Emergency Management of Blocked Cats - Is There Anything New?

Lenore Bacek, DVM, MS, DACVECC reviews recommended management practices for cats suffering from urinary obstruction.

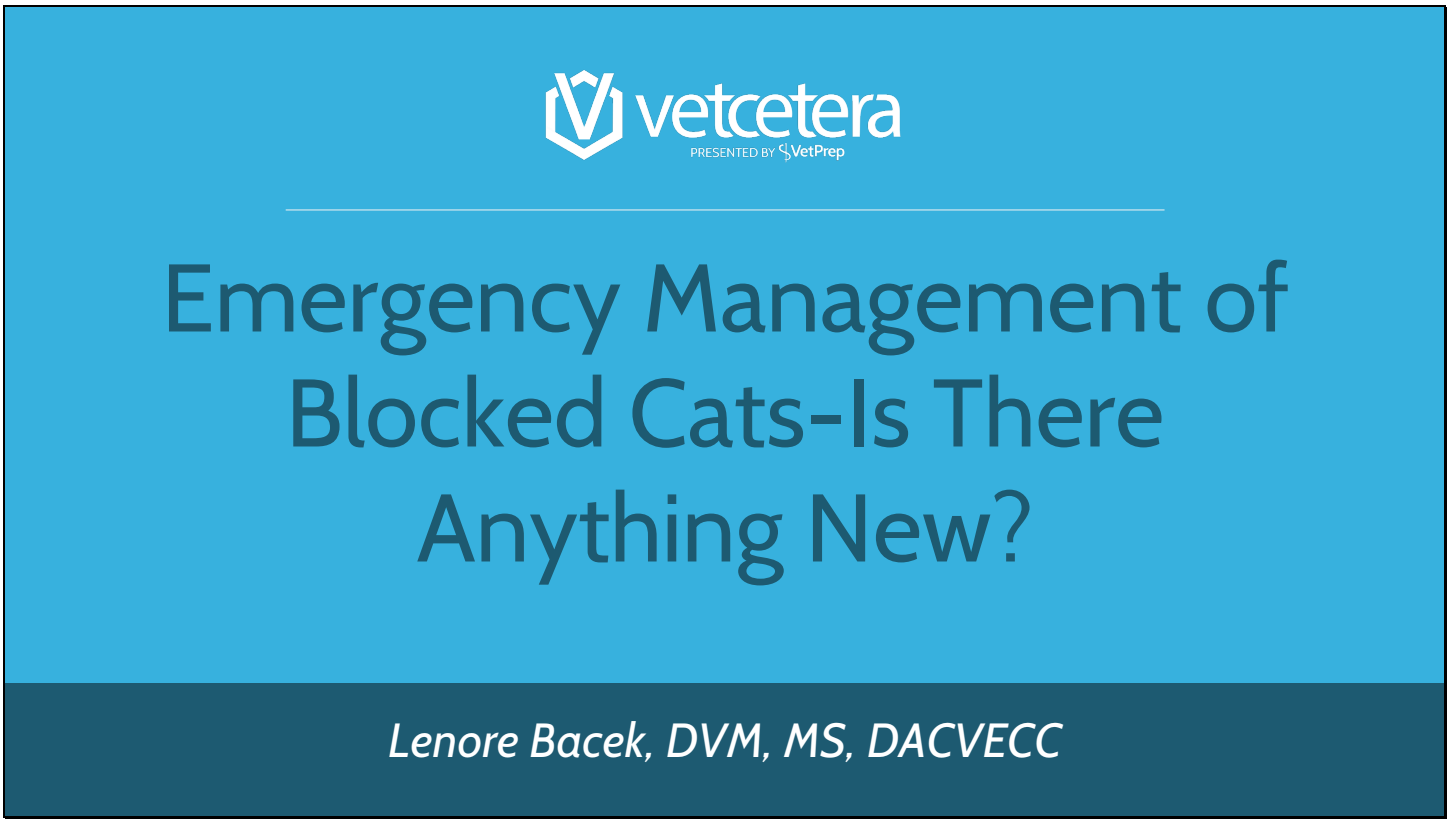
Speaker Bio:

Dr. Lenore Bacek received her DVM from Ross University School of Veterinary Medicine in 2007, followed by a one-year internship in Small Animal Medicine and Surgery at Louisiana State University. She completed both a residency in Small Animal Emergency and Critical Care and a master's degree at Auburn University in 2011. Dr. Bacek is board-certified by the American College of Veterinary Emergency and Critical Care. After spending nearly a decade on faculty at Auburn, Dr. Bacek is currently the Clinical Programs Manager for BluePearl Specialty + Emergency Pet Hospitals. She is incredibly passionate about teaching and leads the emERge program, BluePearl's innovative emergency training and mentorship program as well as other initiatives in training for emergency veterinarians. Dr. Bacek has been an invited speaker at numerous national/international and regional conferences, including the American College of Veterinary Internal Medicine (ACVIM) Forum, the International Veterinary Emergency and Critical Care Symposium (IVECCS), the South Carolina Association for Veterinarians (SCAV) conference, and numerous local continuing education events. She currently serves as the Vice President of the American College of Veterinary Emergency and Critical Care.

Learning Objectives:

1. Be able to have a high index of suspicion for feline urethral obstruction based on history, clinical signs and physical exam findings.
2. Understand treatment goals and priorities.
3. Formulate an analgesia and anesthesia plan depending on stability of patient including regional analgesia.
4. Understand the steps for placement of a urinary catheter including catheter selection.
5. Develop a plan for continued care and monitoring after urinary catheter placement.

Slide 1



And our speaker tonight is Doctor Lenor Bacek. She's an emergency critical care veterinarian and she also happened to teach me when I was at Auburn. She is currently the clinical programs manager at Blue Pearl Specialty and Emergency Pet Hospitals in Miami (Correction – Tampa). And she's the vice president of the American College of Veterinary Emergency Critical Care. She's going to be speaking on Emergency Management of Blocked Cats - Is There Anything New? Hope you guys enjoy, take it away.

Thanks Katie, like Katie said, I'm a criticalist. I was on faculty at Auburn for about eight years and then I joined Blue Pearl in 2019. And I run our Emerge program, which is our emergency doctor training and mentorship program. So I really love teaching.

And that's what I get to spend most of my time doing. So we're going to go ahead and jump into emergency management of blocked cats, is there anything new, Which maybe there is, maybe there isn't, you'll just have to wait and see. But hopefully, you guys will get some good clinical pearls out of this. I try to make all of my lectures as practical as possible.

I know right now ER is blowing up and just so crazy with caseloads, so trying to think about what really matters when we're seeing these cases and what are things that are maybe nice to dos, but not necessarily have to dos.

Slide 2

Objectives

- Index of suspicion
- Prioritize treatment goals
- Formulate analgesia/anesthesia plan
- Develop a plan for continued care and monitoring

https://pixabay.com/illustrations/target-dart-aim-objective-success-1414788/

All right, so we'll go through index of suspicion, how do we prioritize treatment goals? So, again, I think with how busy things are right now, there are a lot of things we may want to do for these cats, but we may have to triage even the treatment plan in our head based on staffing, other cases, what's going on.

Formulate an analgesia and anesthesia plan for these guys. We'll talk a little bit about what a cat looks like that's really critical versus a cat that's quite stable and what that plan might look. And then develop a plan for continued care and monitoring. And, again, on ER, I think the goal is really that initial stabilization. Let's set up a plan for the owner and then let's set up a plan for the PDVM, the next emergency vet, whoever is taking over the case, so we have something that can be continued seamlessly.

Slide 3

Oliver

- 6-year-old, male neutered, domestic short haired cat
- 8/9 body condition score

https://www.flickr.com/photos/golf_pictures/2187242989

So we're going to be talking about Oliver. So Oliver, I'm sure we've all seen cats just like Oliver, so he's a middle-aged, male, neutered, domestic short-haired cat, who lives indoors. He eats dry food and he is quite overweight. If you guys are on Facebook, there's a group called, I think it is called, Chonk Cats, but it's basically people showing they're super fat cats and it's really, really cute and really funny, but obviously it's not ideal for these cats to have eight out of nine or nine of nine body condition scores.

So we're going to be working with Oliver throughout his presentation, his stabilization, and then his management.

Slide 4

History

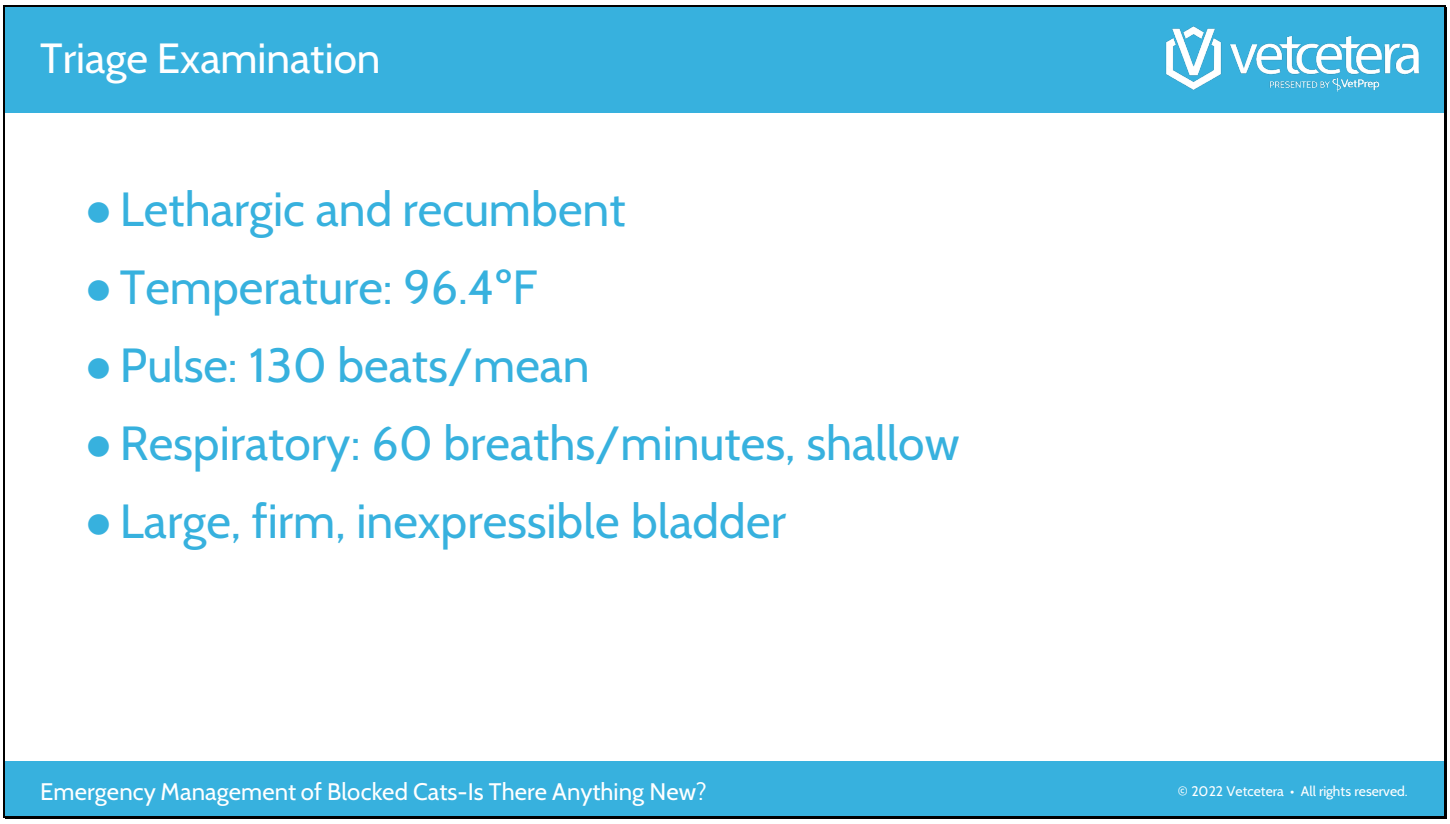
- Presenting for constipation and lethargy
- 2–3-day history of urinating outside the litter box
- 1-day history of vocalizing

https://commons.wikimedia.org/wiki/File:Japanese_litter_box_in_use.jpg

So he's actually presenting for what the owner is calling constipation and lethargy. So, basically, what she's describing is he's going back and forth to the box. She isn't seeing him defecate or urinate, but she sees him straining and she thinks it's constipation, which is relatively common for these cats. The owners may not be aware of whether it's a urination problem or defecation problem.

