outcome.

34. To prognose you must first be able to diagnose
Giving the wrong diagnosis will certainly cause a domino effect on all subsequent actions for your patient. Better to know why a certain action must be taken rather than to regret that it was taken.

35. The toaster effect
Just as bread will pop up in the toaster when it is ready, so will your sick patients rise and eat when they reach the turning point for recovery.

36. To cut is to see; to see is to do; to do is to cure
The diagnostic lap is still a valid procedure for obtaining a definitive diagnosis.

Clinical pearls: practice tips or reflections about many clinical situations

After 25 years of practice, a clinician can come to the clear conclusion that the practice of medicine consists of a fine blend of both the art and the science. Perhaps it might be rather bold to state that at times the value of the art might even surpass that of the science, even in the academic environment. The main objective of this gathering of thoughts is to share some of the lessons that I have learned over the years with the hope that you will walk away with a few PEARLS that will benefit your sick patients. For the sake of simplicity, thoughts have been categorized according to organ system and will be presented in short and simple phrases. First, a bit of philosophy on the art of diagnosis from R. Kreisburg MD:

'To make the correct diagnosis, we need the right choices.
To consider the right choices, we need the right information.
To obtain the right information, we need to ask the right questions.
Asking the right questions is the hallmark of clinical expertise.'

Note: Excerpts from the 'Pearls' listed below have been deliberately repeated in the relevant chapters to which they relate.

Patient evaluation

- Pallor can be caused by hypoxia, shock, anemia, and an epinephrine injection.
- Anemic pallor plus icterus causes a yellow hue.
- Pink mucous membranes plus icterus causes a more orange color.
- Massive generalized lymphadenopathy usually means lymphoma.
- If it looks, smells, and tastes (?) like pus, then it must be pus.
- Chest plus abdominal fluid accumulation commonly depicts a bad disease. Common causes: neoplasia, heart failure, diffuse inflammation, hypoproteinemia.
- Septic shock: hypotension, hypothermia, thrombocytopenia.
- Skin turgor difficult to assess with cachexia and obesity.

- Sudden facial hemorrhagic lymphedema swelling, hemorrhagic oral mucosa, subdued mentation – think eastern diamondback rattlesnake envenomation (in Florida).
- Various causes of hyperventilation: cardiorespiratory, pyrexia, brain disease, Cushing's, metabolic acidosis, anxiety, pain, shock, anemia.
- Fever plus immune-mediated disease – appetite can persist.
- Fever plus sepsis – anorexia.
- Nasal crustiness, scleral injection, muddy mucous membranes – think uremia.
- On palpation: "Touch but don't squeeze the Charmin".
- Take the patient out of the cage and look at it!
- If something just "ain't" right – think neuro.
- Look under the tongue in any vomiting cat (and dog).
- Watch those hindlimbs for the earliest sign of weakness.
- The Big 6: PCV and TP, BUN, glucose, urinalysis, chest/abdominal radiographs.
- After therapeutic paracentesis, go back and repeat abdominal palpation so you don't pass the mass.
- Have you been palpating each mammary gland?
- A lump is a lump until you stick it.
- It's all in the history.
- Don't just look at it (a lump) – stick it!
- Heat stroke >109.4°F (43.0°C) – look out for DIC.
- If the patient is eating and drinking without excess fluid losses, then it doesn't need intravenous fluids.
- Every sick and trauma patient should have chest and abdominal radiographs on initial work up.
- 'The toaster effect'. The patient will be standing with returned appetite when it is well.

Urogenital

- Rule out pyometra in any sick intact female.
- "Never let the sun set on a pyo." (Garvey, M).
- Murky urine can be caused by pus, chyle, or crystals.
- Bilateral renomegaly means very serious disease: lymphoma, hydronephrosis, pyonephrosis, granuloma, inflammation, subcapsular edema, polycystic.
- In cats with chronic kidney disease: one big kidney plus one small kidney can mean one fibrotic and one compensatory hypertrophic with fibrosis.
- Hematuria without stranguria – consider coagulopathy or renal bleed; however, recent renal bleed plus clots in the urinary outflow can cause stranguria.
- Male dog plus stranguria – must radiograph to rule out obstructive uropathy.
- Cessation of polyuria in sick patient – consider oliguria/anuria – a bad sign.
- Oliguric renal failure – hyperkalemia common.
- High output chronic kidney disease – normo- or hypokalemia common.
- Emphysematous cystitis – rule out diabetes mellitus.
- PD plus PU plus isosthenuria – consider chronic kidney disease, even with normal BUN and creatinine, but watch out for Cushing's.
- Be careful when performing 'cystocentesis' with a pyometra – look before your stick!

