Fully interlinked for rapid data exchange in mammography

As data volumes in mammography are continually growing, especially with the increased use of tomosynthesis, powerful software is vital for radiology. In Denmark, an intelligent network infrastructure facilitates cooperation among various mammography clinics.

Text: Niels Anner | Photos: Robert Wengler

Thanks to an intelligent software solution and network, senior radiologist Lisbet Brønsro Larsen, MD, of Odense University Hospital is connected to colleagues accross Southern Denmark, screening more than 100,000 women per year for breast cancer.

In the Region of Southern Denmark, a broad network of hospitals provides medical services for the 1.2 million residents of South Jutland and the island of Funen. A mammography screening program for women ranging in age from 50 to 69 has been running there for 25 years. More than 100,000 women are called in for an examination every year, and at an 85 percent participation rate, the volume of examinations and images is high in international comparison. Intelligent networking is particularly important for processing the enormous volume of data produced by mammography screening. With the increased use of tomosynthesis for diagnostics, these volumes are growing even more.

Connecting screening departments with intelligent server and network structures

Odense University Hospital aims to provide the same level of medical care to women in rural areas, who may not be able to make the long journey to attend the screening program in larger cities. To help enable more access to care, four mammography trailers regularly visit smaller towns and municipalities for screening purposes. The trailers are equipped with a waiting room and an examination room with mammography systems from Siemens Healthineers. “By providing access to these programs to a wider range of patients, large volumes of data are collected. These must be processed in the mammography screening departments of the four central hospitals in the larger cities Odense, Esbjerg, Vejle, and Aabenraa.

“Mammography screening is a very data-intensive process because the throughput of patients is so high,” says senior physician Lisbet Brønsro Larsen, MD. In order to provide a diagnosis, two radiologists are required to read the images. In this case, these radiologists sit in separate places, so the acquired images are then directly transmitted to different locations. This is enabled through an intelligent software solution and network provided by Siemens Healthineers. “The *syngo*.via server and network infrastructure allows us to connect the entire region and perform reading in various locations. We can access the server with all the image data, no matter where we are, which helps us speed up our time to diagnosis,” explains Larsen.

Improved collaboration among individual hospitals

The IT networking brings important benefits, in particular cooperation among individual hospitals: “We can help each other in terms of staffing by performing image analysis in various locations. This is very important given the increased number of patients, but also the lack of radiologists specialized in breast screening,” says the

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Senior radiologist Lisbet Brønsro Larsen, MD, on the go: the new network allows connections to home workstations and mobile PCs.

senior physician. “In addition, the network also provides the flexibility to connect at home workstations or mobile PCs, allowing the solution to be easily adapted to the region’s needs”, she adds.

The data volumes to be processed are also increasing significantly as the use of breast tomosynthesis is expanding. With tomosynthesis, the X-ray tube moves in an arc of 50 degrees over the breast, taking low-dose images across an angular range, which increases the number of images generated in one examination. This imaging data is used to calculate one-millimeter-thin layers of the entire breast, allowing the radiologists to achieve a higher level of detail and see more than with 2D mammography. The layers are then displayed as a stack that the radiologist can scroll through, rather like a flipbook. “Tomosynthesis gives us a higher depth resolution and greater diagnostic accuracy,” says Larsen. The position and morphology of lesions can be more accurately depicted in the 3D mammography sectional images. This could result in patients being spared additional examinations, such as magnetic resonance imaging (MRI), because the diagnosis could be reached with tomosynthesis.

Simpler and faster workflows in screening

Efficient reading of the results is crucial – whether it be in 2D screening or tomosynthesis exams. The Odense network has implemented the reading solution *syngo*.Breast Care to help support them in dealing with the large data volumes. “This facilitates our workflow, particularly in screening, and offers a variety of features that help simplify reading,” says Larsen. She turns to her large reading screen and points to the control menu with the mouse. The chosen options are selected from the customizable menu. “For instance, I can directly access the patient’s images from previous examinations,” says Larsen.

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Lisbet Brønsro Larsen, MD

Prior and current images are displayed together on one screen, which helps easily visualize any noticeable changes in the breast. 2D and 3D views can be compared seamlessly. The system also offers the possibility to integrate images from other imaging modalities, such as the patient’s MRI or ultrasound examinations, displaying them on the screen at the click of a mouse.” Larsen appreciates the fact that the system processes large amounts of data quickly and speeds up her work: “We used to have big problems with speed, especially in screening. That is no longer the case.” be used in the daily operation of the mammography department to support staff. Until then, intelligent algorithms – such as those built into *syngo*.Breast Care, can increasingly take over supporting functions in diagnostics, she says. ●

Niels Anner is an independent journalist based in Copenhagen. He writes on business, science, technology, and society in Northern Europe.

Artificial intelligence in mammography

syngo.Breast Care is planned to use intelligent algorithms to indicate the location of lesions together with lesion and case scores to indicate the likelihood of cancer. This so-called “interactive-decision support” will help speed up reading and will be based on artificial intelligence. The experienced radiologist Lisbet Brønsro Larsen describes artificial intelligence as the future of mammography. She says there is no doubt that digital mammography has brought some of the greatest advances in her field. The problem, however, is that often there are insufficient resources and personnel available to achieve the goals of national screening programs.

“Artificial intelligence could mean that one of the two radiologists reading the patient’s breast images could take on other tasks in future since the second evaluation can be done automatically,” she says. Larsen says that at radiography conferences, tomosynthesis was always the major topic. Now it is artificial intelligence. However, the senior doctor believes it will take time until programs that interactive decision support can

Founded in 1912, Odense University Hospital celebrated its 100-year anniversary in 2012 and is set to open a new building in 2021.

syngo.Breast Care VB40 is currently under development. It is not for sale in the U.S. Its future availability cannot be guaranteed.

The statements by Siemens Healthineers customers described herein are based on results that were achieved in the customer’s unique setting. Since there is no “typical” hospital and many variables exist (e.g., hospital size, case mix, level of IT adoption) there can be no guarantee that other customers will achieve the same results.