But he's also been urinating outside the box for a couple of days, which is not like him. And then the one day history of vocalizing pretty constantly, which, again, he's usually a pretty lazy couch potato and him vocalizing is not very normal for his behavior.

Slide 5



So the technician immediately brings him back. They obviously see on physical that he's not in good shape.

So when they look at him, he is lethargic and recumbent. His temperature initially is 96.4 degrees Fahrenheit. His heart rate is 130 beats per minute. His respiratory rate is 60 breaths per minute and it's quite shallow. And then, he has a large, firm, inexpressible bladder.

So you can see on this triage exam, we're just really concentrating on heart, lungs, and brain when we're doing our triage exam. We're not trying to get a great idea of, does he have any skin problems, or orthopedic problems, we're really trying to, initially, make that decision if he is stable or not stable.

And I think that really helps, especially with caseload, when we're trying to direct these cases, is this a cat that can sit with the owner in the car, or the waiting room, or somewhere. And we can reassess in 10 or 15 minutes or 30 minutes. Or is this a cat that has a life-threatening problem and needs us to intervene right now. So that, for me, is always going to be the first decision when I'm making decisions on these emergency cases. Is this a stable case that can wait or is it an unstable case that needs to be seen right now.

Slide 6

Assessment

- Stable or not stable?
  - **NOT! WHY?**
- Problem list?
  - Shock (hypothermic, bradycardic)
  - Inexpressible bladder
  - Lethargy
  - Constipation?
  - Thoughts?

https://pixabay.com/photos/cat-speech-bubble-question-mark-pet-5755815/

So, hopefully, you guys can answer in the chat, but, again, we said stable or not stable. And then, why do you think he's stable or not stable. So feel free to jump in the chat there. I'll give you guys a little bit of time to do that.

Yeah, awesome. So lots of votes for not stable. So I agree. For me this cat is very close to arresting. He's very close to not being Oliver anymore. So I agree, I said, not stable.

And then we have some votes, he's obviously unstable, because he's very hypothermic. He's very bradycardic for a cat. Those things together would make me very concerned. So if I see a cat that's hypothermic and bradycardic, I'm probably also going to assume that this cat is hypotensive. And in cats, those three things together usually indicate that we have a very, very unstable cat.

For me, when, I'm triaging cats I like to use the heart rate a lot to make that initial decision. A cat in the hospital, really, coming in should have a heart rate of 200, 210, 220. So anything that's below about 160, 150 is going to be a relative where maybe it doesn't seem that slow, but for a cat, that's going to be an indication that there's probably something pretty wrong, whether it's a cold cat, is a septic cat, is this a hyperkalemic cat, but that would be a cat that I'd want to see right away. So I agree, not stable.

And then, what would you guys have on your problem list at this point? And, for me, I try to make my problem lists from most life-threatening to least life-threatening. So I try to focus on, what do I need to

be addressing right now? And what are things that I can come back and look at in a few hours, or a few days, or never, if it's something completely unrelated.

Yeah, so we have some votes for bradycardia and hypothermia and then some votes for obstruction, some votes for both. So, I agree. So, for me, the life-threatening problem in this cat is shock. So this cat is hypothermic and bradycardic. We all have our index of suspicion, why but really that's what we need to start addressing first.

Obviously, this lecture is on blocked cats. This cat has a firm, inexpressible bladder. So our suspicion that he is blocked, that's going to be lower on the list, because we're really not going to even start addressing that yet, until we make this cat more stable. So, for me, the shock is the life-threatening abnormality.

We have a couple of votes for hyperkalemia. Again, that's an index of suspicion that he's probably hyperkalemic. We don't quite know that yet, but I agree, that's something we're going to want to look at. And then things like lethargy and I put constipation with a question mark.

Owners are always worried about bowel movements in the hospital. So leaving that on the problem list, just so we can make sure we go back and at least communicate to the owner, this is what's actually going on. We know you're presenting complaint was constipation, but Oliver actually has a blockage in his urethra, or however you want to explain it, but great job. So I agree, the hypothermia and the bradycardia and the shock is probably going to be our problem first.

So I think everyone probably has an index of suspicion of what's wrong with Oliver, based on the title of this presentation and the rest of his physical exam. So at this point, I would really suspect that he's blocked. So if he came in like this-- any time I really have a bradycardic cat come in, one of the first things I want to do is palpate their bladder, just because I know that that's going to be a pretty common reason for them to be hyperkalemic and subsequently bradycardic.

So, yeah, I think at this point, we can all say we're pretty sure this is a blocked cat.

Slide 7

Feline Urethral Obstruction

- Common
- Majority present early/mild
  - ~10% present critically ill
- Dehydration
- Azotemia/electrolyte abnormalities (within 24 hours)
- Death within 3 days!
- Prompt recognition!
- Goal = **stabilize** THEN unblock!

https://www.etsy.com/listing/1094034986/grim-reaper-cat-enamel-pin

So these cats are pretty common. I think everyone's probably seen them. The good news is most of them don't present like Oliver. I love cases that present like this, because you can do a lot of things and really make them stable very quickly. But the majority do present early and mild.

I think, in the pandemic, probably good and bad for cats, is that owners are home a lot and they may notice something earlier than they did previously. But about 10% do present critically ill, like Oliver. So definitely worth keeping in mind, that there's a fairly big percentage that are going to come in and be in really rough condition.

A lot of the mild cats, they will be dehydrated. Very quickly they're going to develop blood work abnormalities, so azotemia, electrolyte abnormalities, so, again, within about 24 hours. They usually will die within about three days, if left untreated. Again, the good thing is, owners would, hopefully, notice something. I think the challenge is in multi-cat households, where it's not clear who's not using the litter box or maybe who's having accidents, so really, prompt recognition.

And the goal for these cases is going to be to stabilize them first and then unblock them. And I think sometimes it's hard. We all, rationally, want to unblock him. We know that's his problem. But if we don't make him more stable first, there is a good chance that he could arrest while we're in the process of unblocking. So stabilize first and then unblock.

Slide 8

Signalment

- Young, male, indoor, overweight cats
- Due to
  - Idiopathic (~50%)
  - Urethral plugs (~20%)
  - Calculi (~30%)
  - Urethral edema

https://commons.wikimedia.org/wiki/File:Big_Fat_Red_Cat.jpg

Associations between increased body condition score, bodyweight, age and breed with urethral obstruction in male castrated cats

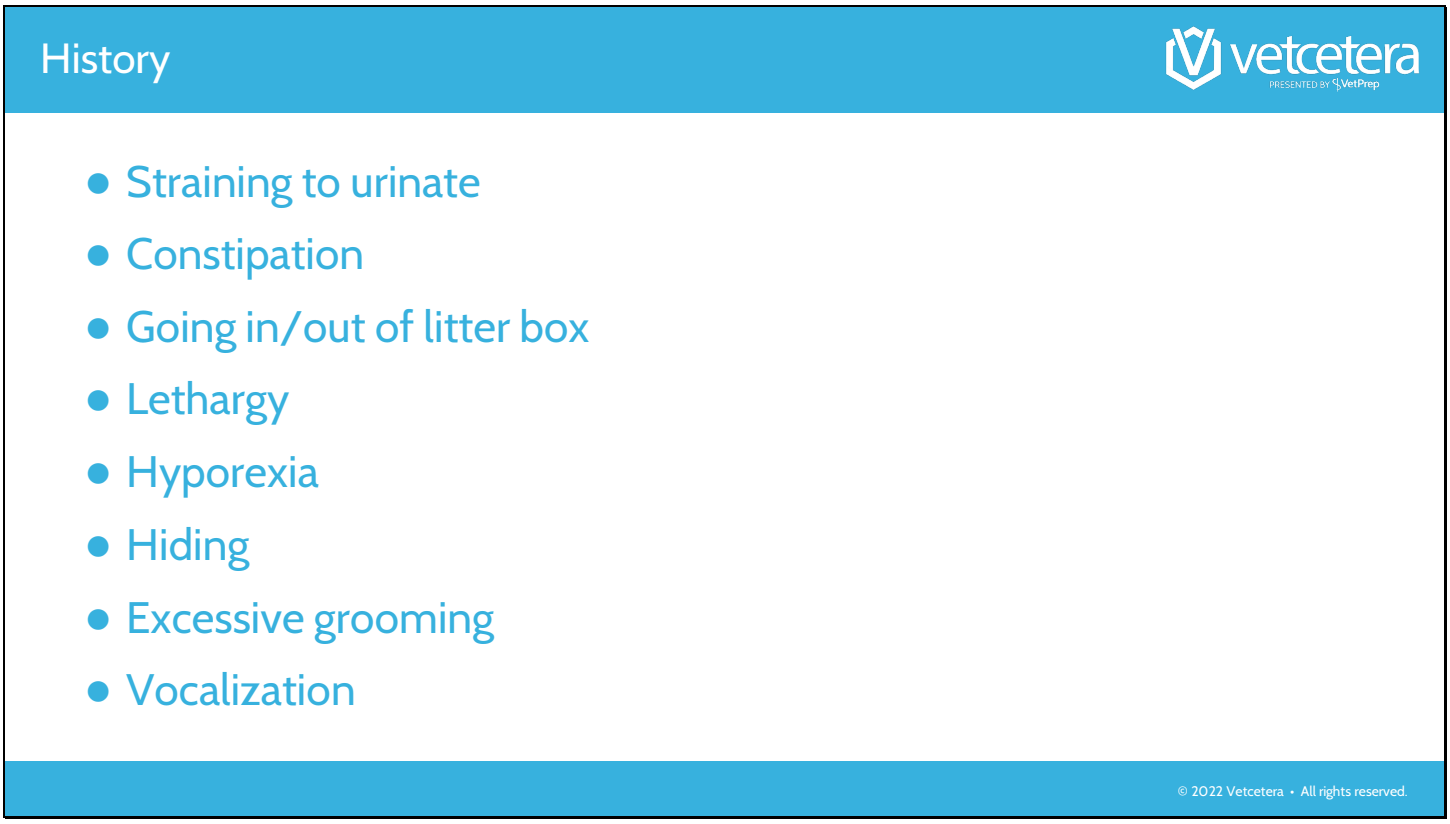
A. Jukes[a,*], M. Lui[a,1], J.M. Morton[b], R. Marshall[a], N. Yeow[a], M. Gunew[a]

The Veterinary Journal 244 (2019) 7–12

So, again, these are usually young male and/or overweight cats. There are lots of fat cat pictures on the internet. So it was fun finding pictures for this presentation. But really, these are cats that are typically indoor cats. They're typically fed dry. Diets they're typically male cats and fat cats that don't get a lot of exercise.

