6c: Concepts for Diagnosis - 3D / Yale Fisher, MD

Transcript

The third part of the clinical concepts is three dimensional thinking. If you understand real time - it's basically a movie - and if you understand gray scale and A-scan - it's basically amplitude - three dimensional thinking is the concept that I have found to be the most difficult to teach. It is the ability to look at sections that you are not used to in ophthalmology on a routine basis and paste them back together into your mind into a three dimensional image, even though you only have two dimensional cross-sections.

I don't know how to get started with this other than with a simple concept of a retinal detachment. So let's begin that way. Let's assume you have a plain retinal detachment, which is total. Almost all of us would know that this is a cone shaped lesion located inside the eye that extends from the ora serrata to the optic nerve.

But I told you before, we're not going to image this in an axial method through the lens. We're going to look at it coronally, at least in the scanning mode. So you have to start asking yourself - here you're going to take the coronal of a cone. What is that cross-section? What does it look like? It's a good time to stop right here and think about it.

And that's what I do all the time. I'm looking at the screen and I'm constantly thinking: "What am I looking at in cross-section? How can I put that into a whole topographical map?"

Let's begin with something that is symmetrical, like I said, a total retinal detachment and think of a superior to inferior cut, looking at the inferior portion of the eye going right through a total retinal detachment. Many of you will have already guessed that a cross-sectional image of a cone would be a circle. And indeed it is.

If you tilt the probe forward, the circle will get larger because you are approaching the area of the ora serrata, the biggest width of the cone. And if you tilt it more toward the optic nerve, you should be seeing the circle get smaller. It should be strongly reflective because retina is a great deal of acoustic impedance mismatch when compared to water, at least when you are perpendicular to it and less so when your not. But the object should lead to the optic nerve.

So in this very, very simple three dimensional thinking case, I've tried to relate to you how I go about making a diagnosis with the third of the clinical concepts, that being three dimensional thinking.

If all of these concepts aren't used, it is extremely difficult to make a diagnosis. I don't think you can. You need all three. You need real time, gray scale with or without simultaneous A-scan, and three dimensional thinking.