

ISPY-2 BREAST

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The breast MRI protocol includes a T2-weighted sequence, diffusion-weighted imaging (DWI) sequence, and dynamic contrast-enhanced (DCE) series using a bilateral, 3D, fat-suppressed, T1-weighted sequence with 80-100 second temporal resolution. The general imaging parameters are included in Table 1 below. Sites that participate in the ACRIN 6693 protocol (pending) may qualify for an advanced protocol (not included here) that will add an optional single voxel proton magnetic resonance spectroscopy (MRS) measurement.

Sites that cannot achieve the protocol specifications listed in Table 1 because of system limitations can request approval to use out-of-range parameters. The request should be submitted to the ACRIN Imaging Core, and should detail the specific out-of-range parameters along with a qualification scan obtained using the requested protocol. Requests will be approved on a case-by-case basis.

General Requirements

- MR3 only
 - Dedicated breast radiofrequency coil
 - One pre-chemotherapy (baseline) MRI; one or more MRI exams during treatment; one post-chemotherapy, pre-surgery MRI
 - **All MRI exams for the same patient should be performed using the same magnet configuration** (manufacturer; field strength; breast coil model)
 - Patient scanned in prone position with in-dwelling IV catheter
 - Single dose contrast agent injection (FDA-approved gadolinium-based contrast agent); **the same contrast agent brand should be used for all MRI exams for the same patient.**
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- **MR3 ONLY**
 - **Page Alina Tudorica @ 11496 when the patient arrives**
 - **FOLDER: BODY NEW JAN 07 > BREAST > Breast ISPY2 > “Breast ISPY2 updated 3-11”**
 - **Patient position:** prone, head first for orientation (make sure this is also on the scanner). Breasts should be pointed UP.
 - Care should be taken to **select the smallest FOV and slice coverage that completely encompasses** both breasts and axilla.
 - **Sequences:**
 - localization scan
 - **AX T2 SPAIR** – “auto shim”, “no sense”, “auto prep”
 - **DWI**
 - **Pre T1 Thrive** – check for optimal fat suppression. Prep should be on “FULL”
 - **Post T1 Thrive**
 - copy and paste the Pre
 - change Prep to “AUTO”
 - Increase number of dynamics so the sequence length is at least 8 minutes. This means more than 8 minutes. Never less than 8 minutes.
 - Flow rate is 1ml/sec. Weight based contrast.
 - Follow with 10mL saline at 1mL/sec.
 - Start the scan at the same time you inject.
 - **Create the subtraction and send to PACS only.**
 - **Send T2, pre and Post to Dynacad**
 - **Send Only good images to PACS. Send subtraction**

Contrast Agent Administration

An intravenous catheter will be inserted in the arm or hand prior to the start of imaging. For the contrast-enhanced study (following the T2-weighted acquisition), gadolinium contrast agent will be administered intravenously at a dose of 0.1 mmol/kg body weight and rate of 1 ml/second, followed by a 10 ml saline flush. Contrast injection will begin simultaneously with the start of data acquisition.

Table 1: Pulse Sequence Parameters*

	T2-weighted	T1-weighted	DWI
Sequence type	Fast spin echo (FSE) or STIR	gradient echo (GE)	Diffusion-weighted spin echo, echo planar imaging (DW SE-EPI)
2D or 3D sequence	2D	3D	2D
Slice orientation	Axial or sagittal	Axial	Axial
Laterality	Bilateral	Bilateral	Bilateral
Frequency direction	A/P	A/P	A/P
Phase direction	R/L (axial); S/I (sagittal)	R/L	R/L
FOV - frequency	260-360 mm (axial); 180-220 mm (sagittal)	260-360 mm	260-360 mm
FOV - phase	260-360 mm (axial); 180-220 mm (sagittal)	260-360 mm	260-360 mm
Matrix – frequency (acquired)	256-512	384-512	192
Matrix – phase (acquired)	≥ 256	≥ 256	192
In-plane resolution	≤ 1.4 mm	≤ 1.4 mm	≤ 1.9 mm
Fat-suppression	Active fat-sat recommended	Active fat-sat recommended	Active fat-sat
TR	2000-10000 ms	4-10 ms	6,000 ms
TE	70-140 ms	1.3 or 4.2 ms (fat/water in-phase)	Minimum TE
Echo Train Length	≤ 16	N/A	N/A
TI (STIR sequence)	150 ms (1.5T); 300 ms (3.0T)	N/A	N/A
Flip Angle	90 degrees	10-20 degrees	90 degrees
B values	N/A	N/A	0, 800 s/mm ²
Slice thickness (acquired, not interpolated)	≤ 4 mm	≤ 2.5 mm	5 mm
Number of slices	Variable; complete bilateral coverage	≥ 60; complete bilateral coverage	Variable; complete bilateral coverage
Slice Gap	≤ 1.0 mm	No gap	No gap
Parallel imaging factor	≤ 2	≤ 2	2
No. of excitations or averages	≤ 2	≤ 2	5
k-space ordering	N/A	-k to +k (standard, non-centric)	N/A
Sequence acquisition time	≤ 7 minutes	80 sec ≤ scan time ≤ 100 sec	≤ 4 minutes
Total post-contrast imaging duration	N/A	≥ 8 minutes following injection	N/A

Scan Verification Form

ISPY2 PATIENT ID# _____ ISPY visit: 1 2 3 4

MRI DATE: _____

STUDY BREAST: Right Left

T2 SERIES: series _____

DWI SERIES: series _____

3D T1 SERIES: series _____

GADOLINIUM INJECTION RATE _____ ml/sec

Flush Volume: _____ ml

SCAN ISSUES/COMMENTS: