(*Note: This article was originally written last fall about Jason Pinkston. With Anderson Varejao suffering a blood clot in his lung, I have updated and enhanced that article to address his situation.)*

See http://bit.ly/145pZah .

For the second time in the past three months, a Cleveland athlete is in the hospital because of blood clots in his lung. Anderson Varejao, already on the shelf with a split muscle that required surgery, is back in the hospital because of a blood clot . He joins Browns guard Jason Pinkston, who similarly had his season ended by clots in his lung last October.

Blood clots are pretty mysterious. Even for sports fans who are used to hearing about torn ligaments, sprained ankles, and shredded rotator cuffs, blood clots don't immediately register. The reasons why clots are dangerous, the treatments to overcome them, and the long-term outlook are all foreign to most sports fans.

As someone who has had multiple rounds of blood clots the past few years (multiple clots in my lung in 2008, and then a huge blood clot in my leg following back surgery in 2011), I wanted to provide some background on what Varejao is going through.

I'll say upfront that I am not a doctor and have no medical training. What I'm writing here is based on my experiences and what I've learned as a patient. Don't take this article as medical advice, okay?

I also know nothing about Varejao's specific case, other than the bits that have been reported in the media. I am guessing what he is going through right now. Because of my experience, they are good guesses; but nothing more than that.

That said, let's look at the most likely questions:

What is a blood clot? What is a deep vein thrombosis (DVT)? What is a pulmonary embolism (PE)?

A blood clot is just what its name suggests -- a collection of blood cells that lump together. Often times, blood clotting is desirable. Any time we cut ourselves, our blood coagulates (clots) so that we do not keep bleeding. It would be a real hassle if you nicked yourself shaving and then bled to death. Our blood's ability to clot keeps that from happening.

But within the blood vessels, blood clots are generally not a good thing. They are the equivalent of a bad accident on the highway -- blocking most/all of the vessel so that less/no blood can get through.

Most blood clots start in the veins in the legs. The medical term for this is a *deep vein thrombosis* (often abbreviated DVT).

You may or may not feel symptoms with a DVT. The first time I had blood clots, they started as a pain in my calf. I thought it was nothing more than a cramp, or maybe that I had bumped my leg on something. I had no idea it was a clot. I was still able to walk and run, even though I had some pain at the site of the clot. The skin was a little warm to the touch. It certainly wasn't anything I thought would be life threatening. Other patients may have more/less symptoms.

A DVT, in and of itself, is not life threatening. The real danger is that the clot will break off from the wall of the vein, and go on a road trip through your circulatory system. When it does that, it travels through the larger veins, into the heart, and then through the pulmonary artery into the lungs. Inside the lungs, the blood vessels thin out, and the clot eventually becomes stuck.

A blood clot in the lungs is known as a *pulmonary embolism* (PE), and it is a much more serious situation than having a clot in the legs. If the embolism gets trapped in the pulmonary artery, then you'll die more or less immediately, because the entire circulatory system is stopped (think of it like stepping on a garden hose). Even if the clot makes it through the pulmonary artery and then becomes trapped in the lungs, it's still a serious and potentially life-threatening situation. Depending on the number and size of the clots, the lung capacity will be diminished, possibly seriously. Even basic activities like walking can make you short of breath and can cause pains in your side or chest.

More than likely, Varejao's clot started in his legs. He may not have even known it was there. Even if he did feel something, it probably wouldn't have been enough for him to really worry about it -- especially as a pro athlete who is used to having plenty of aches and pains. Somewhere along the way, the clot broke off from the vein in his legs, traveled through his heart, and ended up in his lungs. That's when he started suffering the more serious symptoms that landed him in the hospital.

Why do blood clots form?

Blood clots form for many reasons. They could be because of a genetic condition. They can also occur because of lifestyle factors. One of the biggest factors is being sedentary, especially after a surgery. (In my example, I had back surgery, and about nine days later a large clot formed in my leg. Although I wasn't completely sedentary, I was moving around a lot less than would normally have been the case.) Blood clots can also be an indicator of cancer.

Of course, Varejao just had leg surgery. He would have been sedentary in the days after the operation. That fact fits perfectly in explaining why his clot may have occurred.

Unfortunately, in many cases (my doctor estimated about 25% of the time), blood clots are *idiop athic*
(a big word that means "we really don't know how they happened").

In my case, while I was in the hospital, I was given a battery of tests to check for various clotting disorders. All of the tests came back negative. According to my doctor, there were some conditions that they couldn't test for because I was already on blood thinning medications (more on those later), and in order to have an accurate test, I would have needed to not be on any blood thinners. (They weren't about to take me off blood thinners, and possibly risk my life, just so I could take some tests.)

