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It's time for more patient-centric imaging in the MR department

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Buzzwords and platitudes abound in radiological social media (@nuromoMRI), society meetings, and literature. The ideal of “patient-centric care” is trending as much as any topic in radiology conversations at the payer, administrative, and clinical levels. Perhaps more than most, the concept of tailoring care to the needs and concerns of the patient lends itself to a wide variety of approaches in medical imaging. As an advanced imaging specialist with an administrative bent, I’d like to discuss measures that we can take to alleviate the pain points associated with the diagnostic imaging process, focusing on magnetic resonance imaging (MRI).

MRI scanning has been common practice for about 30 years, and yet we rarely consider the patient perspective. It would seem that improvements in technology have streamlined the process of undergoing an MRI scan. Initially, patients spent upwards of 90 minutes or more inside a 55-cm magnet bore

and—aside from those termed “claustrophobic”—we thought most patients tolerated the procedure well. Yet today patients still find the MRI experience intimidating, with many suffering feelings of fear, anxiety and a sense of reduced control and abandonment.^{1,2} Frank anxiety reactions have been reported in up to 30% of patients.³ Uncomfortable patients tend to have suboptimal studies, mostly due to motion, which affects approximately 20% of scans.⁴

In a 2017 Philips survey, “Enhancing the Patient Experience of Imaging,” approximately 25% of patients rated the process of preparing for and undergoing an examination as “average to very poor.” The recent recommendation of the American College of Radiology to reduce or eliminate renal-function screening prior to (group II) gadolinium administration represents a large boost in value from the patient’s exam preparation perspective, as well as a significant reduction in cost for imaging centers.

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As you might expect, magnet-bore size has a significant impact on the patient experience. In an internal 3T study (RadNet 2016, N=800) patients scanned in a 70-cm bore magnet rated comfort (49%) and scan length (51%) better than expected, as opposed to only 6% for each measure using an older, 60-cm bore machine. As a result, as these older machines age out, we prefer to replace them with a 70-cm bore magnet rather than upgrade. High field (1.2T) open MR imaging systems deliver high satisfaction ratings in large and claustrophobic patient populations. Immersive MRI-compatible audio and video entertainment systems can also distract from the discomfort of the examination. Wireless headsets are easier for technologists to use; thus they get offered more consistently.

As it turns out, however, reducing scan time is likely the shortest path to better patient comfort. Sixty-one percent of respondents in the Philips survey want “an accurate scan in the least amount of time to reduce physical discomfort.” Indeed, while shorter scans have traditionally been promoted in the community setting, it is only

recently that academic institutions are documenting equivalent outcomes and value with more concise brain, body, breast, and musculoskeletal MRI examinations with scan times as short as 5 to 10 minutes. Demonstrating the impact of even minor scan time reductions, an internal Radnet study found that approximately 10% more patients rated the experience of scan length better than expected on the 2-3 minutes faster 3T scanner than on a similar, same-site 1.5T scanner.

Novel image-reconstruction techniques, such as parallel imaging and compressed sensing, have already reduced individual scan times significantly. We are already beginning to see machine learning-based applications like iterative reconstruction and super-resolution pushing the limits of the scan-time equation. While innovative scanning techniques can contribute to a shorter exam experience, the greatest strides are effected when value-based imaging protocol trimming is done. It isn't terribly difficult for experts to agree on the core elements of an MRI protocol, but it is a significantly greater challenge for

radiologists to drop favorite “just in case” or “remember that one time” protocol components that deliver minimal incremental value and interfere with productivity and a more favorable patient response.

In summary, despite incremental improvements over the last 30 years, most patients continue to endure an uncomfortable MR imaging experience. A variety of measures, including but not limited to reducing scan time, would be a meaningful step in the “patient-centric” direction.

REFERENCES

1. Carlsson J, Carlsson E. 'The situation and the uncertainty about the coming result scared me but interaction with the radiographers helped me through': a qualitative study on patients' experiences of magnetic resonance imaging examinations. *J Clin Nurs*. 2013;22(21).
2. Tornqvist E, Mansson A, Larsson EM, et al. Impact of extended written information on patient anxiety and image motion artifacts during magnetic resonance imaging. *Acta Radiol*. 2006;47(5):474-480.
3. Grey SJ, Price G, Mathews A. Reduction of anxiety during MR imaging: a controlled trial. *Magn Reson Imaging*. 2000;18(3):351-355.
4. Andre JB, Bresnahan BW, Mossa-Basha M, et al. Toward quantifying the prevalence, severity, and cost associated with patient motion during clinical MR examinations. *J Am Coll Radiol*. 2015;12(7):689-695.