



Endocrine Emergencies for Veterinary Technicians

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version 1

Instructor: Amy Newfield, MS, CVT, VTS (ECC)

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Prognosis



- Unknown in pets
- People: 10-40% mortality
- Treat aggressively
- Consider I-131 therapy or thyroidectomy once resolved



What's the prognosis for this? It's unknown in pets. We don't see it that often. Again, in 25 years, I've only seen one cat with it. It was because of thyroid carcinoma. We don't see it that often. And obviously, we don't have a lot of data-driven studies on it. And people depending on the literature, the mortality rate is about 10% to 40%, again, a very common endocrine emergency for people.

We do know we want to treat them aggressively. And ultimately, we have to stop the thyroid from being high. That's where we will consider the I-131 therapy or removing the thyroid altogether. But then we've got the flip. Now we've got hypothyroidism, which does need to be treated.

Myxedema Coma



- Rare, life-threatening complication of hypothyroidism in dogs
- Not documented in cats
- In people it's 1: 1,000,000
- Not fully understood



All right, myxedema coma. Now we're talking about the opposite, not hyper- but hypothyroidism. I've never seen this. But we're going to talk about it because it's something that can occur. It's not documented in cats. In people, it's one in a million chance. You're super unlucky.

We don't fully understand why it happens. Again, if you see this in veterinary medicine, you have to write it up in a case report because you're going to be one of the few people ever to see this. It's not even common in human medicine. But it is documented in veterinary medicine. If you get this, you better be presenting this at ACVIM, IVECCS. VMX has case report challenges. Present this as a case report should it ever come your way. Again, I've never seen it.

Results In



Think LOW

Low intracellular T₃ leads to cardiac depression (Bradycardia)

Patient's respiratory function starts to decrease resulting in hypercapnia and hypoxia

Hypothermia

Hyponatremia (see-saw loop to the adrenals)

Hypotension

Low potassium isn't reported

What does this result in? I want you to think low, hypothyroidism. And as we know, the thyroid is the thing that controls the metabolism. We want to ensure that we think everything will be low, with low intracellular T₃ and cardiac depression. We're going to have bradycardia. This dog's heart rate is now 40 or 50 beats a minute.

And unfortunately, we start to see a decrease in respiratory function, which causes a decrease in breathing, which results in hypercapnia and hypoxia. Our end-tidal CO₂ is going to go up. And unfortunately, our oxygenation level is going to go down. Please think about them getting cold.

When we have bradycardia, unfortunately, things aren't getting perfused the way they should; now we're cold. We're going to you usually have this patient around 97, 98 degrees. Hyponatremia, again the seesaw loop of the adrenals. If the thyroid is low, we're starting to see, unfortunately, the low sodium hypotension as well, so again, very low blood pressure.

And interestingly, even though we just talked about it, in veterinary medicine, in the few cases that I could find and look at, low potassium isn't reported. And it's not reported in people. Don't ask me because you would think if we have that seesaw effect; we should be able to have that low potassium or high potassium. We do not see that with that seesaw effect.

Symptoms



Weight gain

Alopecia/thin haircoat

Weakness

Lethargy

Peripheral neuropathies

Coma

In a study of 7 dogs with myxedema coma none were in a coma

We know hypothyroidism in and of itself, especially with our canine species. They've got alopecia, a thin hair coat. They balloon up. The arms are like; I don't know why he's getting so much weight. But this is an exaggeration of this. We see, again, weight gain, that thin haircoat, weakness, lethargy. Now, we see peripheral neuropathy and eventually in a coma.

Now, in a study of seven dogs with myxedema coma, none were in a coma. And I know you're like, but the name says coma, Amy. I get it. But it had all the other signs and symptoms. And since this is so rare, we still say that they have been diagnosed with myxedema coma, even though they're not in a coma, but we're going to say it. In people, they do go into a coma if it's left untreated.

I like to think that when you start having peripheral neuropathies and struggling to walk, you get to the emergency room before slipping into a coma. When you're starting down bradycardias and hypotension, you probably feel bad enough that you're going to check yourself into a hospital. I think the name is slightly misleading because it sounds like everybody should be in a coma. But I think that's sort of like the end stage of this particular endocrine emergency.

Treatment



- Thyroid hormone replacement therapy
 - Levothyroxine IV since they often can't ingest oral
- Empiric use of broad-spectrum antibiotics
 - Bradycardia and hypothermia mask signs of infection
 - One study: 52% of case mortality was associated with sepsis in people
- Manage hyponatremia: Slow administration of hypertonic saline



How do we treat it? We have to go ahead and give thyroid hormone replacement therapy. The thyroid isn't functioning. We usually give levothyroxine IV. They can't tend to ingest anything oral. You're going to go ahead and give that IV. And then we're going to think about broad-spectrum antibiotics.

Interestingly enough, whenever we're dealing with bradycardia hypotension hypothermic patients, it's interesting, but they have a secondary risk for sepsis or secondary pneumonia, or even urinary tract infection. When you become hypothyroid, you are unfortunately considered immune-compromised, more so than when you're in the hypothyroid state, which is very interesting.

But cold as a total side note, hypothermia in and of itself actually can decrease your immune response. You're considered immune-compromised if, let's say, you have a thin ice dog or something like that. Or you know, right now, we're all in summer here in the United States. But if it was wintertime and we had that thin ice dog, those patients experiencing hypothermia are considered immune-compromised and can develop secondary infections. Bradycardia and hypothermias tend to mask the signs of infection. And in one study, 52% of case mortality was associated with the sepsis in people they developed during this myxedema coma stage. We definitely want to get them on broad-spectrum antibiotics. And we're going to manage that low sodium, slow administration of hypertonic saline if they have a really low sodium level.

When dealing with sodium derangements, we want to think about the brain. And we think about swelling or decreasing or shrinking of the brain. And if we change the sodium level too quickly in the brain, that can cause dysregulation, and we can cause it to go to the other end, either shrink or swell too quickly, which, as one can imagine, isn't good for your central nervous system.

Whenever we're putting any sodium in the body, we go slow, and we constantly watch what is that sodium level doing because we don't want to jerk it around too much or we're going to cause central nervous system disturbances.