Corporate Presentation

The Use of Breast Tomosynthesis in Clinical Practice

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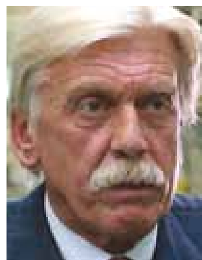

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Dr. Pietro Panizza
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Prof. Pattrice Taourel
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Dozens of papers, scientific and poster sessions on breast tomosynthesis were offered at the 2010 Radiological Society of North America annual meeting. Interest was unusually high since Hologic, the women's health company, received a Food and Drug Administration (FDA) "Approvable Letter" for a 3D digital mammography tomosynthesis system just before the meeting. Commercial Hologic systems are already installed in Europe, the Middle East, South America, Canada and Mexico and parts of Asia but the biggest opportunity for the new technology is the United States where recall rates for breast cancer screening exams run from 10 to 15 percent. On 11 February 2011 Hologic received full FDA approval on its 3D digital mammography breast tomosynthesis system, joining a large part of the global community.

S. G. Collins, a video film producer based in Amsterdam, videotaped the comments of dozens of luminaries in Europe, and North and South America for a documentary on tomosynthes that premiered at RSNA. Below are quoted excerpts from the documentary.

What does breast tomosynthesis do that mammography doesn't?

Prof. Gandini: The main problem with digital mammography is the same as analog mammography: the overlapping of radiopaque images – therefore false images, images that we call overlapping. Tomosynthesis should avoid these 'summation' images, because it breaks up the image.

Dr. Tourasse: Tomosynthesis gives us more confidence in our readings, which leads to a lower recall rate. In most cases, cancer not seen on 2D can be identified on a second reading with tomosynthesis.

Dr. Gignier: Tomosynthesis enables us to eliminate a false image made by tissue overlap. We have found cancers with our 3D tomosynthesis images that were not visible with our 2D images.

The other big benefit of tomosynthesis is the improvement of the workflow of patients, since we don't do localized compression views any more, since thanks to the tomosynthesis, all [tissue] overlays are removed.

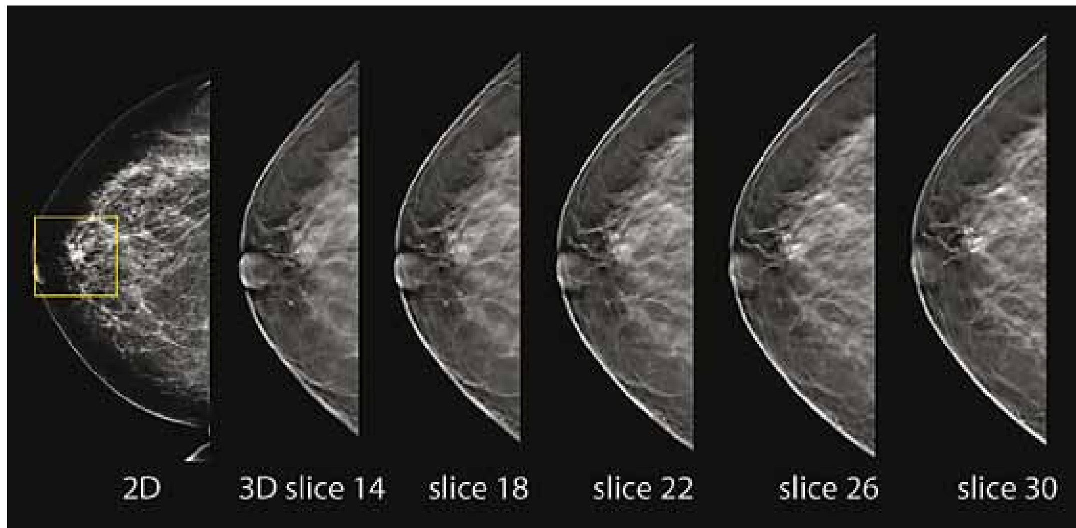
Dr. Panizza: The first time I saw tomosynthesis, I imagined the possibility of reducing [the number of] ultrasound [exams]. That is nowadays my main problem, because there are few radiologists and non-radiologists who are able to do high quality ultrasound exams. Ultrasound is an expensive test, which is not so easy to use in the screening phase. Therefore the possibility of having greater sensitivity than mammography thanks to tomosynthesis can reduce the number of ultrasounds and therefore costs.

