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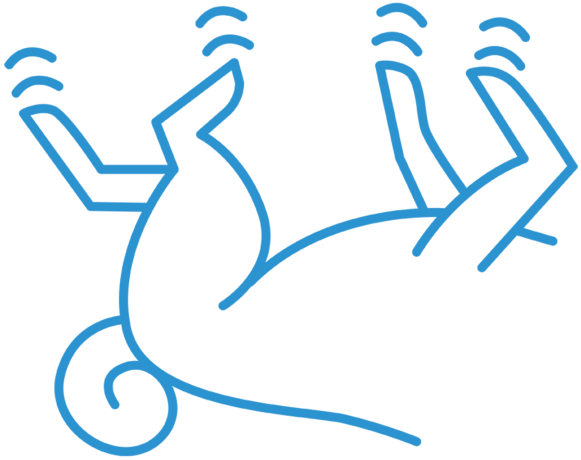

The Clinical Approach to Seizures

DRIP 5

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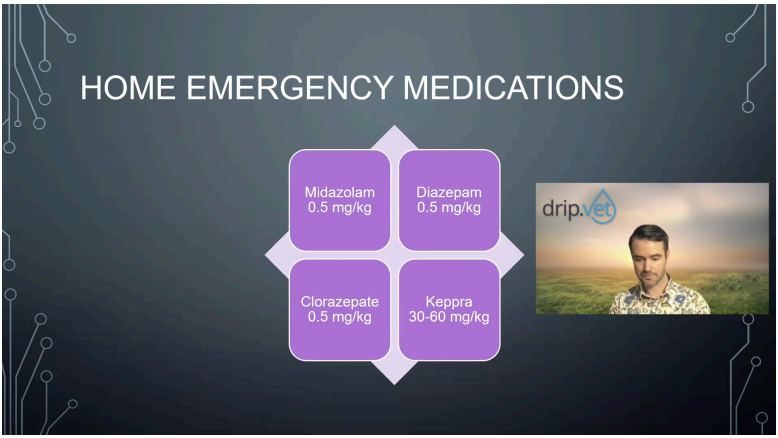
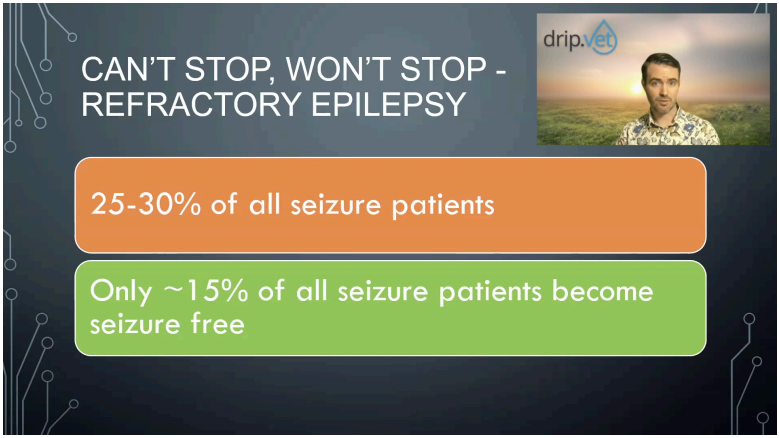
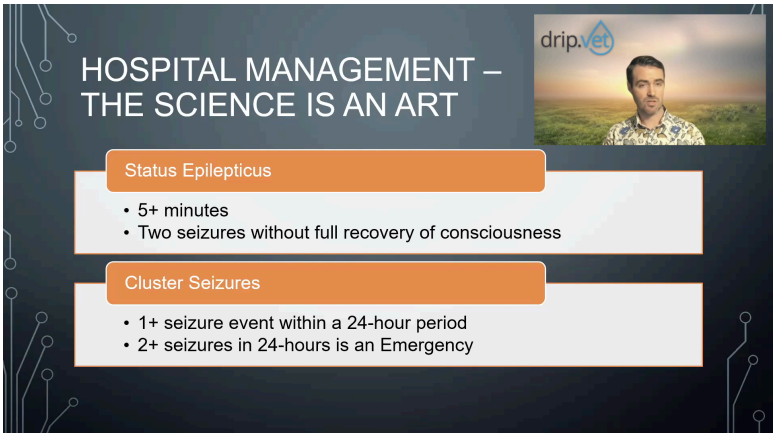


nd so what do we do at home for these medications? I typically will use the top two, diazepam and midazolam, we have fairly good success with it. Some patients do need clorazepate at home in order to help. And then, you can always do a bolus doses of Keppra if the patient is on it in order to try to help with any cluster seizure events that may be occurring.

