Impacting Patient Management with Q.Clear and Q.Freeze

Choosing the right imaging system to meet clinical needs is of paramount importance for any hospital. System specifications, image quality and advanced features are all factors in most equipment purchasing decisions. Yet, what matters most is the impact the system and its technology has on patient care.

When Clarice Sprinz, MD, a radiologist at Mãe de Deus Hospital in Porto Alegre, Brazil, began looking for a new PET/CT system in 2016, her hospital's key requirements were a robust system with high image quality that could handle the increasing volume of patients and imaging data. Mãe de Deus is a general hospital and a Cancer Center of reference.

Initially, Dr. Sprinz didn't consider a scanner with BGO crystal technology, such as Discovery™ IQ. While BGO is an established crystal technology, scanners with LSO crystals had gained popularity in the market.

"We were looking for a robust system that could process high volumes of data, so we were looking at other crystal technologies," Dr. Sprinz says. "Our need was for a system that would not hold us back. We had an ever-increasing volume with a mix of patient conditions and our old system was limiting the number of exams we could perform each day. So, we needed higher flexibility in our acquisitions."

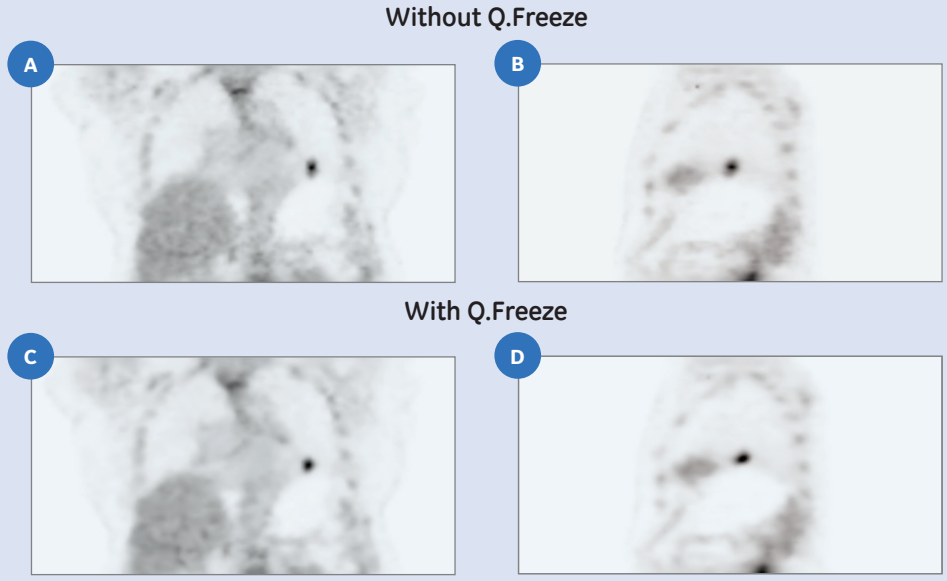

Figure 1. Patient with sigmoid colon cancer, underwent surgery in April 2017. Indeterminate CT; 2.0 mm lung nodule detected in left inferior lobe on PET/CT. Gated study (A, B) without and (C, D) with Q.Freeze for motion correction.

However, she began to change her mind during a GE Healthcare user meeting held in Toulouse, France, featuring presentations from clinicians from all around the world. She listened to the experience of others using Discovery IQ and saw the high-quality images it generates.

"We were very impressed with the high quality that we saw in the images, especially in the lower neck, liver and lungs, areas that sometimes might be problematic to evaluate,"

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>
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she adds. "We learned this system is also fast and efficient, and the images are clear with low noise."

Seeing the results made her and her colleagues believers. They visited several sites that were using Discovery IQ to see it in use, first-hand, solidifying their belief it was the right system for their clinical needs and patient care. In March 2017, Mãe de Deus Hospital installed the Discovery IQ 5-Ring PET/CT system.

Remarkable tools

For Dr. Sprinz, one of the most impressive features of Discovery IQ 5-Ring is Q.Clear. Q.Clear is GE Healthcare's PET image reconstruction technology that delivers not only up to a 2x improvement in PET quantitation accuracy (SUV_{mean}), but also up to a 2x improvement in image quality (SNR).

"Q.Clear is a remarkable tool that generates exquisite images," Dr. Sprinz says. "We use it in all our patients, both diagnostic cases and for treatment planning."

