

Use of gadolinium for hysterosalpingography in iodine allergic women: a case-control study

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Objective: To examine the performance of gadolinium in iodine-sensitive women undergoing hysterosalpingography.

Design: Case-control study.

Setting: Odessa Regional Hospital, Texas.

Patient(s): Seven women, three with no allergies to iodinated contrast medium (controls) and four with known allergies.

Intervention(s): Use of gadolinium in women with known allergies to iodinated contrast medium.

Main Outcome Measure(s): How does gadolinium compare as a diagnostic tool in hysterosalpingogram versus iodinated contrast medium?

Result(s): The images of the uterus and unobstructed fallopian tubes produced by gadolinium appear to yield equally diagnostic results compared with images produced by iodinated contrast medium.

Conclusion(s): It appears that hysterosalpingogram with gadolinium is a viable option for patients that are allergic to iodinated contrast medium. (Fertil Steril® 2008; ■: ■-■. ©2008 by American Society for Reproductive Medicine.)

Key Words: HSG, gadolinium, iodine allergy, infertility

Hysterosalpingogram (HSG) is a radiological study that is often used during the infertility workup. It is usually done in the radiology department of the hospital. Iodinated contrast is injected into the uterine cavity through the cervix, allowing the uterine cavity and fallopian tubes to be evaluated. It accurately defines the size and shape of the uterine cavity and assesses whether the fallopian tubes are patent (1, 2).

Occasionally, a patient presents with a history of an allergic reaction to iodinated contrast medium. Recently, two case reports have indicated the use of gadolinium as an alternative to iodinated contrast for HSG in women who are allergic to the iodinated contrast media (3, 4). In this case-control study, we report the use of gadolinium in lieu of radiographic contrast dye to evaluate the pelvis in women with or without allergies to iodinated contrast medium.

Chealated gadolinium is a commonly used contrast agent for magnetic resonance imaging (MRI). Gadolinium is a heavy metal element that can be used as a radiographic con-

trast material as well (5). It was approved by the Food and Drug Administration in 1988 for use in MRI. It has been used for many years on thousands of patients in the United States, Europe, and Japan with minimal serious complications. The half-life is 1.6 hours, and it is not metabolized by the human body. It is excreted by the kidney so it is not recommended for use in patients with renal impairment (6). There have been a few side effects identified such as mild headache, nausea, and local burning (6). Gadolinium is approximately \$30–50 more expensive than iodinated contrast.

MATERIALS AND METHODS

Patients

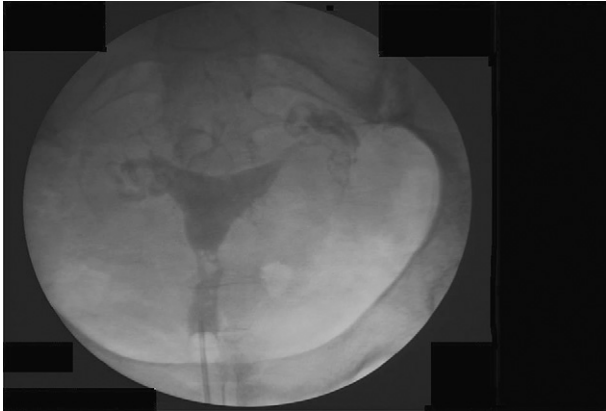
Institutional Review Board approval was obtained through the Odessa Regional Hospital before the start of the study. This is a case-control study of seven women who underwent HSG for infertility workup. Three of the study participants did not have allergies to medications or contrast medium. The remaining four participants had a known allergic reaction to iodinated contrast medium. Informed consent was obtained before the procedure. A 5-day course of oral antibiotics and a blood β -hCG quantitative test were done. The HSG was performed on day 8–10 of the menstrual cycle. The patient was placed in the dorsal lithotomy position and was prepped and draped in the normal sterile fashion. The cervix was visualized

Received May 7, 2006; revised and accepted February 12, 2007.

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FIGURE 1

Control subject A injected with gadolinium.



Belt. Hysterosalpingography using gadolinium. Fertil Steril 2008.