They're usually idiopathic. So it's more likely to be something functional than something that would be an actual mechanical obstruction, like a urethral plug or calculi. And then, a lot of the times, they'll also have a component of edema, just from straining, or if there is plugs or calculi or whatever else is going on.

Slide 9



The history can be pretty variable. I think, a lot of times, owners will either notice straining or constipation. I don't think, again, they can always make that distinction. But they usually notice, hey, my cat's going back and forth to the litter box and nothing is happening. What's going on? Or, if they've had a previous episode or a previous cat that's had a blockage, they may be aware of what could happen.

Sometimes they're just lethargic, hyporexic. Cats, unfortunately, when they are ill, they really like to hide, versus our dogs that usually let us know pretty aggressively that they're not feeling well. They can be excessive in their grooming, especially around the penis and maybe you can even see some redness or some irritation. And then sometimes vocalization, especially being picked up, if the bladder is really firm and painful, they may cry out and yell when they're picked up by the owner.

Slide 10

Physical Exam

- Dehydration
- Hypovolemia
- Bradycardia
- Hypothermia
- Tachycardia
- Firm, non-expressible bladder
- Extruded penis/inflammation
- Collapse

Again, physical is going to be really, really variable. So those more mild cases, they may look very, very stable and the only abnormality may be that they have a firm bladder or they have some inflammation around their penis. But a lot of the cases will come in and have some degree of dehydration.

If they've been doing the typical cat thing and hiding, they may be hypovolemic, bradycardic, hypothermic. If they're more advanced, they can be tachycardic, as well, and then they can collapse. So some of the cases that are more advanced can actually go ahead and collapse. A lot of them will come in though with this triad of bradycardia, hypothermia, and hypotension.

Slide 11

Initial Triage Plan?

- Triage orders?
  - Hook up the ECG
  - IV catheter placement
  - Aggressive external warming
  - Conservative fluid bolus (i.e. 3-5 ml/kg isotonic crystalloid)
  - Diagnostics

Vetwarming.com

So I think this is a big thing when we're, again, seeing a lot of cases and trying to use the staff we have in the best way and make sure we're using them to their full potential and full ability. How do we give triage orders for some of these cases. So what would be the initial-- you're writing down, I want you to do these few things. So what would be the first few things you'd want to do with Oliver?

I love of all the answers, they make me very happy. Yeah, so we have some votes for fluids, IV catheter, ECG, bloodwork, warming, calcium. So lots of really, really good ideas. So, for me, I would want this cat on an ECG yesterday. So this cat's heart rate, I believe, was 130. That's really low for a cat. The cat is lateral. So multiple reasons, we can look at what the ECG rhythm is, but we could also have this cat being monitored pretty aggressively, in case he progresses to a cardiac arrest event.

I would definitely want to get some sort of catheter placed. It may be challenging, because he's cold and a cat. So starting some sort of aggressive external warming. And then, I'm really, really wimpy with my cold cat fluids. So cats are, again, we have two cats so I can say cats are weird.

When they are cold they're adrenergic receptors don't respond normally. So if we give them a lot of fluids and they have really flaccid blood vessels, we warm them up and then their blood vessels constrict. It's really easy to overload them. I think we've all done that. I've definitely overloaded cold cats. So I try to start aggressive warming and just be super wimpy with my crystalloid boluses.

So I'll start between three and five mls per kg as I'm warming them up to see if that's helping with blood pressure. Does their heart rate start coming up as they're being warmed and getting some fluids? There's a really small case series of about 12 cats that got overloaded during the treatment for being blocked. A lot of them, in the course of being hospitalized, developed a murmur. So certainly worth making sure they don't have any obvious murmur or gallop, or if they develop it maybe trying to be more conservative. But I usually try to be super wimpy, because I can always give more, but I can't take it away once I give it.

And then, I think this would be where I would start in terms of my triage orders and then I would probably start thinking about diagnostics. So some people already threw diagnostics in there, so I saw a couple for some bloodwork, some renal values, let's see, blood work. And someone said pain meds, which is awesome. I did not have pain meds on my initial triages, but that's probably something totally worth adding in as well.

So for me, for my initial diagnostics, we have ECG on here, but for me, an ECG would probably be one of the first things I would do. And then I put a minimum database. And I think that really depends on this cat and this owner and what you want immediately. So as a criticalist, I'm very impatient. And when I worked at Auburn, the emergency room was right across from the clin path lab, and you could hand in a stat renal panel, which had electrolytes, and I would just go stand there and wait for it, because it only took a minute.

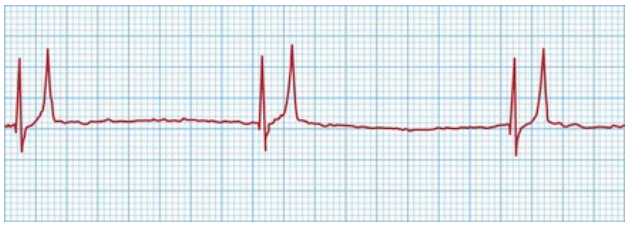
So I think deciding what you really need, is this a cat that I'm going to submit a full CBC chem on? Probably not. This is a six-year-old cat, he's blocked. What I'm really interested in is probably his electrolytes and his renal values. So, for me, a minimum database in this cat is probably just that, a renal panel.

Maybe, if I have extra blood, I do a packed cell volume, total solids, maybe a glucose, things like that, but I'm probably not going to initially submit a full CBC chem. Especially, again, if there's financial concerns. I don't know if the CBC is going to really change what we're doing. If I ran a packed cell volume and it was 15 or something really abnormal, then maybe I would talk to the owner about that, but initially I think what I want is some sort of renal panel.

Slide 12

Diagnostics

- ECG



https://veteriankey.com

- Thoughts?

So we do an ECG. Does anyone have any thoughts about this ECG? So, obviously, this isn't actually from Oliver, but this is representative. Yeah, so the T is super high. So this is the T, hopefully you guys can see my arrow. So we have a really tented T wave. And then, anyone else notice anything maybe that's not there? Yeah, there's no P wave.

So any time you have to think about, is there a P wave? There's probably not. So, for me, if I'm looking at this, there's a few little bumps here and there that maybe, if I squint, I can make be a P wave, but they're not consistent, they're not really corresponding to this QRS and this T. So this would be that there's no P wave. This is atrial standstill. And then, the T wave looks really, really tented.

So, already, we were probably suspecting hyperkalemia, but seeing this ECG, to me, would be, this cat's hyperkalemic. We don't know the degree yet. We probably need to start some treatment very quickly and see what the ECG does.

Slide 13

Diagnostics

- Bloodwork
  - BUN/Creatinine >>>>
  - K 8.8 mmol/L (3.5-4.5)
  - Packed cell volume 57%, TS 7.6 g/dL
  - Blood glucose 250 mg/dL (80-120)
- Do we need a urinalysis and urine culture?

And then we do some blood work. So, again, it really depends, I think, on the machine you have, what you're looking for. But for me, really, what I want, and what I want now, is I want to know this cat's potassium. That would probably be the first thing, if I had a pick.

And then it's nice to know the initial BUN creatinine, but, quite honestly, in that initial triage, where we're stabilizing this cat, it's probably not going to change what we're doing. We know it's going to be super high. And the goal would be, we're going to track it over the next few days as we're unblocking and treating. We're going to see it come down, but what I really want now is the potassium.

If all the machines in the building were broke, I probably don't even really need the potassium. I can probably just start treating it based on my index of suspicion, and then, hopefully, get a fixed machine. But we do manage to run a little bit of bloodwork on Oliver.

So his BUN creatinine won't even read, they just read little greater than signs. His potassium is very elevated, so it's 8.8 millimoles per liter and the high end of our reference range just 4 and 1/2. And we do have a little bit of extra blood, so we get a quick PCV, which is 57 and total solids which are 7.6. And then, his glucose is elevated at 250, with the high end of normal being 120.

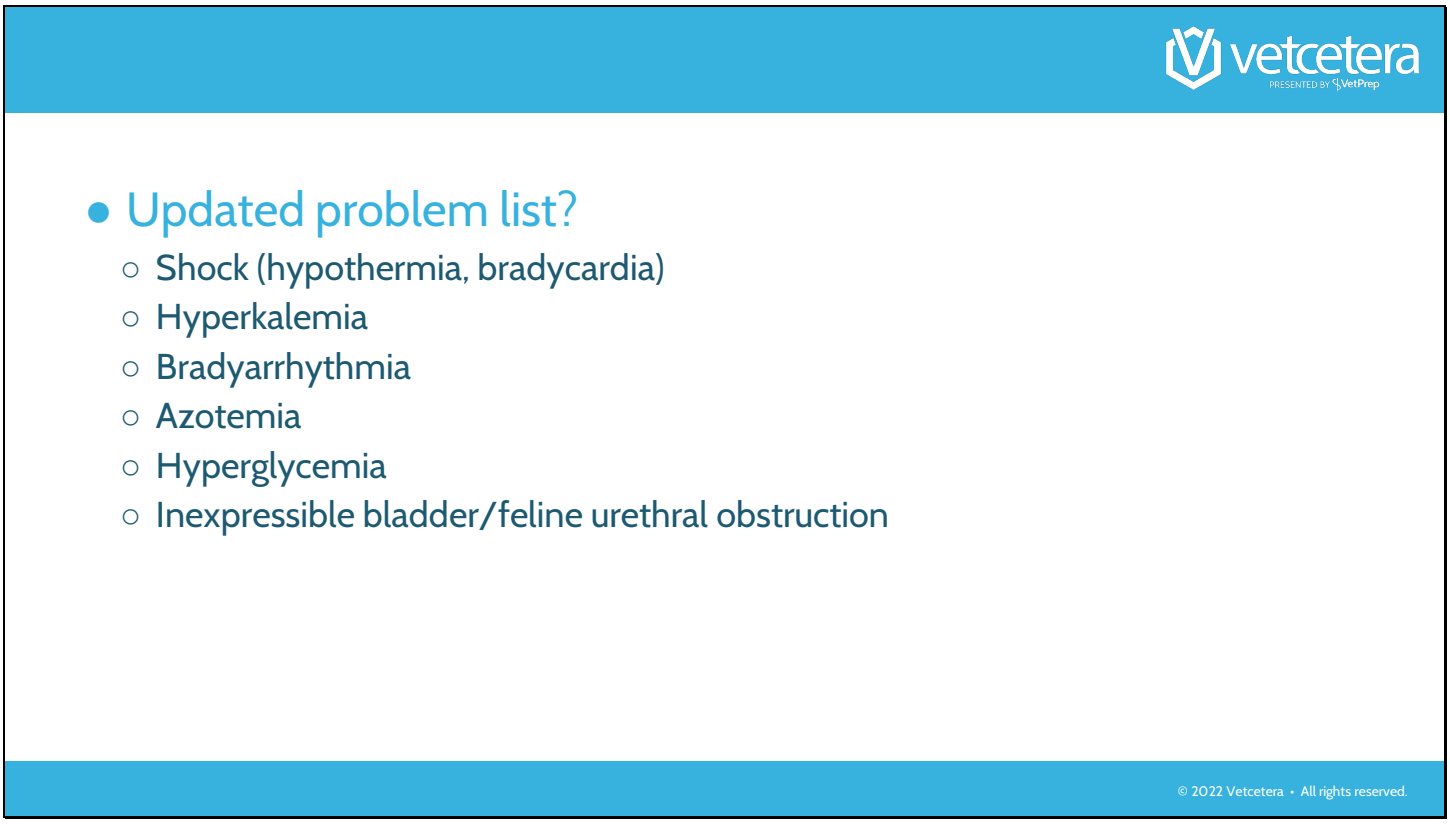
So what do you guys think? Do you think, on this cat, we really need, right now, a urinalysis and urine culture? Do we need it at any point? Is this something we would talk about with the owner, doing later or follow up? What do you guys think?

