

So when we decide to place a patient on combination therapy, we have a couple of options. We have just prescribing that patient cytomel and levothyroxine, cytomel being the sodium T3 that's sold, or a lot of physicians place patients on dessicated thyroid extract, DTE, that has multiple different brands.

So DTE, as I mentioned before, historically was the first form of treatment of hypothyroidism. It was used for 90, 100 years before it was almost replaced by levothyroxine. DTE is just thyroid extract from pigs. It used to be that it could be done from different animals. However, today in the United States, all DTE is produced based on thyroid that has been removed from pigs, from slaughterhouses.

So Chicago was the birthplace of DTE here with the slaughterhouse Armour and Swift. They had so many thyroid glands, because they were killing all those animals that they developed this Armour thyroid, for example. It comes from the Armour slaughterhouse. So DTE contains T4 and T3. If it's from pig, it's in a ratio of 4 to 1. So there are four molecules of T4 and one molecule of T3.

DTE pills are measured in grains. It's the old way of measuring this, but it's equivalent to 65 milligrams. So one grain is equivalent to 65 milligrams of extract. In 65 milligrams of the extract, you will have 38 micrograms of T4 and 9 micrograms of T3. And all of them should have those numbers, because that's established by the United States Pharmacopeia.

So to produce DTE, a laboratory needs to follow those standards from the United States Pharmacopeia, which says 38 micrograms of thyroxine and 9 micrograms of T3. They allow you to have about plus, minus 10%. So there's a small range around the 38 and a small range about the 9 micrograms. But that's standard.

Now, if you start a patient on levothyroxine, as I mentioned, you would give about 1.5 micrograms of levothyroxine per day per kilo. For DTE, I actually looked at several studies. And it seems that the dose that will provide replacement for a hypothyroid patient is between 1 grain and 2 grains, about 120 milligrams of DTE per day. But again, this is just like levothyroxine. It depends on the absorption rate, the efficiency. And it, again, depends on TSH.

So how are you going to monitor that? First, you should start with a small dose. You should never go and give a full blast of DTE, because it does contain T3, and you want to avoid that. Remember, levothyroxine is very safe, because it does not contain T3. DTE does contain T3. So I would start with half or even less of half of DTE of the dose. And then build your way up.

Now, what should you be measuring? You should be measuring TSH, free T4, and T3. Why do you measure T3? Because you're giving T3. You want to know what are you doing to the T3 levels of that patient. If you were not giving T3, it wouldn't be helpful. But you are giving T3.

So when do you measure this? Because T3 has the issue of a rapid absorption and a rapid half-life, you need to measure fasting, before the patient takes the pill, so you know how much T3 is coming from the previous pill that that patient received, and three hours after the patient took the pill, because then you know how high that T3 in the circulation is going.

Let's say you have a baseline of a T3 that's about 120 nanograms per dl, well within the normal range. But after three hours that the patient took the pill, T3 levels are going to 250. That's too high. It means that during a significant number of hours, that patient is going to exhibit thyrotoxic levels of T3. And you don't want to have that. Therefore, I always like to measure baseline and the peak at around three hours, because then you can tell yourself, I'm happy, I'm safe here, because even though before and after they took the pill, the excursion of the T3 levels did not go outside of the normal range.

In fact, Francesco Celi did some studies in his lab, in which he measured the fluctuation of T3 in the circulation after patients took different amounts of T3. And he saw that if a patient takes between 2.5 and 7.5 micrograms of T3 twice a day, that patient, the excursion of T3 levels, it's not going to be outside of the normal range. Above 7.5, it might take that patient to above the normal range.

Now, the issue is that 1 grain of DTE contains 9 micrograms of T3, which is slightly more than the 7.5 micrograms that Francesco determined. So I would be careful. I would be monitoring that, because we want to make sure that we are not going overboard and the patient is not experiencing a few hours of thyrotoxicosis or elevated serum T3 after they took that pill.