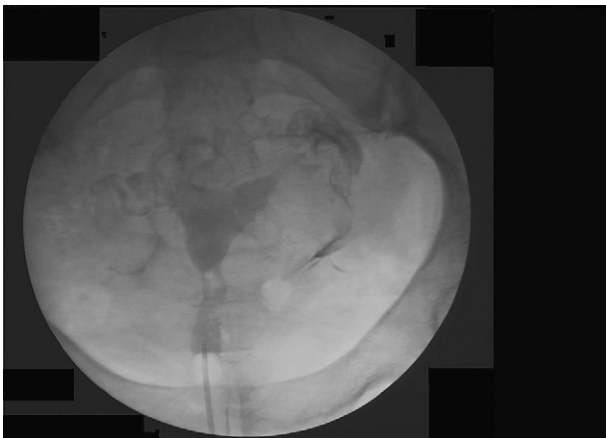
through the speculum, and a Cook silicone balloon HSG catheter or a cone cannula was inserted into the cervix.

Experimental Design

The control arm of the study consisted of three women without allergies to iodinated contrast medium. The study was set up as previously described. Three microliters of gadolinium contrast was slowly injected into the uterine cavity, and images were obtained. Iodinated contrast was then injected into the uterine cavity, and a second set of images was obtained. In the experimental arm of the study, four patients who had allergies to iodinated contrast medium were injected with gadolinium only and images were then obtained. The radiologist who read the images was blinded as to which contrast medium was used.

FIGURE 2

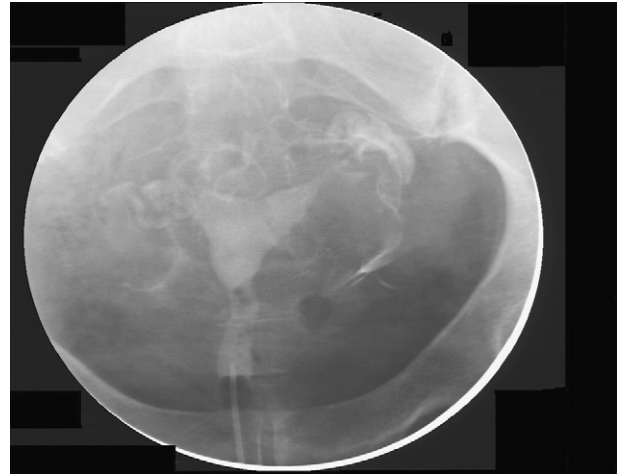
Control subject A injected with gadolinium. The uterus has filled nicely, and bilateral fallopian tubes have also filled, with adequate spill noted.



Belt. Hysterosalpingography using gadolinium. Fertil Steril 2008.

FIGURE 3

Control subject B injected with iodinated contrast medium.



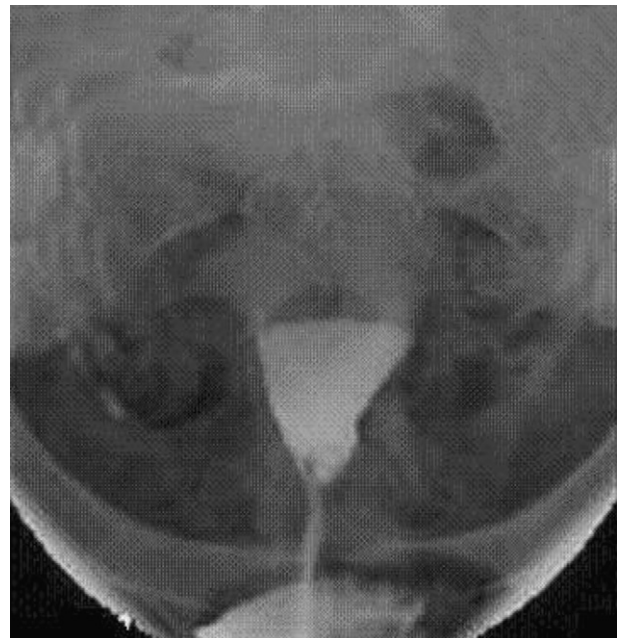
Belt. Hysterosalpingography using gadolinium. Fertil Steril 2008.

RESULTS

In our study, no allergic reactions to any of the contrast media occurred. When comparing the two contrast media in control subject A (Figs. 1–3), the only difference noted is that the iodinated contrast is denser and therefore produces a darker image.

