

## Quality Improvement in Cardiac Magnetic Resonance Imaging

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**Background:** Magnetic resonance imaging (MRI) has become more routine in the care of patients with congenital heart disease (CHD) because imaging is not limited by body habitus. Exquisite anatomic and functional data about ventricular size and vascular flow aids decision making for medical and surgical care. Anecdotal concerns complaints about the MRI experience were the catalyst for this quality improvement project, which sought to enhance patient experience in the Cardiac MRI Suite at Children’s Hospital of Wisconsin by utilizing pre- and post-MRI survey data to better appreciate patient perceptions regarding MRI.

**Methods:** From February 9 to July 11 2016, 106 consecutive patients, coming for a cardiac MRI without need for anesthesia, were asked to complete pre-MRI and post-MRI satisfaction surveys.

**Results:** 106 subjects (mode age range: 13 – 18 years) completed the pre-MRI survey and 102 completed the post-MRI survey. Interestingly, review of the pre-MRI survey showed that just over three-quarters of patients knew why they were having the MRI scan, and most (64/106, 60%) felt “prepared” for testing (Table). Many patients, nonetheless, reported some anxiety – citing: anticipation of long scan time (44 patients, 42 %), need for IV (38 patients, 36 %), claustrophobia (24, 23%), and MRI loudness (22, 21%).

| Pre MRI Survey   | N = 106 | %  |
|--|---------|----|
| Patient reports receiving information from primary cardiologist regarding added value of cardiac MRI | 82      | 77 |
| <u>Patient self-report regarding preparedness for MRI</u>  | 64      | 60 |
| Extremely or very well prepared  | 27      | 26 |
| Moderately well prepared   | 13      | 12 |
| Slightly prepared  | 2       | 2  |
| Not prepared   | 2       | 2  |
| No answer  | 2       | 2  |
| <u>Additional information requested by patients during MRI scheduling</u>                            |         |    |
| 1) Need for IV   | 16      | 15 |
| 2) Food allowed?   | 9       | 8  |
| 3) Location of scan  | 8       | 7  |
| Pre-test anxiety (any)   | 77      | 72 |
| Pre-test severe anxiety  | 14      | 13 |
| Pre-test no anxiety  | 29      | 27 |
| <u>Estimated MRI scan time</u>   |         |    |
| Less than 30 min   | 3       | 3  |
| 31 – 60 min  | 30      | 28 |
| 61 – 90 min  | 43      | 41 |
| 91 – 120 min   | 15      | 14 |
| More than 120 min  | 3       | 3  |
| Unknown  | 14      | 11 |

While nearly half (50/102) of the patients who completed the post-MRI survey met with a physician before the MRI, 8(15%) of the remaining 52 noted a desire to do so. Most patients had no concerns to report after the scan, although 7/102 noted an issue – with 1 complaint for each of the following: breath-hold too long, technologist did not listen, scan time too long, dye issue, uncomfortable table, room temperature inadequate, and unable to hear music. After imaging, 51/102 (50%) of the patients stated that the scan time overall was what they expected, while (15/102, ~ 15%) said it was “a lot shorter than expected” and 5/102 (~ 5%) “a lot longer than expected.” Finally, nearly half (49/102) expressed a desire to see images after the scan.

**Conclusions:** These surveys demonstrate that patients with CHD want to understand why a cardiac MRI scan is recommended, as well as what the procedure will entail. Thus, the next phase of this quality improvement project is focused on education of patients and referring cardiologists. The goal is that *all patients* who come to the scanner understand the added value of cardiac MRI. This information may lessen their anxiety and enhance their preparedness. In addition, in this next phase of quality improvement, we have begun to implement more rigorous imaging protocols to shorten scan time, decrease imaging variability, and avoid an IV, where possible.