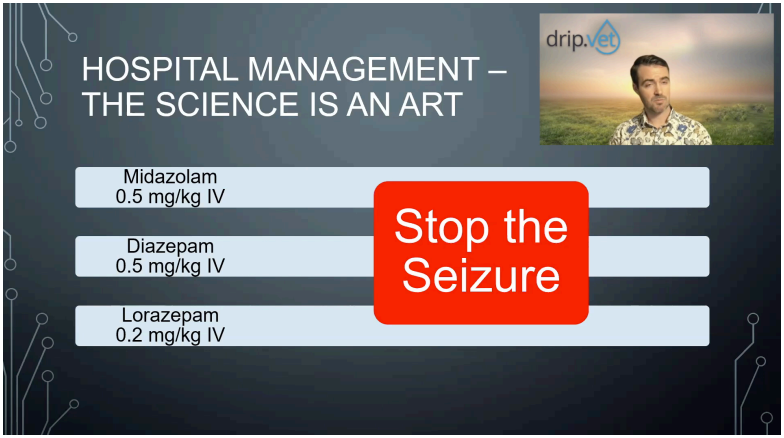


Now, we've got to talk about some of the fun stuff that we have to have conversations with the clients on.

Unfortunately, in refractory epilepsy, this does account for 25% to 30% of all seizure patients. And so that's a pretty large number of patients that are going to be on more than one anticonvulsant. And so always just have that conversation there. Only about 15% of patients actually become seizure free. And so, we don't want to set up expectations that are going to be failing for the patient and the client.

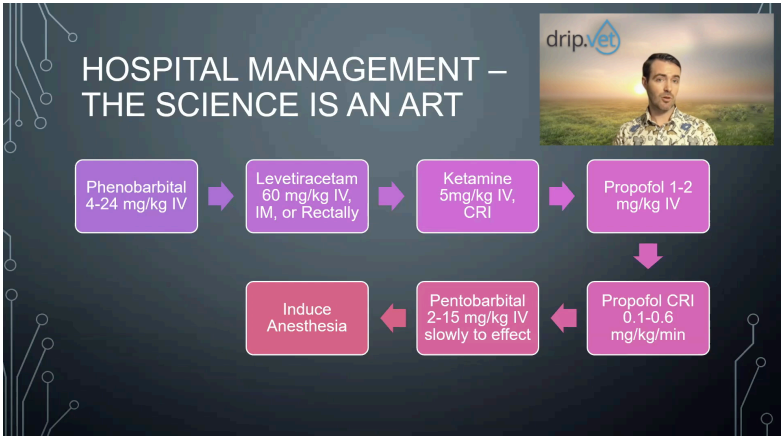


So when do we need to worry about getting them into the hospital? This is where a patient has status epilepticus or cluster seizures. This is when the patient has two full seizures without full recovery of consciousness or that the seizures are lasting longer than five minutes. If the patient has more than one seizure within a 24 hour period, we usually recommend getting the patient evaluated. For some of my patients, if I know they're going to have 2 or 3, then I usually say, OK, that's going to be our benchmark. If they have more than that, then you have to get them into the hospital.



And so in the hospital, what do we do? First thing, we got to stop the seizre. Midazolam, diazepam, or lorazepam, whatever you have sitting around, grab it, give the patient a dose, try to get it in as best you can. If you have midazolam, you can go intranasal with it. If you have any of the others or if you have IV access, then IV access is going to be better for all of these patients.

And then once we stop that initial seizure, we need to hopefully try to stop any more seizure. But let's say they don't respond to those initial doses, what do we do from there?



Well, here's where we're going in order to try to stop some of these seizures. We're usually loading phenobarbital, that's the first thing that I want to reach for when I need to load a patient on a medication. Say, I've given them a dose or two of midazolam, they've stopped but I'm worried about them coming back in the seizures. I give them phenobarbital as an IV dose in order to get it on board.

If that's not working, then I usually have to go to Keppra. You can do 60 milligrams per kilogram IV IM, and you can do it rectally. The liquid is good rectally. There's also a study out there, where you can crush up the tablets, put them in sterile saline and get them rectally in there, and that should help as well. Here is a new paper, it's ketamine. We always think of ketamine as being seizurogenic.

But there's a new paper, where the underlying thought is that over a period of time, we're thinking maybe in the 30 to 45 minute range of active seizuring, that those GABA receptors that our benzodiazepines are acting on actually fall into the background and NMDA receptors become upregulated. So what we found is that by using ketamine in those patients, a 5 milligram per kilogram IV dose or even as a CRI, we've had really good success at stopping those seizures.