I'm guessing that the same thing is happening to Varejao now -- they've probably taken plenty of his blood to do a number of different tests, in hopes of finding out why his blood clot occurred. As in my case, they may never find out exactly why he suffered his clot.

What are the risks of blood clots?

If a blood clot is left untreated, it can cause serious damage to the body, and perhaps even result in death. A PE can cause death to the surrounding lung tissue; depending on how much tissue is involved, and the patient's condition otherwise (i.e., are they a distance runner or a three-pack-a-day smoker), it can be life-changing.

In my case, I was lucky that my episodes with blood clots (particularly the time that two clots ended up in my lungs) really didn't change my life at all. There was some dead tissue in my lungs, but fortunately not much. I can walk, run, play with my kids, and otherwise do the same activities that I did before. I was also in very good shape, and generally do not have any negative lifestyle factors (non-smoker, exercise a lot, etc.).

As for Varejao, he will probably come out of this episode just fine. If any damage has occurred to his lungs because of this clot, it has already been done. It is not going to get worse, as he is in the hospital and is getting the care he needs. Depending on the size of the clot and how much damage it did, it may affect his lung capacity. Because he is a pro athlete, he was in excellent condition to begin with, so hopefully he will not have any lasting effects from this clot.

How do doctors treat blood clots?

Clots are typically treated with medications. In unusual cases, such as a huge clot, a doctor may choose to remove it surgically. (That happened to me the second time I had clots. I developed a huge clot that extended from my navel to my knee -- that is an unusually large clot, and my vascular surgeon later told me it was the largest clot he had ever seen in his ~30 years in practice.) But usually doctors will want to treat the clots with medications that are designed to thin the blood and make it less susceptible to clotting.

The times I have had clots, I've been treated with two separate medications. One is enoxaparin (which often goes under the name Lovenox). It it given by needle -- you need to inject it along your waistline, just below the skin (not a problem for most of us). In my experience, you take the Lovenox twice a day for a week or two, in order to kick-start the process of thinning out your blood, and to dissolve any clots that are present. Once your blood is in the target range of

thickness (more on that shortly), then you no longer have to take the Lovenox injections.

The other medication commonly used to treat blood clots is warfarin (commonly known as Coumadin). Warfarin is taken as a pill every day. Believe it or not, it is actually rat poison, just in a different dosage/form. It works by interfering with vitamin K, which causes blood to clot. (For that reason, patients with blood clots are actually discouraged from eating otherwise-super-healthy foods like spinach or kale, because those foods are so high in vitamin K. I do have to say, being told "you shouldn't eat spinach" didn't upset me too much.)

Coumadin is a long-established drug. There are several newer blood thinning medications, but none of them have (yet) been indicated for prevention of blood clots/DVTs.

Varejao has likely been getting Lovenox injections twice a day, and has also been started on Coumadin and is taking it every day. It does not sound like his clot will need to be removed surgically.

Why is Varejao still in the hospital?

This is the tricky part. The funny thing is that Varejao probably doesn't look sick now. He probably feels fine and is absolutely chomping at the bit to be released from the hospital. I definitely felt that way when I was in the hospital with clots in my lung. It's not like you are going off to tests all the time, or that you are undergoing constant treatments. Instead, it's more like a nurse draws blood for testing, then gives you your Lovenox injection ... and then you lay in bed all day, with basically nothing to do. It's very frustrating, because you feel fine, and yet you have to remain in the hospital.

So why is he in the hospital? Because the doctors want to make sure that his blood has thinned enough before releasing him. Blood thickness is measured by a value called the *International Normalized Ratio*, or INR. On the INR scale, a lower number indicates thicker blood, and a higher number indicates thinner blood. A value of 1.0 is average. For a patient on blood thinners, doctors will want to see the INR rise to a range of 2.0 to 3.0 before they'll be comfortable releasing you from the hospital. They want to be near-certain that the existing clot has dissolved and that further clots are very unlikely to develop.

My best guess at Varejao's typical day is something like this:

- ·7:00 AM: Have blood drawn for INR testing.
- ·Shortly after 7:00 AM: INR results come back. They show that his INR is still not above 2.0. Maybe it is 1.4, or 1.6, or 1.8; but it still hasn't hit the 2.0 level where doctors would feel comfortable releasing him.
- ·Rest of Day: Lay in hospital bed, eat crappy food, feel frustrated at being cooped up in a hospital bed despite generally feeling good, spend a lot of time on Twitter and watching TV, and hoping that tomorrow's test brings better results.