Yeah, and I'm going to call out Rachel for saying it would be nice to have to check for crystals. So, for me, I'm going to prioritize a UA. Most of these cats-- almost zero cats, present with an active UTI. The numbers are very, very low. So if I have to pick a UA or a culture, I'm going to do a UA, because I want to see, are there crystals? Is there something else in the urinalysis that maybe I could be treating primarily with the diet change?

If there's suspicion of index for a UTI, then absolutely get a culture. It's probably not going to be something I worry too much about, initially. Usually what I'll do is either, if they develop signs of an infection in the hospital, meaning their urine character changes or they develop signs, like a fever, then I'll get a sterile sample for culture. But I'll try to get, at least, something for a UA to look at crystals, look for white blood cells, blood, all the other fun things.

So I think, again, it's probably not something I'm going to be super worried about at this exact moment, because it's not going to change my acute treatment, but I'm probably going to talk to the owner. We'd like to at least get a UA, so we can rule out XYZ and if we need to do something long term like a diet change.

Slide 14



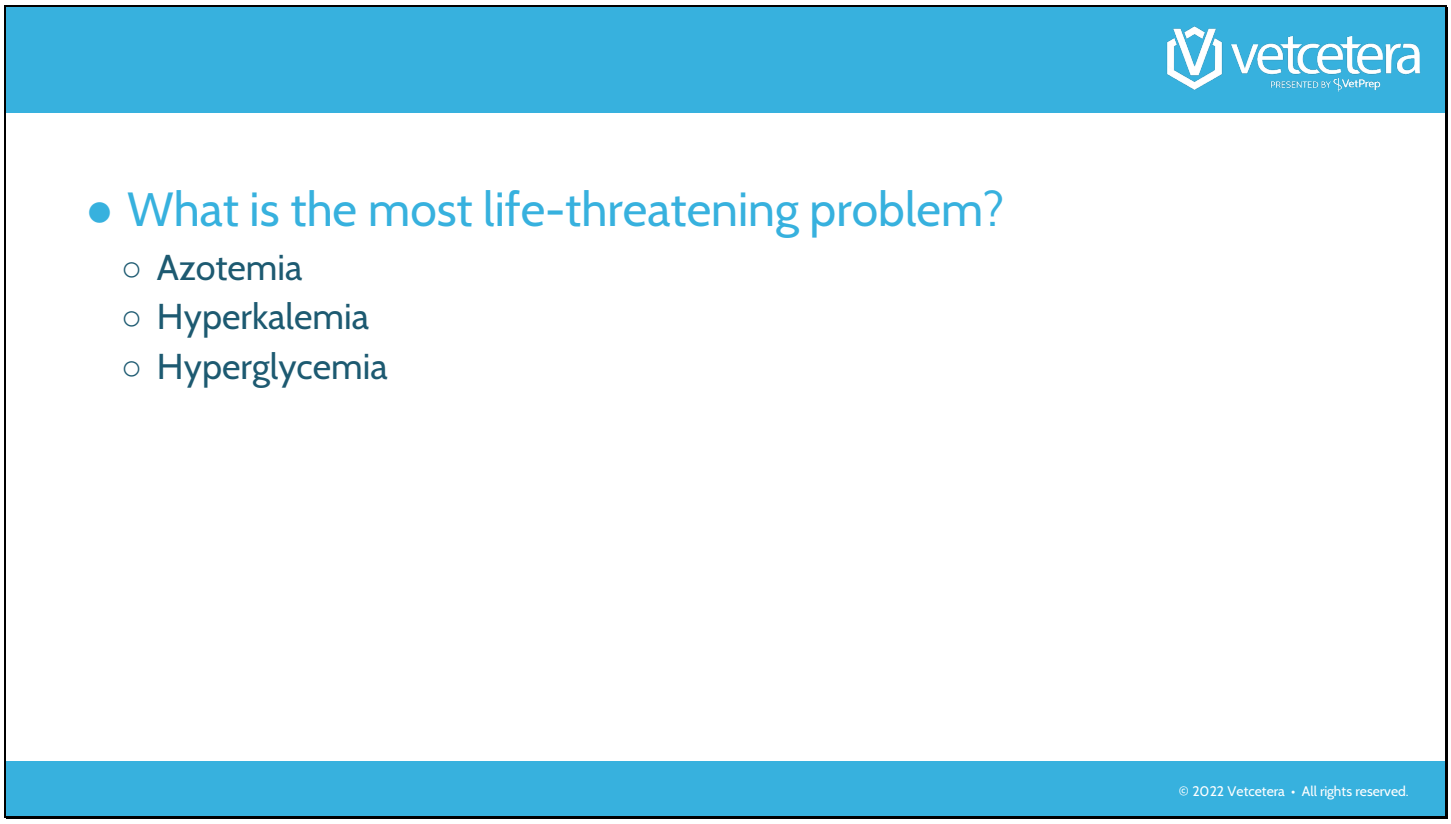
All right, so what's our updated problem list at this point? So we have some bloodwork back. We have some other diagnostics back. And, again, I, would try to prioritize what's going to kill Oliver first and then what's going to be stuff we cannot think about at this very moment.

Yeah, so he's hyperkalemic, he's still shocky, we haven't really-- we've started fluids, we've started warming. He's blocked, he's azotemic. So, again, I kept the shock at the top. I think the hyperkalemia is also very likely to be something that we need to be treating now, the bradyarrhythmia, the azotemia. The is azotemia is really scary, when we look at the bloodwork and it won't even give us a number, but, really, we're going to fix that.

Hopefully that's going to come down as we treat him with fluid therapy and unblock him. It's probably not going to be the thing that kills him. He probably doesn't feel great from it. Hyperglycemia, I like that someone said obese. Yes, we can talk to the owner maybe about a diet change and maybe a little more engagement with Oliver. And then, feeling urethral obstruction or inexpressible bladder.

So great job. Again, I agree the shock and the hyperkalemia, for me, are what I worry about the most.

Slide 15



And then, just a follow-up, so out of these, we, just really answered this but the life-threatening thing out of this list is going to be the hyperkalemia. That azotemia is really informational.

Again, if I had to pick, if I got a drop of blood and could only do either a potassium or a BUN creatinine, I would do a potassium. The azotemia is really just nice to track, but it's not going to change what we're doing in that initial 15, 20, 30-minute acute treatment. And then, the hyperglycemia, again, this is a cat. He's very close to death. His stress, his cortisol and epinephrine are through the roof. So he's hyperglycemic, no surprise there, so, yes, the hyperkalemia.

Slide 16

Treatment Priorities

- Treat the life-threatening electrolyte abnormalities
- Fluid therapy
- Relieve the obstruction
- Supportive care
  - Pain medication
  - Anti-spasmotics

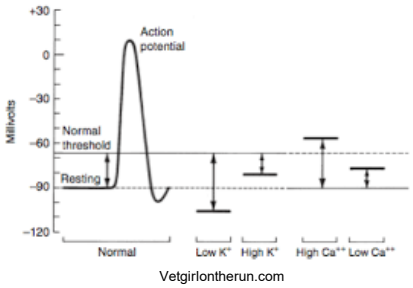
So for treatment priorities, again, I think, intuitively, it seems like the first thing we should do is pass a urinary catheter, but really, for cats like Oliver, the first thing we need to do is treat the life-threatening electrolyte abnormalities and get him more stable. Fluid therapy. and then relieve the obstruction and then think about supportive care.

Whoever said pain meds early though, I agree. I probably would include some pain meds earlier than now. So maybe with that initial triage, I would think about something, but definitely continuing supportive care, like pain meds. And then we'll talk a little bit about antispasmodics, like prazosin. And I would love to hear your guys' thoughts and what you guys are doing. So we'll talk a little bit about other things we could try, at least, too.

Slide 17

Treatment of life-threatening electrolyte abnormalities

- Calcium gluconate 10%
  - 3 ml/cat slowly over 5-10 minutes
  - Monitor ECG during administration
  - Fast acting (seconds to minutes); lasts for 20-30 minutes
  - *does not change serum potassium levels



Vetgirlontherun.com

So I'm a big fan, for hyperkalemia, of calcium gluconate. That's my treatment of choice. I like it because it works really fast. So it works really, really quickly, in seconds to minutes. And it buys you about a 20 to 30 minute window, which is nice, because in most cases, I feel like that's enough time to unblock these guys.

It's also nice, because you don't have to do any math. So, for me, if you have an average size cat, the treatment dose is really going to be about three mls per cat. Obviously, if it's a giant Maine Coon that weighs 40 pounds or a dog, we'll have to calculate out our dose, but for an average house cat, three mls per cat is usually a good place to start.

So what we'll do is we'll have them hooked up to the ECG. We'll have someone give it slowly, over about five to 10 minutes. And then, we should see the ECG change pretty quickly. The thing about calcium, though, to remember, is it's not going to actually change the level of potassium in the blood.

So if I give calcium, the cat becomes more stable. And I recheck bloodwork, it's going to be exactly the same. I'm not doing anything to change the potassium. All I'm doing is changing the action potential. So I'm changing the threshold potential. So, basically, when you have a really high potassium, so, like in this fun little chart.

So, normally, our resting potential is about -90. it comes up and is less negative with a really high potassium. So the space between the resting and the threshold potential decreases. So the heart gets

really hyperexcitable. So what we want to do is restore that gradient, so we increase the threshold by giving calcium and increasing the amount of calcium.

So we're not actually changing the potassium concentration in this cat, we're just going to buy us some time. So, again, it works really fast. It's something, usually, that's in a crash cart. Again, the big thing is just to give it slowly. If you push calcium really fast, that will probably kill Oliver. So we just want to make sure we're giving it slowly.

Slide 18

- Insulin/dextrose
  - 1-unit regular insulin IV
  - 1 ml/kg 50% dextrose IV (diluted)
  - Slower onset (10-20 minutes); lasts 2-6 hours
  - Pushes K^+ intracellularly
  - Monitor blood glucose for several hours
    - Dextrose CRI

https://commons.wikimedia.org/wiki/File:Human_insulin_100IU-ml_vial_yellow_background.jpg

And then someone said insulin, so that's also a great choice. So I think a lot of these initial treatments are going to be, what are you comfortable with and what have you tried and what have you not tried. So I'm a calcium fan, but I definitely will also do insulin and dextrose.