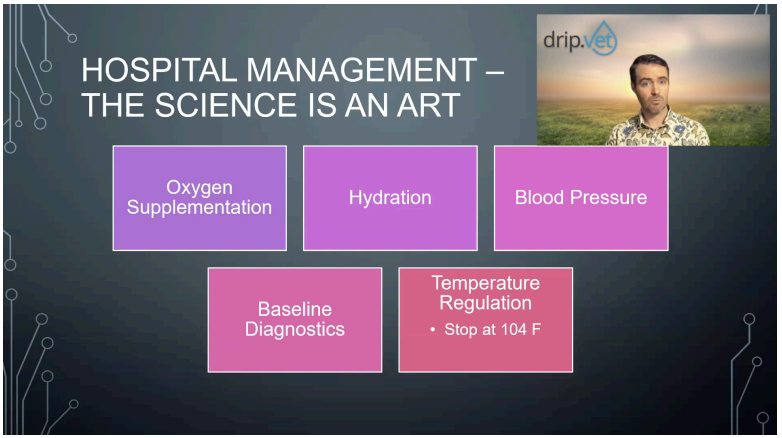
Yes, you have to be careful for the side effects of ketamine. And you always want to make sure that they actively had that duration of seizures in order to do it. But that's usually the next step that we will go to and our hospital is doing this pretty consistently now with good results. After that, I'm usually having a conversation with the client about what the prognosis is and where are we going with everything. Because your next steps are getting into propofol anesthesia. The one that scares everybody is pentobarbital. Yes, that is used as well.

And so one, finding a sterile bottle may be kind of difficult in your clinic. But if you're going to go from propofol CRI, maybe we just induce anesthesia and go from there. Inducing anesthesia can commonly be the stopgap for a lot of families, especially because you may be looking at prolonged anesthesia in the course of hours. And in some cases, up to 12 or 16 hours, and which may require ventilators and heat support throughout the entire time as well.

Once the patient is no longer seizuring, then we can try to wean them off it in a lot of these patients.

And so once we stop the seizure, what's our next goal? We need to prevent further seizures. And so this is where phenobarbital load, potassium bromide load, or Keppra load comes into play. I typically reach for phenobarbital first. In those cases, we will give 4 to 8 milligram per kilogram bolus as a phenobarbital until the patient is either sedate or we've stopped the seizures and feel comfortable with where they are at clinically.

Keppram same thing, the 60 milligrams per kilogram IV load. Potassium bromide, for that load, yes, it's an oral pill but there is a liquid form. The liquid form can go rectally. It is pretty nasty to do that. You're going to end up with a lot of very viscous fluid, and it almost always causes ecolitis and diarrhea. And so do this sparingly. Or to save the patient's life, I don't typically jump for a rectal load of potassium bromide on these patients.



Other things we can do to help them out. Let's say we have all the drugs in or we're just trying to get everything in, we always want to supplement these patients with oxygen. We also want to get blood pressure checks. And the big thing is temperature regulation. These patients temperatures will spike. But once we get them down to about 104 degrees, we want to stop because they will continue to go down. If you continue to actively cool them, you will probably push them into hypothermia, which for the average cluster seizure patient may not be ideal.

Always evaluate hydration. And so we'll want to use IV fluids in some of these patients, again, with caution if they are on potassium bromide. And then just the baseline diagnostics we discussed earlier.

So what other options do we have if anticonvulsants are off the table? Well, there are also a few other things out there. Surgery is very limited in animals, mainly because of the necessary diagnostic testing to figure out where to do it.

Vagus nerve stimulation has some evidence it could be helpful, but there's really only one study that really looked at it. And it's very, very expensive. Acupuncture right now, unfortunately, there's no current evidence, I wish there was. In the future, I'm hoping that there will be. Ketogenic diet such as NeuroCare. There may actually be something here, but we do need a few more studies to determine whether or not it actually is effective.

The last thing is CBD. What I can say about this is be exceedingly careful. There's only really one study that showed any promise, and even then, there were really no hard conclusions. There's ongoing research currently but the issues with it are unregulated, and so there's substantial evidence that a lot of these products are labeled incorrectly. The booming medical grade marijuana business has caused a massive increase in toxicities. And all I would recommend for everybody is just know what your state, local, and federal laws are. So that way, you're not getting yourself in trouble or putting your license at risk by prescribing this if it's not legal in your area.