When Varejao does get released from the hospital (which should happen in the next few days), that will be the sign that his INR has risen to that magic 2.0 level.

How long do you need to be treated for a blood clot?

For a first clot, and particularly one that doesn't have a known cause, you will be on blood thinners for probably three to six months. During that time, you will have to go to the hospital routinely (probably multiple times per week at first, gradually decreasing to every couple of weeks) to get your INR tested. It turns out that INRs can fluctuate quite a bit, and thus you'll be tested pretty frequently to make sure that the Coumadin dosage is at the right level. (If the INR is dropping, they'll make the daily dose higher; if the INR is above 3.0, they'll probably scale it back a bit.)

Generally, doctors do not want to keep you on blood thinners forever. The side effect of having thinner blood is that you are more susceptible to losing a lot of blood (and potentially dying) from a large gash or from an internal injury.

I don't want to exaggerate the effects of blood thinners here. It's not like you get a scratch and blood starts shooting from the wound like a fire hose; nothing like that at all. Instead, when you cut yourself, it just takes longer for the bleeding to stop. If we're talking about a small cut, it's an annoyance, but you're not going to bleed to death. But if you do have a large cut, or an internal wound (say, the kind you can get from heavy contact sports like basketball), then you could lose a lot more blood than if you weren't on blood thinners.

The point here is that doctors are balancing the need to get rid of the clot, and to make sure that it is gone and that more clots do not occur, against the risk of unusual/heavy bleeding from a wound or accident. And it seems that the consensus is that being on blood thinners for three to six months is the right way to balance those offsetting risks.

Now, if it turns out that you have some genetic factor that could lead to more clots, or that you've had other clots in the past, then you're looking at being on blood thinners like Coumadin for longer, perhaps for life. In my case, I've now had two separate blood clots, so I now take Coumadin every day, have for the past year-plus (since clot #2), and will for the rest of my life. If Varejao turns out to test positive for some rare genetic clotting disorder, he could be looking at being on Coumadin for life as well. But that's a pretty big "if".

Can a patient return to normal activity after having blood clots? Will Varejao ever play again?

You might be wondering “ever play again? Nobody has said anything about this being a career-ending injury!” The fact is: it could be.

But don’t get too alarmed. As I mentioned earlier, I can do everything now that I did before my clots. Even though I am now permanently on blood thinners, I still do everything that I used to do, including higher-risk activities like trail running through remote areas. (My doctor isn’t completely jazzed about that, for the record.)

However, for most of us, "normal activity" doesn't include "getting smacked around by 250-pound men while chasing rebounds." Of course, that's what Varejao does for a living. So he's at a much higher risk of a bleed-out type injury than the rest of us.

The key is: Varejao will not be cleared to play basketball while he is taking blood thinners. The Cavs’s doctors simply will not take the risk of him being out on the court, getting smacked by Dwight Howard on a seemingly innocuous play, and having him lose a lot of blood internally and potentially dying.

So my best guess at what Anderson Varejao's future holds:

- ·He will continue to stay in the hospital, and continue to get Lovenox injections, until his INR is in the therapeutic range above 2.0. As mentioned, that will probably happen within the next couple of days.
- ·He'll take blood thinners (Coumadin) for at least three months. That would put us into April before he stops treatment (and explains why his season is over).
- ·If a cause for the clot has not been found by then (based on the tests he's undergone while in the hospital), then they'll take him off Coumadin. After his blood has returned to normal, they may perform more tests on him (the ones that are dependent on him not being on blood-thinning medication), in hopes of finding the cause of the clot.
- ·If the cause of the clot is traced back to some genetic condition, then he'll be on blood thinners for life, and his NBA career will likely be over. Even though he will seem healthy enough to play, he will not want to take the risk of bleeding to death from some injury sustained on the field (an injury that would not have the same bleeding risk for any other player). And even if he is okay with taking that risk, the Cavs and the NBA would not be; he would fail his physical simply on the basis of being on blood thinners.
- ·If the cause of the clot is never determined, or is determined to have resulted from some factor unlikely to recur (I'm not 100% sure what that would be), then he'll likely be back on the court next season. If he ever suffers another blood clot, then he will probably need to be put on blood thinners permanently, and his career will likely be over. (Especially pay attention if he ever needs another surgery; again, clots often develop when you are sedentary, and post-surgery is a time when you are about as sedentary as you ever get. It would not be a shock if he needed, say, knee surgery, then developed a clot in the days following surgery, and his career ending as a result.)

Of course, it would be disappointing if Varejao never plays basketball again. But that is a worst-case scenario. There are still a lot of cards face down on the table, and until we see what they are, we won't know for sure what his future holds.