So, for most cats, I'll give one unit of regular insulin IV and then about a ml per kg of dextrose diluted IV. It does take a little bit longer, but it does last longer, which is nice. And it will actually change your potassium level, so it's going to actually push potassium into the cells.

The reason I don't like insulin dextrose, sometimes, is because when it gets really busy, I feel like this can fall through the cracks. But if we give insulin, we give a dextrose bolus, we need to continuously, at several intervals, monitor the glucose, because it's probably going to not stay up from that one bolus of dextrose. They probably need a CRI.

So I've definitely had cases where we've done insulin dextrose and then, a couple of hours later, the technician is like, hey, that cat looks really terrible. We check a glucose and it's 40 and it's totally my fault, because I forgot to put them on a CRI. So I like calcium, because I'm forgetful. And, when it's busy, it's just one less thing I have to worry about, but certainly this works as well.

Some people will give dextrose alone and try to stimulate the pancreas to release insulin. I find, in really critical cats, that's usually not enough. So I'm going to do either calcium or insulin dextrose.

Slide 19

- Beta agonist (terbutaline, albuterol)
  - Fast onset (3-5 minutes); lasts 1-4 hours
  - 0.01 mg/kg IV terbutaline or 1-3 puffs albuterol inhaler
  - Pushes K^+ intracellularly

https://www.allivet.com/p-9012-terbutaline-sulfate-injection-1-mg-ml-1-ml-vial.aspx?sku=51262

And then someone said a puff of albuterol, which I also think is great. So this is maybe, I would say, like a new-er thing. When I was doing my residency, we didn't do this. But you can give a beta-agonist to push potassium into cells, as well. So you can give something injectable, like terbutaline, or you can give a puff of albuterol, if you have an albuterol inhaler around.

This will work relatively quickly, so within about five minutes, and lasts a few hours. Same concept as the insulin, it's going to push potassium into those cells. So this is a great option, too. And I think it's one of those things, if you've tried it and it worked and you were happy, great. If you haven't tried it, maybe something to try in the next case.

And you can certainly combine therapy. So if you have a cat like Oliver, this cat obviously is in really rough shape. Maybe I give some calcium and then maybe I also give a little bit of terbutaline or something on top of it. Someone asked about bicarb. So I probably can count the number of times I've given bicarb on one hand, my whole career. Bicarb will help. So, I mean, same concept, it's going to basically push potassium into cells, as hydrogen ions come out.

The problem is, it's really easy to overdose bicarb and create an alkalosis. So it just has more side effects. So I try to use-- the order I gave is the order I usually pick drugs in. It's not a wrong drug to use, it's just one of those things. You have to be really conservative, because it's really easy to go too far in the other direction. So I usually use calcium, or insulin dextrose, or a beta-agonist, or, potentially, multiple, in these really, really terrible cases.

Slide 20

Fluid Therapy

- Type of fluid?
- Amount?
  - Initially, treat for shock
  - After stabilization, ins/outs

https://www.walmartpetrx.com/p-2831-normosol-r-electrolyte-bag-1000ml

Original Study

Journal of Veterinary Emergency and Critical Care 18(4) 2008, pp 355–361
doi: 10.1111/j.1476-4431.2008.00328.x

The influence of crystalloid type on acid–base and electrolyte status of cats with urethral obstruction

Kenneth J. Drobatz, DVM, MSCE, DACVIM (Medicine), DACVECC and Steven G. Cole, DVM, DACVECC, DACVIM (Cardiology)

And then, fluid therapy. So type of fluid. So, I think, for a long time we always gave saline, just regular saline, to these cats, because they already have a really high potassium. We didn't want to give a fluid, like Normosol or LRS that had potassium in it.

But Ken Drobatz and the fine folks at Penn did a nice little study, just looking at, does it really matter if you give something that has potassium in it? And the long story short is, it really doesn't. What they found was it didn't really change how fast the potassium came down. It certainly didn't make it go up anymore. And it actually resolves their acid base status faster, because these are alkalinizing versus acidifying, like saline.

So, for me, the amount of potassium in these fluids is so low, when you think about, it's diluted in a liter of fluids, compared to serum potassium. So, for me, I almost always use balanced-electrolyte things, like Normosol or LRS. Very rarely do I ever give saline. Again, it's very, very specific conditions.

So, for me, I usually give Normosol. It's certainly not wrong to give saline. This cat obviously needs some volume. We need to start diluting out that potassium. So if that's what you have, that's totally fine. You just shouldn't worry about giving something that has a little bit of potassium already in it.

And then, amount. So, initially, treat for shock. Again, I'm usually really, really wimpy and conservative in the beginning, just because I know cats that are cold are really easy to overload. So I'll just really titrate

to some nice normal end points of perfusion as I'm warming them up. Once they reach about 98.5, 99, I will feel a little bit more comfortable about being more aggressive.

So if he hits 99 degrees and he's still, I think he's hypovolemic. His blood pressure is not great. Maybe then I'll give five or 10 mls per kg, but I'm pretty wimpy with fluids. I think fluid therapy is one of those things we can probably talk for 10 hours about, but really it's a drug. I think we give fluids a lot more liberally than a lot of other drugs, but we should think about it the same way, because it does have potentially negative side effects, depending on the case.

And then, after stabilization, I'm a big fan of doing ins and outs with the urinary catheter, which we'll talk a little bit more after a couple of slides.

Sedation

- Based on stability of patient
- Severity of clinical signs (i.e. bradycardia)
- Severity of electrolyte abnormalities

And then sedation, so again, everyone's going to have a preference. So the ones I list are not the ones you have to use, it's just what I like using. But really thinking about the stability of the patient. How severe their clinical signs are, how much sedation do they really need.

So a cat like Oliver probably doesn't need ketamine and Valium, he can probably just get away with something much more mild. And then, severity of electrolyte abnormalities.

Slide 22

Sedation

- Typical, stable case
  - Buprenorphine 0.01 mg/kg, ketamine 2-5 mg/kg, midazolam 0.2 mg/kg
  - Buprenorphine 0.01 mg/kg, alfaxalone 1-2 mg/kg (or propofol)
  - Coccygeal epidural
- Critical case
  - Minimal if any systemic sedation
  - Coccygeal epidural
  - Buprenorphine 0.01 mg/kg +/- 0.2 mg/kg midazolam

So, again, these are not like, this is all you can do. These are just things that I like doing.

But, for me, for a typical stable case, maybe he got buprenorphine when he came in for some pain management. For a typical stable case, I like ketamine and midazolam. I love alfaxalone, I think it's a great drug. So I'm a big fan of alfax in cats. I usually combine it with either buprenorphine or butorphanol.

And then, I love coccygeal epidurals. I'll talk about that a little bit more on the next slide. But if you guys haven't been doing these in some of these cats, they're really helpful as an adjunct analgesic. So it's going to be a local nerve block. So it's not going to be anything systemic, but it's really going to cut down the amount of systemic drugs you have to give. So if you have a case that maybe isn't very stable or has concurrent disease, you can be a little less-- you can lower your dosing, in terms of systemic drugs. And then, for critical cases, so this guy, maybe we gave him a little buprenorphine and then we did a coccygeal epidural and that's really all he needs, because he's completely out of it. So, again, just looking at it case by case.

Again, everyone has drugs that they like, that they feel more comfortable with. Really, it's just thinking about, how stable is this cat? How much sedation does he really need? Is this a case that I've been trying to unblock for an hour that I need to put under general anesthesia or is this a case that I only need a few minutes and I could do buprenorphine and ketamine midazolam. So just thinking about each case uniquely.

Slide 23

Coccygeal Epidural

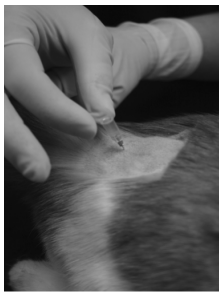
- Adjunct to systemic sedation
- Provides anesthesia to perineum, penis, urethra, colon, anus
- Works quickly and lasts up to an hour
- Minimal supplies

Brief Clinical Communication

Journal of Veterinary Emergency and Critical Care 21(1) 2011, pp 50–52
doi:10.1111/j.1476-4431.2010.00609.x

Coccygeal epidural with local anesthetic for catheterization and pain management in the treatment of feline urethral obstruction

Angela K. O'Hearn, DVM and Bonnie D. Wright, DVM, DACVA



So coccygeal epidurals, so these are really, really nice. And it's nice because there's no special equipment that you need, it's really easy to do, and they're really safe. So there's not a lot of risk if you're doing it right. So, basically, what you're doing is, you're palpitating between the sacrum and the first coccygeal vertebrae.

So if you pull the tail up and down like a lever, a little space will open up. So that's what they're showing in this first picture with their gloved finger. They're feeling for that space. So as you pump the tail up and down, you'll feel that sacral coccygeal space open up and that's where we're going to aim for.

The nice thing is, it's going to provide anesthesia to the perineum, the penis, the urethra, and the colon. And it's going to work really quickly. So within about 10 minutes, you'll know if you've hit the right spot. And it's going to last about an hour. So again, hopefully that's enough time to get him unblocked, hopefully make him more comfortable if he has a lot of urethral inflammation and spasms.

And, really, the supplies are minimal. So in the second picture here, all you really need is a 25 gauge, one inch needle and then a one cc syringe. And then some preservative-free lidocaine. So something that you would use for an epidural, not the lidocaine that's been in the crash cart that everyone is grabbing for arrhythmias.

But, essentially, you're just holding it, almost like you'd hold a pencil. You're feeling for that space. I am right-handed, so I feel for the space with my left hand. And then, I direct the needle, cranially, at the

angle of a pencil with my right hand. And you should feel a little pop through the ligament and flavum. So you should actually feel, OK, I just went through that space.

You would aspirate back, make sure you don't get blood, and then you would give, it's 1/2 cc per cat, of preservative-free lidocaine. It should go pretty minimally with no resistance. It's hard to tell if you're in the space, because you're not going to get fluid back. It's very far caudal, so you're not going to get CSF or anything and you're not going to get a negative drop, like you would if you were doing an epidural.

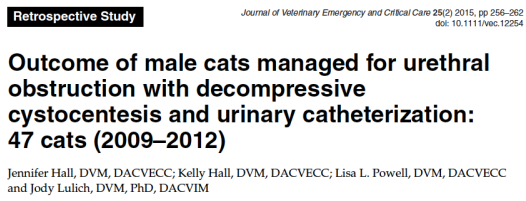
But, basically, what will happen if you hit the right spot, is about 10 minutes later, their tail will become really flaccid and their anus will dilate really, really big. So if you look in 10 minutes, that's what you should notice. You can repeat it a second time if you don't see the results you want, but after that, it's usually not recommended. Because if we push too much lidocaine cranially, we could actually anesthetize, essentially, those nerves of the diaphragm and the other respiratory muscles.

But there's a really nice JVECC article just demonstrating it. And if anyone subscribes to VETgirl, she has a really nice video, actually doing it on a cat. So I'm a big fan. I think they're really nice. If this is a minimally sick cat, you'd probably have to sedate this cat first and then do this, but, for Oliver, maybe a little buprenorphine and then the epidural is enough. He might not need any other sedation.

Slide 24

What about decompressive cystocentesis?

