Nuclear camera alters Anger method

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Iain Stark, former president of the North American subsidiary of Scottish gamma camera manufacturer Scintronix (SCAN 12/28/88), has invented an innovative "non-Anger" nuclear medicine camera. Stark lined up Canadian venture capital last year to support commercialization of the product.

The patent-pending camera converts analog image data (the light produced by the scintillation crystal) to digital form within the camera's photomultiplier tubes. Analog to digital conversion in the PM tubes has been explored in the past, but handling the massive amount of digital data produced in the process proved difficult, Stark told SCAN.

Stark has found a way to process up to 300 megabytes of digital data per second rapidly enough to determine a position for each nuclear event and provide a sufficiently high count rate. The key is not raw computer power, he said. Although Stark's prototype does have seven computers to guide signal processing, gantry movement and postacquisition processing, these computers are not outlandishly fast, he said.

"No computer can handle 300 megabytes a second, let alone do the calculations on an event-by-event basis. That is the problem. That is why other people haven't done it," Stark said.

Stark founded and is president of Independent Scintillation Imaging Systems (ISIS) of Montreal. ISIS attended the Society of Nuclear Medicine meeting last month to introduce its system, although the firm was not able to bring the prototype to the exhibit floor.

ISIS has not yet signed on a partner to help sell the system. A number of parties expressed interest at the SNM show, and the firm plans to develop its commercialization strategy over the next two months, Stark said.

Stark's technology overcomes several fundamental problems linked to the image formation process in scintillation cameras that have been in use since H. O. Anger proposed the concept in 1957. The principle of the Anger camera is flawed in a way that requires complicated linearity and energy correction as well as threshold preamplifiers that cut off the information from distant PM tubes, he said.

"The advantages of having solved the problem (of handling digital data from the PM tubes) are tremendous. You have better positional resolution, energy resolution and linearity. You obtain a bigger field-of-view out of the same crystal, and you are able to image off-peak in a way other cameras cannot," Stark said.

Patents have also been filed on the camera's mechanical system. The unit automatically changes collimators and can be programmed to run quality assurance tests prior to each day's use, he said. The camera's gantry can perform circular and noncircular SPECT procedures, including body contouring, without having to move the patient bed. Setup for contour exams is rapid since the bed is stationary and its coordinates are programmed into the computer's guidance system.

"The camera can synthesize any motion in a completely independent way. Since the bed height is fixed, the only variability is how deep the patient is. When you drive the camera down until it touches the patient, it (the computer) knows all the parameters. Setup for SPECT takes eight to ten seconds," Stark said.

Disclosures:

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