FIGURE 4

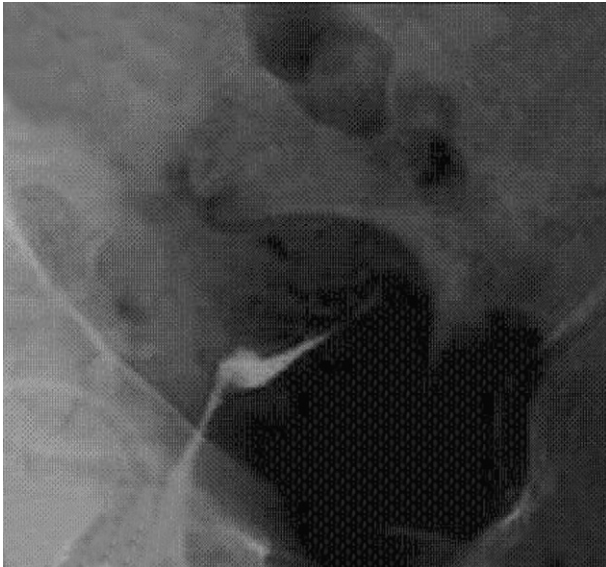
Control subject B injected with gadolinium. The fallopian tubes have failed to fill and there is no tubal spill.



Belt. Hysterosalpingography using gadolinium. Fertil Steril 2008.

FIGURE 5

Control subject B injected with gadolinium. In this view an intramural myoma is seen impinging on the uterine cavity.



Belt. Hysterosalpingography using gadolinium. Fertil Steril 2008.

Figure 4 is another control subject injected with gadolinium. From this view, the uterine cavity has filled and the fallopian tubes have not. In this image, gadolinium has allowed us to observe some pathological blocked fallopian tubes with no spill from the tubes. Figure 5 is the same control subject as in Figure 4 who received gadolinium. From this view an intramural myoma is seen impinging on the uterine cavity. There is still no spill observed from the fallopian tubes.

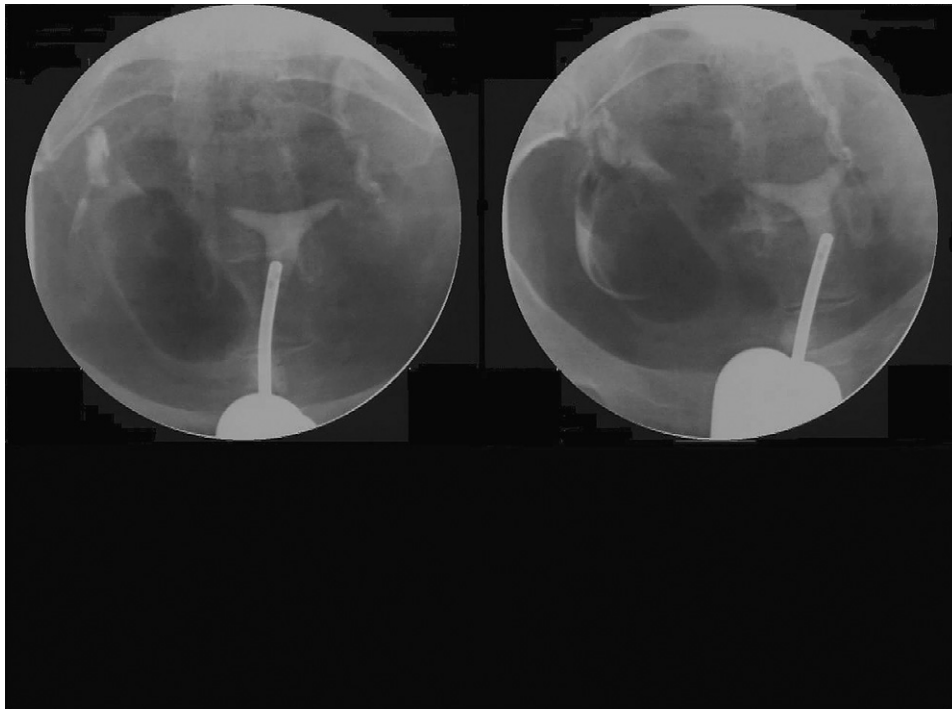
Figure 6 is an image from a patient in the experimental arm of our study. She received gadolinium only. The image on the left shows the slow injection of the gadolinium, and the image on the right shows the patient's patent fallopian tubes; adequate spill is noted. Figure 7 is another patient from the experimental arm of the study. This image has undergone digital manipulation by the radiologist. After digital manipulation the image is much darker.