As important, Q.Clear has helped reduce non-diagnostic studies. In Dr. Sprinz's experience, this is particularly the case with small lesions less than 1 cm. "These lesions are more clear to see with Q.Clear. Before they were blurry, but now we see more of the focal lesion and we have more confidence to characterize them," she adds.

With the improvement in SNR and image quality from using Q.Clear, Dr. Sprinz and colleagues realized they could reduce injected dose. Dr. Sprinz estimates the department has reduced FDG dose by 30%[1] across all studies—delivering a benefit for both the patient and the hospital. According to Dr Sprinz, the benefit has been two-fold.

"We can save costs (of FDG) and also scan more patients with less radiation to them," she explains.

Using Q.Clear, Mãe de Deus Hospital provides oncologists and referring clinicians with Q.SUV, a consistent, accurate SUV measurement. Q.SUV helps to more accurately assess treatment response and better guide therapy planning decisions than conventional methods. It can also help improve communication between radiologists, oncologists and patients.

Initially, Dr. Sprinz and her colleagues in radiology were concerned about the change in measurements, as the Q.SUV is often higher than a standard SUV. However, when the oncologists were notified about the change in technology and impact on the measurement, they were very receptive.

"We all agree that quantitation is very important," she explains. "We do believe the Q.SUV more accurately reflects the disease, especially in small lesions that are more difficult to assess and in the lower lung and liver where there is often respiratory motion. We feel that Q.SUV delivers a great advantage to our referring clinicians."

With the higher confidence resulting from the use of Q.Clear and Q.SUV, patient management has also been impacted. Dr. Sprinz and her colleagues are more confident in reporting small lesions and whether the patient has localized or metastatic disease.[1]

Addressing respiratory motion

The 4D gating feature, Q.Freeze, is another impressive technology on Discovery IQ 5-Ring. Since March 2017, it has

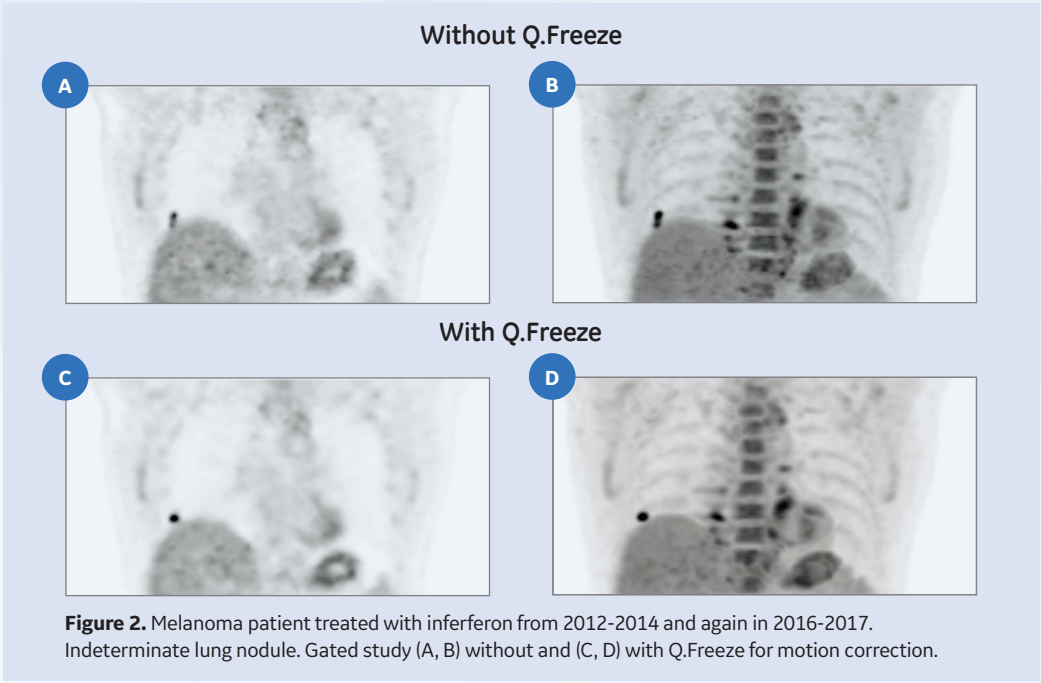

Figure 2. Melanoma patient treated with inferferon from 2012-2014 and again in 2016-2017. Indeterminate lung nodule. Gated study (A, B) without and (C, D) with Q.Freeze for motion correction.