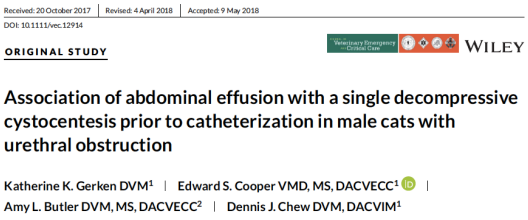
- Pros
  - Sterile sample for culture
  - Patient comfort
  - May relieve 'back pressure'
  - May ease catheter placement
- Cons
  - Potential uroabdomen?
  - Potential hemoabdomen?
  - Bladder rupture?


Retrospective Study

Journal of Veterinary Emergency and Critical Care 25(2) 2015, pp 256–262
doi: 10.1111/vec.12254

Outcome of male cats managed for urethral obstruction with decompressive cystocentesis and urinary catheterization: 47 cats (2009–2012)

Jennifer Hall, DVM, DACVECC; Kelly Hall, DVM, DACVECC; Lisa L. Powell, DVM, DACVECC and Jody Lulich, DVM, PhD, DACVIM


Received: 20 October 2017 | Revised: 4 April 2018 | Accepted: 9 May 2018
DOI: 10.1111/vec.12914

ORIGINAL STUDY

WILEY

Association of abdominal effusion with a single decompressive cystocentesis prior to catheterization in male cats with urethral obstruction

Katherine K. Gerken DVM[1] | Edward S. Cooper VMD, MS, DACVECC[1] | Amy L. Butler DVM, MS, DACVECC[2] | Dennis J. Chew DVM, DACVIM[1]

And then, a lot of the times we talk about, what about a decompressive cysto? I think there's a lot of fear around exploding bladders and other things that might potentially happen. So I'm a fan. I think the big thing for me is, if I'm going in for a decompressive cysto, I'm doing it once and I'm emptying out the whole bladder.

So I'm setting up with a catheter, a stopcock, an extension set, a friend. We're going to drain the bladder. We'll save some for culture. This is great, maybe in a more stable case, where 15 cases have just come in at the same time and this is not the most critical case. So maybe we want to empty the bladder, buy us a little time, before we go back and unblock him.

It's definitely going to make them more comfortable, maybe relieve back pressure, and maybe ease catheter placement. That's really not something that's been proven, it's more of an anecdotal thing. And then, I think, again, for cons, we worry a lot about bladder rupture and uroabdomens and hemoabdomens. And the good news is, there's been a bunch of studies.

So the Ohio State does a ton of research on blocked cats. That's one of their things that they do. And they did this really nice study looking at cats. Essentially, when they came in, all the cats got an ultrasound, so just a quick, point-of-care ultrasound. And then they did the cysto and then they looked again.

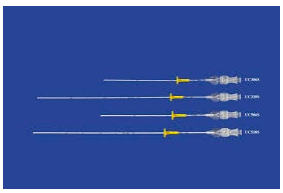
And what they actually found was, a lot of cats have free fluid before the cysto. The significance is not known. It's not urine. So, definitely, for peace of mind, I like to scan these cats before my cysto, so I don't go back and scan them and then worry that I created that urine.

And, again, if you're just doing it one time, the bladder is not going to pop like a balloon. Potentially, anything can happen, but none of these cases have any problems. It's not typically something that we really, really worry about. I think, conceptually, we worry about it, but actually, with these cases, it's not something that we see. So go ahead and feel comfortable doing that. I would say, again, just do it once and empty the bladder as much as you can. So have everything set up and just go for an empty bladder.

Slide 25

Unblocking

- Lube is your friend!!
- Patient must be fully sedated/anesthetized!
- Catheter selection
  - Softer to minimize inflammation
  - Smaller?



Milainternational.com

Initial treatment factors associated with feline urethral obstruction recurrence rate: 192 cases (2004–2010)

Peter F. Hetrick, DVM, and Elizabeth B. Davidow, DVM, DACVECC

JAVMA 2013

And then unblocking, again, I think everyone has their tips and tricks. I really like these Mila catheters. They have a stylet in them that you can flush through, so they're very rigid, but then when you pull the stylet out, they're very soft. So they can be left in place. You're not switching out a more rigid catheter for a red rubber. So you can just leave in the catheter that you get.

The big thing is going to be, lube is your friend. The patient has to be fully sedated or anesthetized. If we're fighting a cat doing this, it's probably not going to end up in a really good place. The softer catheters are going to be better. So, again, trying to leave something in that's like a red rubber or, again, these Mila catheters.

And then, a lot of the times, we'll try to go for maybe a smaller catheter. So for most cats, I'll put in a 3 and 1/2 French. If it's a giant cat and the 3 and 1/2 French seems laughable, then I'll do a five. But we try not to create any additional trauma. So trying to be aware of the size of the cat, the size of the urethra, and starting small and then maybe going to a five if you need to.

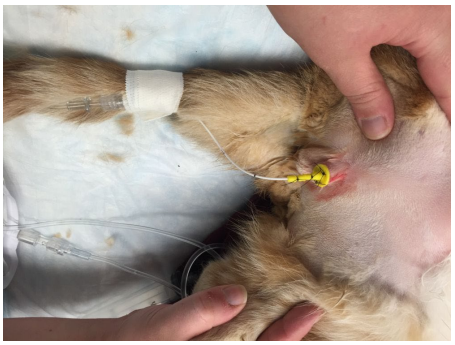
But, again, I don't work for Mila, but I think these catheters are really nice. They also have this little yellow doohickey that you can-- it's a circle with little holes in it, so you can suture the little circle right to their prepuce and then you don't have to worry about making a tape butterfly or anything MacGyver.

You can just use that. And it slides up and down the catheter, so you can adjust it depending on the size of the cat. So I'm a big fan of those. I hate having to switch out the catheter once you get it in for something else. So I really, really like those.

Slide 26

Unblocking

- Clip hair in perineal area, prepare skin aseptically
- Extrude the penis, retract caudally to straighten urethra
- Advance catheter to site of obstruction
- Flush, flush, flush
- Secure to prepuce!
- Attached closed system
- Lateral radiograph
- E-collar!



Milainternational.com

So for these guys, again, I think everyone has a different way of doing it. I am right-handed. I put them in lateral when I do them and I extrude the penis myself with my left hand and then pass the catheter with my right hand. I've seen people put them on their back with their legs pulled up. So whatever works for you. There's no right way to do it. I think the big thing is trying to do it aseptically.

Having a friend extrude the penis or extruding yourself to really get rid of that bend and really straighten out the urethra. Being gentle, so I always warn owners about urethral tears every single time, because I feel like the times where it slips my mind are the times where we accidentally do that. So advancing the catheter to the site and then flushing really aggressively, securing it, and putting an e-collar on immediately.

I've definitely seen cats that you think are sedated, they wake up and the first thing they do is just immediately turn around and rip out their U-cath. So before they even wake up, I like to have it sutured in, e-collar on, and then attached to a closed system. So, again, to keep it sterile, but also to monitor how much urine they're making.

These cats can be incredibly polyuric. So, for us, it's going to be important to know how much urine are they actually producing, so we can match our fluid rates and make sure that we're not getting behind. And then, I'll usually take, at least, a lateral X-ray. Stones are pretty uncommon in these cats, but before we move too far forward, I want to make sure that it's not bladder stones or urethral stones. And then

just see where the catheter's tip is sitting, make sure I'm happy with it and make sure there's nothing else going on.

So I'll usually do my radiograph then, surely you can do them before the catheter placement, if you have a stable cat. The catheter being introduced will introduce a little bit of artifact. You might see air in the bladder that wasn't there before or shouldn't be there, but it's not usually a huge deal. And, again, with a cat like Oliver, I'll usually do my X-ray after I have the catheter in.

And then, a question about flushing. So I think it's nice to flush out the bladder with sterile saline to try to get out any-- if there's lots of red blood cells, or crystals, or other debris plugs that are in there. So I like to flush it out a little bit. So once the catheter is placed, I'll flush in a few syringes, empty it back out after I get my sterile sample for culture. And that way, I don't have to, hopefully, worry about the catheter obstructing and the urine, hopefully, will be a little bit more clear as it's coming out.

You don't have to do that, but I think it's nice. And, sometimes, if the catheter gets obstructed, it's not twisted or anything, the line's not twisted, I'll just flush the catheter, too, and make sure there's not like a little plug sitting on the end of it.

Slide 27

Atracurium?

- Neuromuscular blocking agent
- Given 4mls intraurethral before unblocking
- More cats unblocked on first attempt and reduced time to unblocking

Effect of intraurethral administration of atracurium besylate in male cats with urethral plugs

F Galluzzi, F De Rensis*, A. Menozzi* and G. Spattini

JSAP 2012

And then, atracurium, I have actually only done this a couple of times, but there's one paper that I could find and it's pretty promising. I'm not sure if a lot of people are doing this, but atracurium is a neuromuscular blocking agent, so a paralytic.

So in this paper, what they do is, they give cats 4 mls in their urethra before they unblock. And they actually found that they unblocked the cats faster and, more times, on the first attempt, than they did if they didn't give atracurium. So something to consider, maybe it's a challenging unblock and you've been trying and someone else has been trying and it's not happening. So it would definitely be something I would try before maybe giving up, or placing a pigtail directly into the bladder, or something like that.

I've only used it in cases where I've really struggled. So it would be interesting to have-- this is a pretty small study, to have a bigger study, where we actually-- should we be doing this in more of those cats on initial presentation, because maybe we'll create less trauma and less inflammation and maybe decrease the risk of them blocking again. So something to think about.

Slide 28

Post Obstructive Care

- Post obstructive diuresis
- Urinary catheter care
- Pain medication
- Electrolyte/fluid monitoring
- Urethral relaxants

So for post-obstructive care, these cats are super, super, super polyuric. There's a lot of cases that I've had on fluid rates of like 80 mls an hour, 100 mls an hour, and I think this is a great communication point with technicians and doctors, explaining why they're on a high fluid rate when we're used to seeing cats on rates of maybe 10 or 15 mls an hour. U-cath care, pain meds, electrolyte fluid monitoring, and then urethral accidents. So we'll go through these a little bit more in detail.

Post Obstructive Diuresis

- Typically, proportional to degree of azotemia
- Very high volumes of urine
- Monitor 'ins/outs'
  - Replace urine volume + ~22 ml/kg/day for insensible losses
- Adjust fluids to match urine output
- Taper when azotemia resolves
- Monitor electrolytes (~q24h)

But a lot of cats, so about half of cats, will have a post-obstructive diuresis. And it's usually going to be cats like Oliver, that are super azotemic. So it's proportional to the degree of azotemia. So a more mild cat with a BUN of like 40, probably is not going to be super polyuric, but a cat like Oliver probably is. And they're going to be making ridiculously high volumes of urine.

So, again, they're going to be making 80 mls, 90 mls, 100 mls per hour, sometimes even more. So what I like to do is monitor ins and outs. So what I try to do, it's sometimes challenging to figure out a way to write this on the treatment sheet, but, I think, again, trying to communicate with the technical staff, what I usually like to do for these really, really azotemic cats is actually monitor and measure their urine output every two to four hours. And then change the fluid rate to match that every two to four hours, as well.

And I'll only do this until their azotemia resolves. So, again, the initial maybe 24 to 48 hours, they may be on these crazy-high rates. Once their azotemia resolves, then I'm going to try to taper their fluids. We can't just cut off the fluids, because we're giving so much that it's probably going to be hard for them to match that with just oral intake and they may get dehydrated and hypovolemic. So we want to give them a chance to concentrate their urine again.