- Prostate trends: carcinoma – asymmetrical, hard, mid or caudal pelvis; BPH – symmetrical, firm, anterior displacement.
- Empty urine line: anuria, recent emptying, obstruction.
- Always assess urine SG before starting fluid therapy.
- BPH: passive penile bleed, normal urination, normal dog.
- Detecting urethral pathology in female dog – do a rectal examination.
- Prostate inflammation → 'prostatic shuffle' during ambulation.
- For oliguria, try dopamine at 3–5 µg/kg/minute.

Fluids and electrolytes

- SC fluid administration – isotonic, 18 gauge needle, gravity flow.
- Metabolic alkalosis plus hypokalemia common with upper GI obstructions.
- 0.9% NaCl plus KCl – best for upper GI obstructions.
- TCO_2 >40 mEq/L is always metabolic alkalosis (usually with hypokalemia).
- TCO_2 <10 mEq/L – usually means severe metabolic acidosis.
- Potassium penicillin contains 1.7 mEq K+/million units – take heed when bolusing.
- Treatment of hypocalcemia when intravenous not an option: add 2.5 ml/kg 10% calcium gluconate to 150 ml 0.9% NaCl – give subcutaneously q12h (for adult sized cat). Discontinue if inflammation occurs.
- When giving subcutaneous fluids avoid hypokalemia – add 3.5 mEq KCl/150 ml lactated Ringer's solution – give subcutaneously (for adult sized cat).
- All intravenous maintenance fluids should contain 7–10 mEq/KCl/250 ml; exceptions: oliguria and untreated addisonian.
- To make up 2.5% dextrose solution increments, add 12.5 ml D-50-W to 250 ml of isotonic crystalloid fluid or add 50 ml of D-50-W to a liter of isotonic crystalloid (lactated Ringer's solution, NaCl).
- Rehydrate before inducing diuresis; check urine SG first.
- Volume load with isotonic crystalloid.
- Avoid detrimental tissue edema by restricting excess fluids with severe pulmonary, brain, and general trauma.
- Intraosseous cannulas can be life saving.
- Dextrose given intravenously at doses >0.5 g/kg/hour might cause glycosuria.

Gastrointestinal

- GI obstructions – main sign is vomiting.
- Acute excruciating abdominal pain (like never before seen!) – consider bowel infarction and intestinal volvulus.
- Causes of coffee ground vomitus: gastric ulcers (primary/secondary), uremic gastritis.
- Melena causes: upper GI lesion, thrombocytopenia.
- Occult blood loss – think GI.
- Melena detection – "Let your finger do the walking".
- Black stools: upper GI bleed, thrombocytopenia, swallowing blood, 'Pepto-bismol' (bismuth subsalicylate), iron, charcoal.
- Elevated BUN plus normal creatinine – consider upper GI bleed, especially if kidney can concentrate urine.

- Bile in vomitus signifies pyloric patency.
- The lower the obstruction, the more feculent the vomitus.
- Sudden mental depression 2–3 days post enterotomy – rule out dehiscence and sepsis.
- Never let the sun set on a linear foreign body intestinal obstruction.
- Diffuse inflammatory bowel disease can often be diagnosed with distal colon biopsy.
- Sepsis can cause cholangiostasis.
- Gas in the gallbladder is bad and is a surgical disease.
- Bilirubinuria in cats signifies liver disease.
- J-tube feeding for managing the prolonged period of *nil per os* in pancreatitis can be beneficial.
- Look for pancreatic pathology when the right kidney is easily visible on a radiograph.
- For benign ptyalism administer diphenoxylate/atropine (Lomotil) 0.25 mg/kg q12h. Add minocycline q12h to treat accompanying perioral dermatitis.

Cardiorespiratory

- Many die without ever showing open-mouth breathing.
- Watch for the exaggerated abdominal component.
- Cardiomegaly does not always cause tall ECG complexes.
- A standing lead II ECG is satisfactory for rate, rhythm, and interval measurements.
- Do not use beta-blockers until pulmonary edema resolves.
- Muffled chest sounds: fluid, mass, air, obesity, deep chested, 'plugged ears'.
- Diffuse muffling – usually chest fluid.
- Dorsal muffling – air or mass in chest.
- Coughing cats: allergic bronchitis, flukes, lungworms, heartworms, hair or foreign body in trachea, tumor.
- Sudden-onset diffuse pulmonary infiltrates – think acute respiratory disease syndrome.
- Cats with heart disease rarely cough.
- Bacterial pneumonia plus leukopenia (bone marrow associated) – causes minimal radiographic infiltrates.
- Heartworm treated dog at discharge: dispense prednisone and furosemide for the earliest signs of pulmonary thromboembolism.
- Echocardiogram for diagnosing vegetative endocarditis.
- Ketamine (3–5 mg [total] intravenously) for a dyspneic cat can allow 'survival' radiographs.
- Remember – good side UP when radiographing dyspneic patient.
- Digoxin intoxication can cause any cardiac arrhythmia.
- Aspiration pneumonia can be worse when H2 blockers are used due to altered GI microflora.
- Only pulmonary edema can clear from the lungs after 36–48 hours.
- Dyspneic patients find it difficult to sleep because they know they are dying.