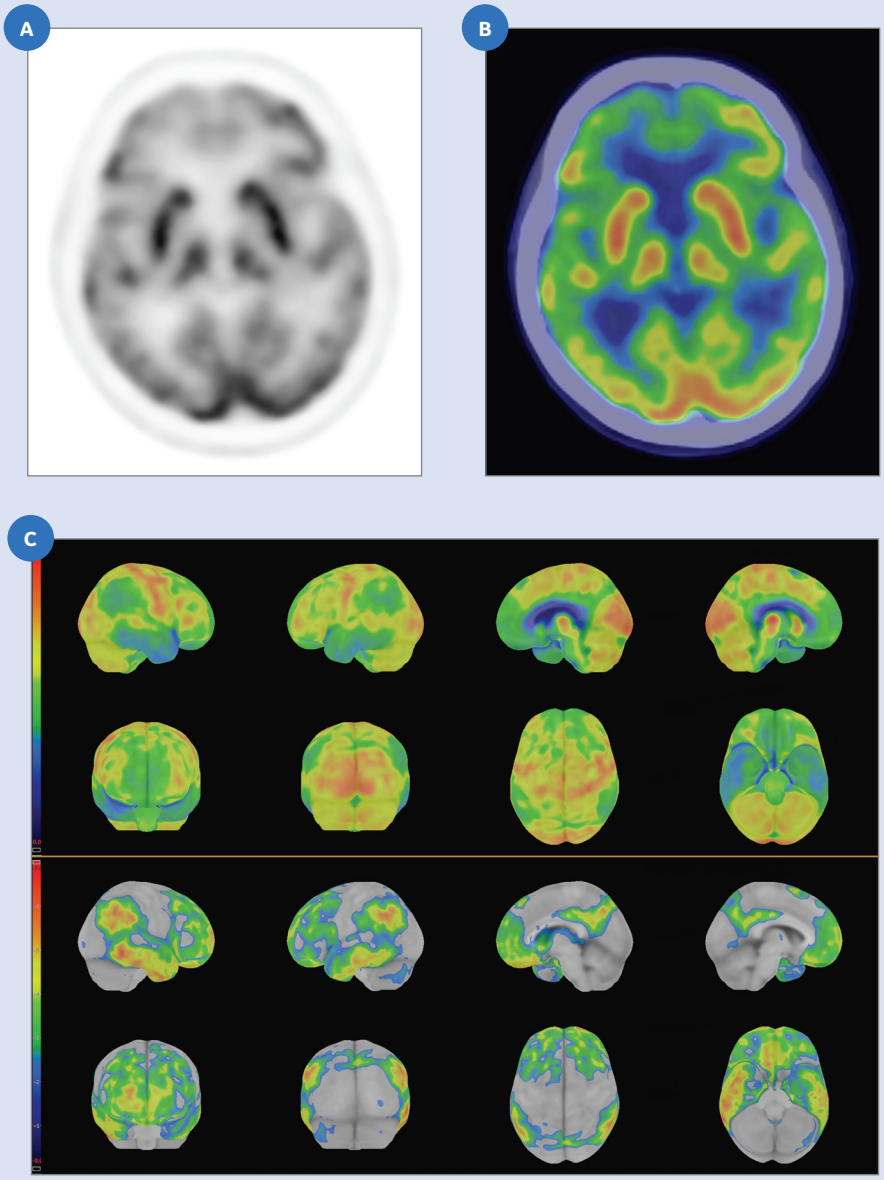

Figure 3. (A) PET only image; (B) PET and CT fused image; (C) CortexID Suite application of both SSP projections and Z-score summary.

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been used in just over 40 cases at Mãe de Deus Hospital, most of these being lung studies. While not yet routinely implemented, the radiologist will review the patient history and determine if Q.Freeze would be beneficial for examining lung lesions.

"We've seen a big impact in our ability to characterize the lesion, especially small pulmonary nodules," says Dr. Sprinz. "In some cases, we didn't detect the lesion in the whole-body PET, but when we analyzed the 4D gating we could see the uptake. This changes everything in patient management."

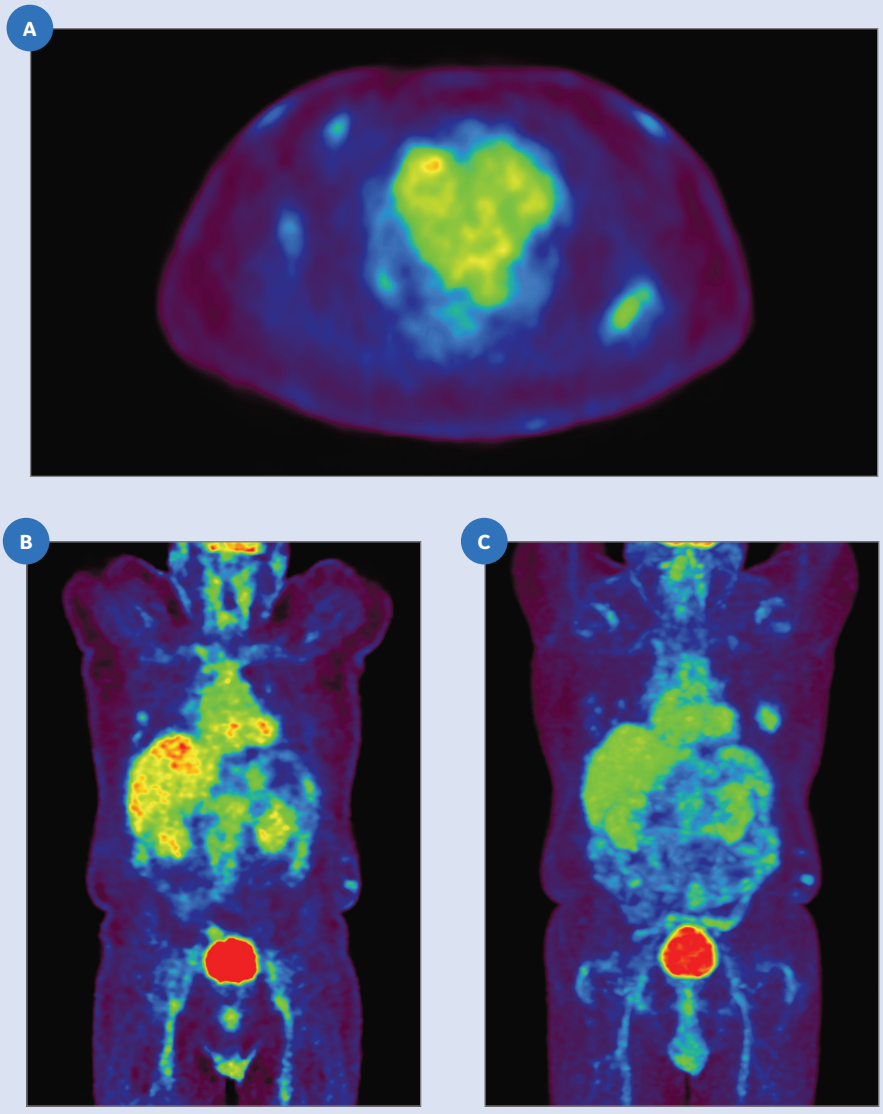

Figure 4. Non-Hodgkin's Lymphoma patient underwent marginal zone biopsy of mass in the retroperitoneal area in October 2016. Received chemotherapy until August 2017. (A) PET only axial view (color map); (B) PET only coronal view (color map); (C) PET MIP (color map).

Efficiency and flexibility

Today, Mãe de Deus Hospital conducts an average of 16 PET/CT studies each day, although they've had as high as 22 patients in one day. And, that's not the limit. Dr. Sprinz believes the hospital can comfortably scan up to 25 patients each day, from 7 am to 5 pm.

Even patients have noticed the efficiency of the new PET/CT scanner. Some who have received PET/CT exams on the prior system have remarked to Dr. Sprinz that the study was very fast and they felt more comfortable.

"That was our problem before this new technology. We had an increasing volume and mix of patients yet we were limited by the system. We needed higher flexibility for acquisitions, and we have that now," Dr. Sprinz says.

Even with the increased volume, the Discovery IQ 5-Ring is a robust system that can handle the additional workload. "We collect a lot of data and the system keeps on working. We saw systems on the market that were new technology, but they weren't stable," she adds.

Dr Sprinz recommends that facilities seeking to invest in new technology see it in operation first-hand at an institution. That's one of the key decisions Dr. Sprinz and her colleagues made, and she's grateful for that because seeing the system in action made her a believer in its imaging capability. ■

Reference

1. This represents a single user's experience and may not be representative of other clinical settings and use cases.