So, again, there's no formula or perfect system to do this. What I usually do is just drop their fluid rate by about 25% every 12-ish hours and make sure they're not getting behind with fluids. So monitor their body weight, monitor their PCV and make sure they're not getting dehydrated.

And then I'll usually check electrolytes every 24 hours or so, depending on the case, because we know, even though this cat Oliver was very hyperkalemic, he's probably actually going to end up needing potassium supplementation in the hospital. So every day-ish, maybe more, depending on the case, but that's usually a reasonable.

Slide 30

Other Supportive Care

- Pain management
  - Buprenorphine
  - Pure mu?
  - Avoid non-steroidal anti-inflammatories
- Urethral relaxants
  - Prazosin? 0.25-1 mg/cat orally q8-12 hours
  - Acepromazine
  - Phenoxybenzamine

https://www.californiapetpharmacy.com/prazosin-1mg-per-capsule.html

And then, other thing, so pain management. So, again, I think pain management is super important in all our cases. I'm sure this is a very uncomfortable disease process. I think buprenorphine, for a lot of these guys, seems to be enough. They seem comfortable, and they eat. There are cats that I've put on fentanyl or hydromorphone or methadone, but I think, most of the time, I'll do buprenorphine.

I really try to avoid nonsteroidals in these cats. With the blockage, they can actually get some intrinsic renal damage if there's actual crushing of the nephrons. And sometimes that's hard to know until days to weeks later. So I try to avoid, even something like Onsior, until maybe down the road or at all. And buprenorphine, you can do gabapentin, I think it's nice if they're really anxious in the hospital and someone--

Yeah, yeah, so I love-- someone just asked that, so that's why I laughed, but yeah, I think gabapentin is awesome. I think it's a great drug. I think you can use it in place of buprenorphine. I think the challenge with gaba sometimes is, it's oral.

Buprenorphine, at least initially, we can do injectable and maybe send of them home with either gabapentin or transbuccal buprenorphine. But, yeah, gabapentin is a really great drug. We use it a lot in our personal cat when we have to cut his nails. And I'm a big fan. So I think that's a great call out.

And then, urethral relaxants, so if anyone wants to chime in the chat, I'm curious how many people are using something like prazosin. There's a big study going on right now at Tufts, where they're gathering a

bunch of data from different institutions, different schools, they sent out a call on the LISTSERV, to try to see if it really makes a difference, because we all give it, but does it really matter?

And right now, what they're finding preliminarily, is it doesn't actually matter, it doesn't seem to do anything. So I agree, someone said they use it once they're eating. Sometimes I'll just send it home with them. I try not to make it a stressful thing that happens in the hospital.

So sometimes I'll just send it. If you can get this in the cat once you're home-- it's not a hill I die on, just because, again, there's not really good evidence. And, hopefully, I'm not sure the timeline for that Tufts study, but the goal is for them to have hundreds and hundreds and hundreds of cats, potentially thousands of cats, to really have numbers to say, there's really no evidence that it does anything to prevent them from reblocking or anything.

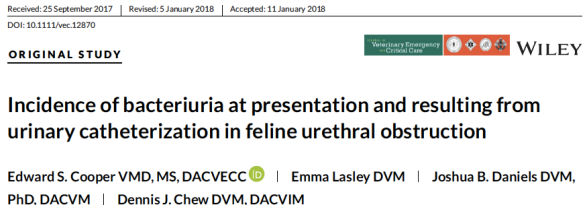
If you use it though, again, I use it a lot of the time. I'll usually do it when they go home and not try to pill them or stress them out in the hospital. You can also use things like Ace or phenoxybenzamine. Phenoxybenzamine is just going to be way more expensive. And then, Ace, obviously, in the hospital, injectable. But, typically, I'll do prazosin, if I do it at all.

Yeah, and you can do IV diazepam. So that's going to be a skeletal muscle relaxant, so I think that's really nice when you're unblocking them initially. It's probably not going to be something we can do long-term, but I think it is nice, maybe for the first 24 hours, if they're having a lot of-- unblock them, you can see them spasming, to try to get rid of a little bit of that spasm. So sometimes I'll do it. I don't do it on every cat. I think maybe sometimes, if I'm really worried, I'll add it in, but that's a good call too.

Slide 31

Other Supportive Care

- Antibiotics
  - **ONLY** if proven UTI by culture



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ORIGINAL STUDY

WILEY

Incidence of bacteriuria at presentation and resulting from urinary catheterization in feline urethral obstruction

Edward S. Cooper VMD, MS, DACVECC | Emma Lasley DVM | Joshua B. Daniels DVM, PhD. DACVM | Dennis J. Chew DVM. DACVIM

And then, antibiotics, so most of these cats-- so, again, this is a paper from Ohio State. The Ohio State, sorry if anyone's from Ohio State. Most of these cats, the incidence of bacteria in this population of cats was zero. So none of these cats when they came in had UTI. They cultured all the cats on presentation, zero had UTI. Some of them developed infection in the hospital, likely from catheter placement, catheter management.

So, typically, it's not going to be something I start right away. It's going to be something where the urine becomes cloudy, or now they're showing signs of SIRS, where they're febrile and tachycardic and I want to rule that out as a source of infection, then I'll get a culture and then I'll treat them, but it's not going to be something that I do as standard initial therapy.

Slide 32

Removal of urinary catheter

- Based on clinical status/signs
- Resolution of azotemia, electrolyte abnormalities
- Clear urine
- ~48 hours average
- Highest risk of re-blocking within first 24 hours

Evaluation for association between indwelling urethral catheter placement and risk of recurrent urethral obstruction in cats

Seitz et al.
JAVMA 2018

And then, removal of urinary catheter. So I would say, on average, they're in for a couple of days. It's going to be based on what the urine looks like. I'd like to have them have normal kidney values, relatively normal potassium. Obviously, that's not always possible, depending on finances and stuff, but ideally the urine would look a lot more clear, the bloodwork would be relatively normal. I don't tend to keep them in the hospital to see if they'll urinate. Most cats do not want to be in the hospital and they're just going to hide in a box and never urinate. So it's not really a good test.

So usually I'll just communicate to the owner, don't follow them around, let them do their thing. But if you're worried, obviously, you can bring them back. The highest risk of reblocking is going to really be in that first 24 hours. So for the first day, having someone home, or having someone, at least, aware that this is what we're really worried about, and then they can, again, always come back. But I don't tend to keep them just for that reason.

Slide 33

Alternative Management?

- Stable cats with K <8, no calculi
- Treated with:
  - Acepromazine, buprenorphine IM
  - +/- medetomidine
  - Decompressive cystocentesis
  - SQ fluids
  - Quiet/dark setting

A protocol for managing urethral obstruction in male cats without urethral catheterization

Edward S. Cooper, VMD, MS, DACVECC; Tammy J. Owens, DVM; Dennis J. Chew, DVM, DACVIM; C. A. Tony Buffington, DVM, PhD, DACVN

JAVMA
2010

And then, there's a paper just talking about alternative management. So I've done this in a couple of cats. I've not been super, super stoked by it, but I think it's really unfortunate when we have to euthanize a young cat that is blocked. So I usually will at least give this a try.

But these would be stable cats. So this is a cat that has a potassium of less than eight, no calculi. So this would be a case where the owner does not have money for a urethral catheter. They don't have money for hospitalization. But these cats are treated with Ace and buprenorphine IM. And then, this is an older paper, so they did medetomidine, but certainly you could do dexmedetomidine.

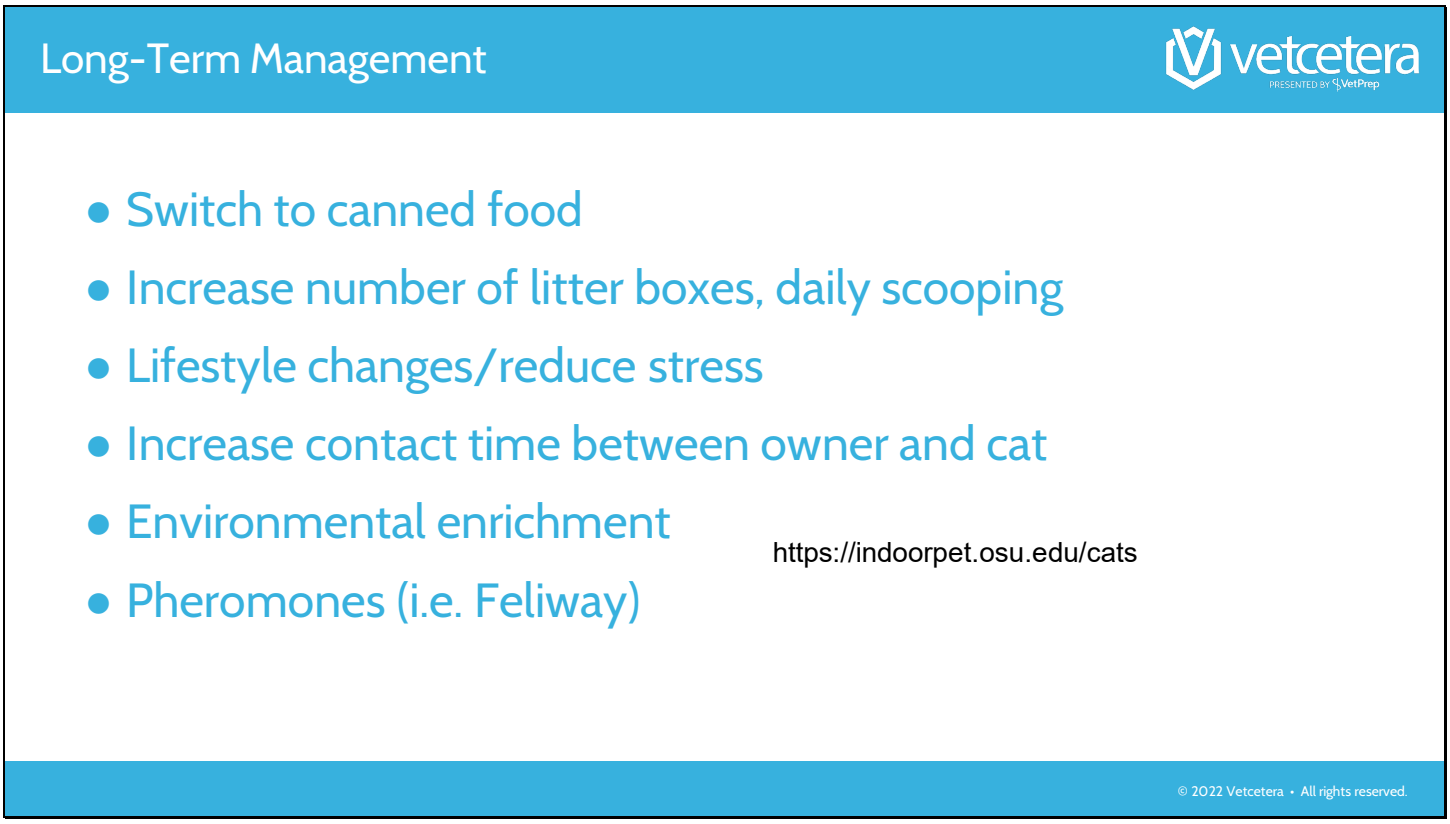
They get a decompressive cysto, sub-Q fluids, and then, essentially, they're placed in a quiet, dark setting. And then they wait for them to urinate. And the success rate wasn't amazing. I believe out of 14 cats, like half were able to urinate and the other half ended up getting euthanized. So certainly something to try.

