

Title: Evaluation of Infertility in Women with Dynamic Multi-Phase MR Hysterosalpingography: A comparison of MR Hysterosalpingography with Conventional Hysterosalpingography.

J. E. Ochsner¹, E. A. Pritts², M. A. Kliewer¹, T. C. Winter¹, F. Korosec¹, K. K. Vigen³, T. M. Grist^{1,3}, E. A. Sadowski¹

¹Department of Radiology, University of Wisconsin, Madison, WI, United States, ²Department of Obstetrics and Gynecology, University of Wisconsin, Madison, WI, United States, ³Department of Medical Physics, University of Wisconsin, Madison, WI, United States

Introduction: The purpose of this study is to develop a protocol for MR hysterosalpingography (MR-HSG) and to compare it to conventional hysterosalpingography (HSG) in the evaluation of tubal patency and uterine pathology.

Materials and Methods: Ten women, ages 27-45, with the diagnosis of infertility were recruited at the time of clinical conventional HSG. Eight subjects had free bilateral intraperitoneal spill and two subjects had a single occluded fallopian tube on conventional HSG. Of these same subjects, five demonstrated uterine contour abnormality and five had normal uterine contour on conventional HSG. The subjects underwent MR-HSG examination approximately one month after conventional HSG. The MR-HSG was scheduled during the first two weeks of the menstrual cycle, to avoid the potential of pregnancy. Anatomical T1-weighted and T2-weighted MR images were performed on a 1.5T system using a 4-element pelvic coil. After anatomical images were obtained, 20-40 cc of 1:100 dilute gadodiamide saline solution was infused into the uterus through a 5F Hystero-salpingography catheter during a dynamic time-resolved T1-weighted sequence (3D TRICKS) acquisition. Average temporal resolution of 1.8 seconds per volume was achieved using a slice thickness of 4-5mm, a matrix of 256x128, a field of view of 26-28, and 16-17 slices per volume. The acquisition time during injection was approximately 1 minute. A final T1-weighted, fat suppressed 3D-SPGR series was obtained to evaluate for intraperitoneal contrast in the pelvis. The conventional HSG and MR-HSG studies were read independently by a single blinded reader, who recorded tubal patency and uterine pathology.

Results:

Tubal Patency: MR-HSG demonstrated bilateral tubal patency as well as free peritoneal spill of contrast in seven of the ten subjects. Each of these seven subjects also had bilateral free peritoneal spill on conventional HSG. In two subjects the MR-HSG examinations were nondiagnostic secondary to patient motion or technical failure. In the remaining one subject, we found an occluded left fallopian tube on MR-HSG (confirmed by conventional HSG) and left hydrosalpinx on anatomical T2-weighted images (not seen on the conventional HSG).

Uterine Pathology: Five of ten subjects showed abnormal uterine contour on conventional HSG. On MR-HSG, three of these subjects had large leiomyomas resulting in deformity and two had arcuate uterine configurations.

Figure 1 (a-d) Dynamic time resolved MR-HSG showing bilateral free spill of contrast into the peritoneum (a-d). White arrows point to bilateral free spill.

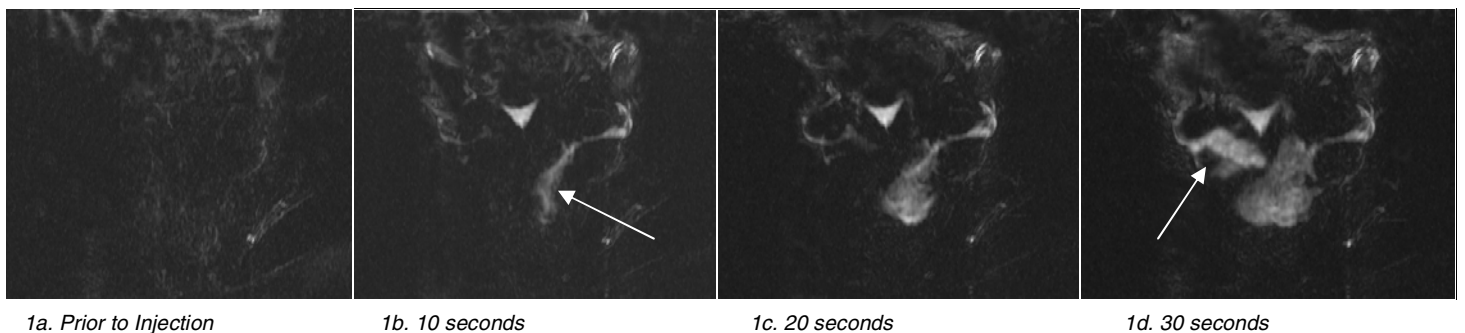
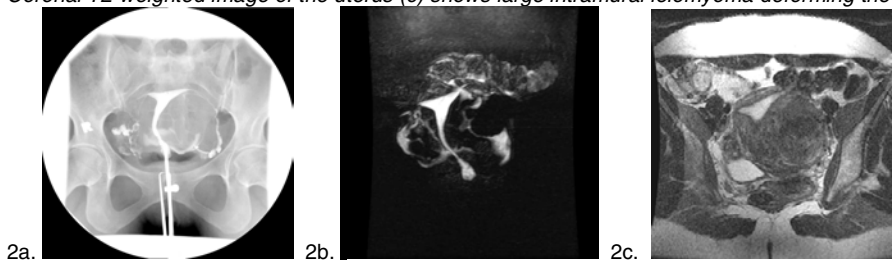


Figure 2 (a-c): Conventional HSG (a) and MR-HSG (b) both demonstrate free spill of contrast into the peritoneum and abnormal uterine contour. Coronal T2-weighted image of the uterus (c) shows large intramural leiomyoma deforming the uterine cavity.



Conclusion: This preliminary data indicates that 3D time-resolved MR-HSG is a comparable study to conventional HSG in the evaluation of tubal patency in infertile women. Pelvic MR imaging is, however, superior to conventional HSG in the characterization of uterine congenital abnormalities and uterine contour abnormalities. Therefore, MR-HSG has the potential for a single comprehensive pelvic imaging examination without the use of ionizing radiation in infertile women.

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