DISCUSSION

The density of gadolinium is less than that of iodinated contrast, but, as seen after digital manipulation of the images, the opacity difference is compensated for between the two contrast agents. The gadolinium images appear to yield equally diagnostic results when compared with regular iodinated contrast images. Gadolinium for use in HSG with patients who are allergic to iodinated contrast appears to be

FIGURE 6

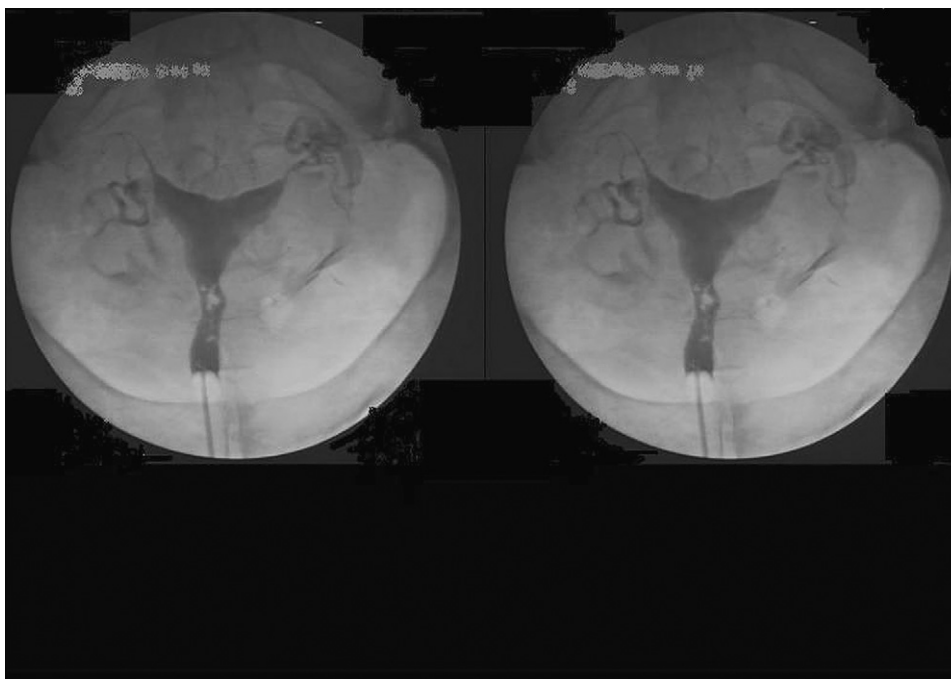
An image from a patient in the experimental arm. She received only gadolinium. The image on the left shows the slow injection of the gadolinium, and the image on the right shows the patient's patent fallopian tubes; adequate spill is noted.



Belt. Hysterosalpingography using gadolinium. Fertil Steril 2008.

FIGURE 7

Another patient from the experimental arm. This image has undergone digital manipulation by the radiologist. After digital manipulation, the image is much darker.



Belt. Hysterosalpingography using gadolinium. Fertil Steril 2008.

a useful alternative. Our more extensive results compare equally with the conclusions of the two previous case reports (3, 4). Our results are also consistent with a report by Ose et al. (5) indicating that gadolinium is an alternative for patients undergoing x-ray angiography who have a severe allergy to iodinated contrast media.

Overall, cost is less with the use of gadolinium in HSG when compared with other options for patients with iodinated contrast allergies. Currently, these patients must undergo an MRI when trying to evaluate the pelvis, especially the uterine cavity, and it is considerably more costly. Another option for these patients is a diagnostic laparoscopy with chromotubation, which is very expensive and has more risks associated with it than an HSG does. Although further research in this area is necessary to establish its diagnostic value, it appears that HSG with gadolinium can provide a cost-effective and

safe option for patients with or without allergies to iodinated contrast.

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6. <http://fda.gov/cder/drug/infopage/gcca/qa.htm>