Neoplasia

- Cutaneous mast cell tumors can mimic any type of skin growth.
- Assume any firm mammary nodule as carcinoma until proven otherwise.
- Mammary tumors – don't stick it, cut it.

- Don't miss lymphangitic inflammatory mammary carcinoma.
- Nasal disease can do anything.
- Copious mucoid nasal discharge, think nasal adenocarcinoma.
- Try gastric biopsy forceps for nasal biopsy.
- Closed mouth nasal cavity radiographs are useless.
- Cancer can cause an elevated temperature and WBC count.

Drugs

- Observe for drug interactions.
- Do not use theophylline with ciprofloxacin – causes theophylline overdose.
- Best avoid intravenous route for thiamine (better intramuscularly) and vitamin K_1 (better subcutaneously).
- Rehydrate prior to using aminoglycosides.
- Prednisone for craniomandibular osteopathy.
- Cimetidine enhances metronidazole-induced neurotoxicity.
- Aspiration pneumonia worse when H2 blockers in use.
- Oral tetracycline can cause fever in cats.
- Follow all oral doxycycline and clindamycin tablets/capsules with water to swallow.
- Chloramphenicol is still a darn good antimicrobial.

Hematology

- Unclotted blood in clot tube – consider coagulopathy.
- Massive splenomegaly – splenic torsion, lymphoma, myeloproliferative or mast cell splenic neoplastic infiltrate.
- Thrombocytopenia plus anemia – causes pale petechiae!
- Fleas plus thrombocytopenia – cause 'lots of' lumbosacral petechiae.
- Low WBCs, low RBCs, low platelets – rule out bone marrow suppression.
- Fulminant hemolysis: anemia, hemoglobinemia, hemoglobinuria, weakness, depression, +/- vomiting; then icterus.
- Bone marrow derived leukopenic animals don't make pus!
- Keep IMHA and ITP patients on long-term every other day maintenance prednisone for 9–12 months to avoid relapse.
- Try danazol (Danocrine) with prednisone for refractory IMHA and ITP.
- Observe for autoagglutination and spherocytes in IMHA.
- Newly acquired bleeding – think anticoagulant rodenticide intoxication.
- A normal bleeding time ensures adequate platelet hemostasis, a normal platelet count does not.
- Owners can use urine dipsticks to detect hemeprotein for early signs of recurrent hemolysis.

Endocrine

- Hypercholesterolemia plus elevated creatine kinase – rule out hypothyroidism; hypocholesterolemia – rule out Addison's disease.
- U-100 syringe (or 1.0 ml tuberculin syringe) should be used for U-100 insulin.

- Do not forget K+ when treating diabetic ketoacidosis.
- Oliguric diabetics have marked hyperglycemia.
- IV fluids alone can lower blood glucose by as much as 50–60% during correction of dehydration.
- Glycosuria can occur with diabetes, proximal renal tubular disease, stress, IV dextrose.
- Marked hyperglycemia with minimal glycosuria – consider oliguria/anuria.
- Morning marked glycosuria and afternoon diminished glycosuria – typifies transient insulin response (need split dose).
- Can use soiled urine to detect glycosuria.
- Hyperglycemia can sometimes be detected in tears using urine glucose test reagent pads.
- Blood glucose meters not very accurate at the high and low ends of the scale.
- Assess the eclampsia dog for hypoglycemia.
- Try mannitol for severe hypoglycemic encephalopathy.
- When fludrocortisone acetate (Florinef) does not work well, use desoxycorticosterone pivalate (DOCP) and prednisone.
- The hypocalcemic cat has not read the book of clinical signs.
- Keep an eye out for the atypical addisonian.
- If you have a diabetic dog with Cushing's disease that is receiving both insulin and mitotane (o'p'-DDD; Lysodren), and the dog becomes weak and depressed, remember this:
  - If the dog is mitotane toxic, **its appetite will have been absent that day** and vomiting may or may not have occurred.
  - If dog is insulin overdosed, it **very likely will have eaten that morning**. Coma and seizures can be present.
  - If dog has both hypoglycemia and mitotane toxicity, any combination of all of the above can occur, and this is where '**treat for the treatable**' comes in if laboratory tests are unavailable and where treatment would call for both dextrose and glucocorticoid.

Neurology

- Rapid onset lower motor neuron paralysis – think ticks, organophosphate, botulism, polyradiculoneuropathy, metronidazole, coral snake.
- Cats with dilated pupils and blank stare – think thiamine.
- Coma: diffuse cerebral, brainstem, but don't forget metabolic.

Intoxication

- Ethylene glycol sometimes fluoresces under Wood's lamp.
- Dimercaptosuccinic acid (DMSA, succimer) – an oral treatment for lead poisoning.
- Unexplainable radiodense particles in the bowel – think lead.
- 4-methylpyrazole for antifreeze intoxication; avoids hangovers (dogs require lower dosages than cats; veterinary product currently unavailable).
- Newer anticoagulant rodenticides – treat with oral K_1 for 4–6 weeks.
- Newly acquired bleeding – think anticoagulant rodenticide intoxication.

Patient management

- Old dogs are poorly tolerant to tranquilization.
- Avoid sedating acutely ill patients unless absolutely necessary.
- Don't sedate at the end of day and leave the animal overnight without IV fluid support, especially old patients.
- Increased spontaneity might pre-empt death.
- Heparinized syringe might contain as much as 200 units heparin – too much for puppies and kittens.
- Traumatic ear flush can cause inner ear and vestibular disease.
- Cats hate atropine drops – causes marked salivation; use ointment instead.
- Some pathologic bladders can leak after cystocentesis.
- Do not forget thiamine in cats.
- Glycerine suppositories for patients with pelvic fractures or constipation will be most appreciated!
- Ketamine (3 mg total dose intravenously) can adequately restrain the sick cat with urethral obstruction.
- Take care with subcutaneous fluids – dogs are not cats and they like to slough!
- Manual expression of a male dog's bladder is hazardous to its health – it can rupture.
- Subcutaneous fluid administration – stay behind the scapula and in front of the wing of the ilium. Use 18 gauge needle and 50 ml/site (adult cat).
- Don't forget glucose for the babies.
- Imipenem for life-threatening infections.
- A clean cat is a happy cat.
- No Fleet enemas for obstipation, unless you want to treat a good case of hypocalcemia.
- When is the last time you hugged your patients?
- A dynamic duo: good science and experience.
- Heat lamp and rubbing alcohol = one **hot** dog.
- Nothing is routine.
- If client can not afford a "Cadillac", there is nothing wrong with a "Chevy".
- Body bandage in cats cause pseudoparalysis.
- Rapid abdominocentesis is effective and safe for chronic ascites, except when it is caused by chronic liver disease, when simultaneous IV plasma or albumin infusion is recommended.
- Best avoid intravenous B_1 and K_1 – give subcutaneously or intramuscularly.
- Never kill'em based on cytology results.

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▲ This cat has hypersensitivity of its nasal planum caused by insect bites.

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Dermatologic disorders

DERMATOLOGY is derived from the Greek term *derma*, meaning skin, and *logos*, meaning study or speech, word, or reason. It is an essential discipline for the practitioner because of the high incidence of skin disease that one can encounter daily in practice. These disorders can occur as primary lesions or syndromes or they can be a reflection of some other internal disease process in the body. Adherence to the essentials of obtaining a full history and doing a complete physical examination will be most helpful in determining the cause of the dermatologic disorder. Perhaps the most common group of skin diseases involve hypersensitivity states, but other important conditions might be associated with autoimmune disorders, infectious diseases, neoplasia, nutritional disorders, and various metabolic and endocrine conditions. The diagnostic methodology of skin diseases, after taking a full history and conducting a physical examination, includes general tests such as a complete blood count, serum biochemistry profile, immune or infectious disease serology, skin hypersensitivity testing, and biopsy. The advantages of these tests are that they are readily available to the practitioner and noninvasive for the patient. In many instances the classic appearance of certain lesions will allow for a minimal diagnostic evaluation, thus saving the owner a substantial amount of expense.

1 Dermatologic disorders

- A lump is a lump until you stick it.
- Don't look at it, stick it.
- Skin turgor is difficult to assess with obesity and cachexia.
- Excessive SC fluids cause skin slough.

1.1a, b. Cutaneous vasculitis. The dermatologic lesions on this dog began as distinct multifocal areas of erythema that progressed to eschar and eventual sloughing. These lesions were biopsied and diagnosed as cutaneous vasculitis. This disorder is usually associated with a type III immune reaction. The sensitizing trigger can vary and includes drugs, underlying diseases and infections, and serum sickness; sometimes the cause remains unknown or idiopathic. The lesions can appear as purpura, petechiae, or ulcers. Histologically, white blood cells are seen surrounding the blood vessel walls (leukocytoclastic vasculitis). Treatment entails removing the insulting agent, if possible, and administering immunosuppressive drugs such as prednisone. The vasculitis can involve both superficial and deep small, medium, or large arteries and arterioles.