Prof. Gandini: What I can say for sure is that tomosynthesis increases the confidence in the radiologist when it comes to diagnosing a malignant tumor. Because two characteristics that are typical of breast cancer are better demonstrated. And those are the calcifications, and the spiculation margins. Spiculations are more visible with tomosynthesis than with 2D mammography.

Dr. Gignier: We installed a Hologic Selenia Dimensions breast tomosynthesis system a year ago. We must have performed some 5,000 exams on that machine. Tomosynthesis allows us to better localize the lesion's position in the breast, especially in the density of the breast.

Have you found cancers with tomosynthesis you might have missed with 2D?

Prof. Taourel: We have had significant experience in tomosynthesis; we must have made some 3,000-4,000 exams



In the 2D image on the left, there is a potential lesion in the subareolar region of the breast. In the tomosynthesis images on the right, it is easy to see that there is no lesion present. One can pick out individual structures on the separate slices, which summate to form the potential lesion seen on the two-dimensional projection image.

in the 18 months that we've been using it. We are deeply convinced that our patients benefit from the tomosynthesis.

We have detected additional cancers... It's true that it doesn't happen every day, not even every week, but... every team using [tomosynthesis], and ours in particular, finds some additional cancers that wouldn't have been seen in mammography, since there was no trace of them, or they wouldn't have been seen in mammography because they weren't pertinent enough – and even if there were some signs, they were too subtle, so they have been missed.

So there are cancers we detected – we could see better [with tomosynthesis]. We could see contralateral cancers, we could see multicentric ones.

Does tomosynthesis take more time than a conventional mammogram?

Dr. Escolano: The time needed for reading one tomosynthesis is comparable to a doctor having to read one or two additional images [views]. But you have to counterbalance this doctor's time with the fact that before, he or she would also have to read additional images. And the patient needed to go back to the mammography room, we had to wait for the results of this additional image. So generally speaking, even though there is some additional time required for a single tomosynthesis reading, on the whole we are gaining doctors' time per patient.

> "We are deeply convinced that our patients benefit from the tomosynthesis."

Prof. Gandini: If tomosynthesis allowed me to reduce the number of ultrasound tests – and an ultrasound test takes about 20 minutes – I should compare the time that I save, those 20 minutes, with the minute that I need to read the tomosynthesis images. This would certainly be a lot of time saved for the doctor.

What patient would benefit the most from breast tomosynthesis?

Prof. Gandini: The patient for whom tomosynthesis is useful is a woman with a dense breast, in about 40 to 50 percent of the total; in women who have had surgery for breast cancer; and in those cases where you have asymmetries in the fibrous glandular between the two sides. These are the patients for whom tomosynthesis can be crucial.

Dr. Taourel: In the beginning we believed that tomosynthesis would be most effective in dense breasts. In fact that's not really the case. If the breasts are really dense, think of plaster: you cut a lump of plaster, you get slices of plaster, and you still can't do any diagnostics.

To be able to do a diagnosis, there must be some interface between the lesion and the fat tissue, and this is how you can make your diagnosis.

So, in my opinion, its best use is not in particularly dense breasts or low density breasts. In the dense breasts it will miss fewer cancers – although it still will... In low density breasts we won't miss any, but also, it's going to be most effective in what I call "disharmonious breasts" – breasts where the longitudinal features are not well organized, where in mammography we see pseudo distortions everywhere. In tomosynthesis we're really able to say "no, this is just a tissue overlap." Or sometimes, we will be able to see something amidst the fat tissue that was not seen otherwise, because in tomosynthesis we can clearly see distortions. Even if the tumor is not dense, it distorts, it pulls the sides, and that's how we can recognize it.

The comments included in this article are the opinions and personal stories of the individuals quoted and not necessarily those of Hologic.