The other thing sometimes I'll do is, obviously, work with referring vets. Try to find someplace they can go that may be lower cost. Maybe pass a catheter and then just not leave it in. I never feel super good about that, but at least giving them a shot instead of euthanizing and otherwise-- especially if it's a very stable cat. If it's a cat like Oliver, I think it's a harder argument, because it's really going to be an expensive journey to get him to a stable point.

But, certainly in those more stable cases, trying some alternatives. And someone asked about PU surgery. So I don't typically recommend PU for the first time. I will put the vibe out there though, like, hey, this is what happens if your cat keeps blocking, this is probably what we're going to recommend.

By the second time, I'm usually telling owners, you're spending X every time the cat comes in blocked. The surgery for a PU is whatever financially it is, so consider that as something-- instead of spending this much money every time he blocks, maybe we spend this much money more, but then the risk is going to be a lot lower. So I usually put it on the table pretty early.

Slide 34



And then, long-term, I really like ER, because I don't have to do long-term management, but these are cases where I, usually, if I'm the one discharging them, I usually do talk to owners about some things they can do at home. The indoor pet-- the Ohio State web page has all this really nice information. Owners can just go to town reading it. So, usually, I give them that web page. I give them a little handout about things they can do at home.

So I usually recommend switching to canned food, increasing number of litter boxes, daily scooping, lifestyle changes, reducing stress. I'm curious if anyone's going to do a study of cats that got blocked during COVID. One of our cats loves us being home, one of our cats does not love us working from home. So it would be interesting to know if the incidence went up, just from people being around all the time. Increased contact time between owner and cat, environmental enrichment, and then, things like Feliway or other pheromones. And, someone recommended, the AAFP has a great handout.

And I think handouts, that's a really good point. I'm a big fan of not reinventing the wheel. So if you find a resource that you really like, give it out to owners. Don't feel like you always have to retype it and make your own. I use the Ve-- I think it's called Pet Partners, I can't remember, the one that's for owners. There's other websites that are written by vets. So I think that's a great call out.

Slide 35

Back to Oliver

- Treated with:
  - IV fluids
  - Calcium gluconate
  - Coccygeal epidural
  - Buprenorphine
  - Indwelling urinary catheter
  - Supportive care for 2 days

So Oliver, back to our friend Oliver. Yeah, Veterinary Partner, thank you. So he was treated with IV fluids, calcium, buprenorphine, he got a coccygeal epidural. We were able to unblock him relatively easily. And then he was in the hospital with just general, supportive care for a couple of days. So he managed to do quite well with supportive therapy.

Slide 36

Prognosis

- Survival rate ~90%
- Recurrence rate ~11-43%
- Owner communication
  - Perineal urethrostomy?

https://memegenerator.net/instance/38261365/tartar-sauce-the-cat-the-communication-here-excites-me

The prognosis is good. I think the big thing for these guys is it can get expensive. And, again, I always would want to give these cats a shot. I think just being honest with owners, though, that they could reblock the next day and that's always a bummer if they've just spent $1,000 treating them. The recurrence rate is somewhere between 11% and 43%. I usually tell people about a quarter to half.

And then we talked a little bit about PUs. So, again, I usually mention it pretty early on in the conversation, not to push them into doing surgery after the first blockage, but just so they have an idea of, if they block again, like this could be the path we're going down, or at least think about, this could be the path we're going down.

Slide 37

So it looks like we have a few minutes for questions. So I'm going to pull up the Q&A box. And so there's a question, do you unblock right away or wait to stabilize. And then, what is your potassium level to think about an insulin infusion. So definitely would want to stabilize first and then unblock after. I feel like they're more stable.

And it's really not, necessarily, one number of the potassium. So it's not like, oh, if the potassium is over eight, I would give insulin. For me it's more clinical signs. So, is this cat bradycardic with ECG abnormalities? Because it doesn't always correlate to the number. So a lot of the studies looking at potassium and ECG changes were in healthy animals. And in sick animals, it's not always the same. So if I see changes or this cat's bradycardic, then I'm just going to go ahead and give insulin or calcium or whatever your drug of choice is.

And then, if they get rid of the U-cath, do you do it again or wait and see if they urinate? So if they pull it out, which is always sad, I think it really depends on how long it's been in and what's going on with the cat. If they pull it out immediately after it's been placed, I'll probably go ahead and replace it. If it's 12 or 24 hours later and the urine was looking better, maybe I'll wait and see. I think it really depends what the urine looked like before it got pulled out, too.

But I am really, really strict, like as soon as the cat has a catheter in, we're putting an e-collar on that cat We are suturing that catheter in, because I think it's like losing an e-tube after a hard intubation, because

no one tied it in. So that's like, it always has to happen, but obviously things can happen anyway. So it just depends, really.

Does anyone else have any other questions? We have two more minutes left. No, so for the Mila-- so there's a question, do you keep the Mila stylet in to unblock? So you keep the stylet in to unblock. So the nice thing about the stylet, it's in the catheter and it's open at the end, so it's not pointy. So you can flush through the stylet. It's just rigid. And then, once the catheter's in, you pull out the stylet and the catheter itself is really soft, so they're actually really, really nice.

And, again, I don't work for them, but they have some really, really nice products that they've come out with. But it's not any more traumatic than if you use a polypropylene catheter to unblock, that's what it feels like. It's not like a hard, hard metal.

Any thoughts on leaving the U-cath open system in to go home? So I would say no. I would feel uncomfortable with that. I think the risk of an ascending infection is going to be really, really high. And I also think that would be incredibly messy for an owner. I would try to find somewhere the cat can go and, at least, board with a bag attached or some sort of closed system, but I would try my best to not have that be the situation.

Again, it's always hard to euthanize an otherwise healthy, young-ish cat. That I feel like could be a recipe for disaster, though. If something happens to the catheter, or the cat gets like a horrendous infection, or the catheter gets pulled out dramatically, or something else happens.

For the coccygeal epidural, it's a 25 gauge, 1 inch needle. And then, if they arrive stable and with a partial obstruction, is catheter necessary? So if it's a partial obstruction, that might be a case where I just do some-- maybe I give a little IV Valium, maybe give them some prazosin, and put them somewhere quiet and see if they'll urinate, if it's just partial.

Because the catheter itself is going to cause some trauma and increase the inflammation. So if we can avoid a catheter, that's always really nice. So I probably would give that cat a little time.

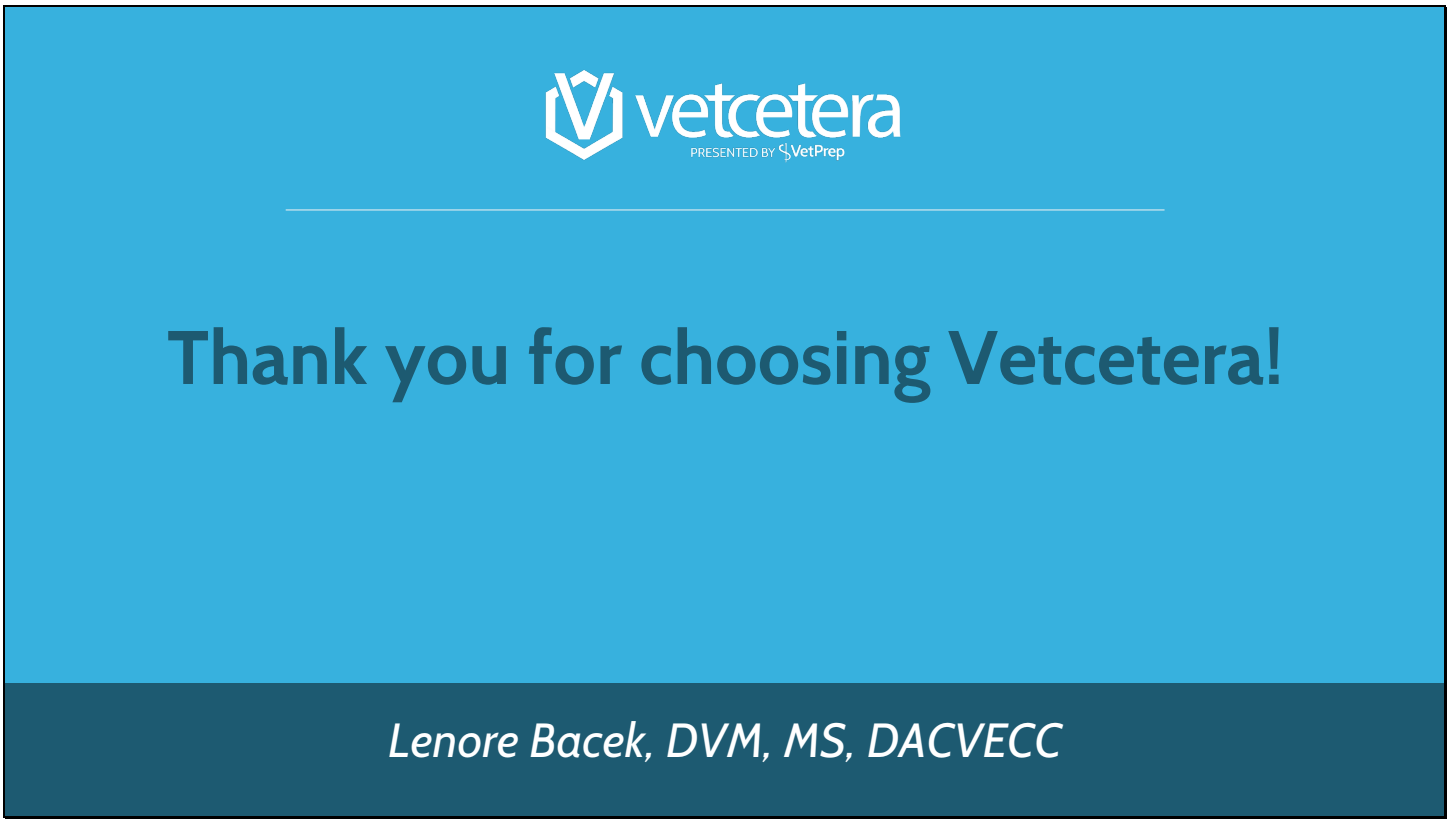
NSAIDS to go home after azotemia is resolved. So I personally don't do any NSAIDS in these cats at all, because even though their azotemia is resolved, we're not going to be able to know what their USG, is because they've been on aggressive fluids and we really won't know 100% that there wasn't intrinsic renal damage.

It's probably fine to do, like a short course of Onsior. I think I'm just super wimpy about NSAIDS, but I would wait until the azotemia resolves, like you said.

Have you used bupivacaine for your coccygeal epidurals? I haven't, personally. You certainly could, as long as it was preservative-free and sterile. It's probably just not going to last quite as long or it's going to last more, I guess, longer.

Alright guys I think that's all we have time for tonight. Thank you so much Dr. Bacek, that was a fantastic presentation. Thank you guys for attending tonight I really appreciated it, I hope you enjoyed it. Bye.

Slide 38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