

Oil or water-based contrast for hysterosalpingography?



The therapeutic potential of hysterosalpingogram (HSG) for infertility is an attractive notion because HSG is a single procedure and thus less time consuming than all standard fertility treatments. In many U.S. markets, diagnostic procedures for infertility are more commonly covered by insurance than treatment, so this has cost-saving potential for the patient as well. Although many patients would nevertheless choose to move ahead with standard treatments rather than continue attempting natural conception after tubal patency is confirmed, an intervention with even modest improvement in success with fertility treatment should be considered.

The proposed mechanism by which HSG may improve pregnancy rates in subsequent ovulatory cycles is tubal flushing to clear any debris or mucus obstructing the free transport of oocyte, spermatozoa, and/or embryo. Various randomized trials have sought to identify the impact of tubal flushing, including the H2Oil trial presented here which was designed to compare the two available types of contrast media, oil and water based. The initial report of the H2Oil trial found higher pregnancy and live-birth rates after the use of an oil medium compared with the water-based medium, with a greater reported effect size after 6 months of follow up evaluation (1). Van Rijswijk et al. (2) report on a full 5 years of follow-up evaluation in this issue of *Fertility and Sterility*. It is noteworthy that some level of benefit has been associated with water-based media as well (3), but proponents of oil-based media cite higher pregnancy rates. Conversely, proponents of water-based media cite safety concerns and improved radiographic image quality.

The complication rates after HSG with an oil-based contrast medium have been reported to be higher compared with water-based contrast (4). The clinically significant complications of HSG include intravasation of the contrast medium, allergic reaction, and infection. The serious adverse outcomes can include fat embolism and pelvic inflammatory disease (PID). The occurrence of fat embolism and patient decompensation when oil-based contrast is used has been restricted to case reports and appears to be rare or essentially nonexistent in more recent literature with modern media and the use of fluoroscopy. The risk of PID after HSG is low, regardless of the contrast medium used (0.2% to 0.3%) (4).

The van Rijswijk et al. study (2) provides a longer follow-up period than the previous studies, seeking to provide an answer to the question of whether this effect persists long term. Compared to this 5-year study (ongoing pregnancy: rate ratio 1.07; 95% confidence interval [CI], 1.00–1.14; $P=.04$, oil vs. water-based contrast), the original study (1) noted a larger magnitude of difference between the oil and water-based contrast groups (rate ratio 1.37; 95% CI, 1.16–1.61). This makes biologic sense if debris accumulates in tubes over time from events such as retrograde menstruation and tubal secretions. The more time that has elapsed since a tubal flushing event, the less impact from this event would be ex-

pected. Alternatively, patients who benefit from HSG may represent a subgroup of women undergoing testing, with those not achieving a pregnancy within the first few months unlikely to benefit.

Because the original study is available to us, it is possible to eliminate the pregnancies within the first 6 months and compare the late pregnancy rates that occurred beyond the initial follow-up period. When the initially reported pregnancies are excluded, comparing the pregnancies from the last 4.5 years of follow up, the pregnancy rate between groups is similar: 224 (66.9%) of 335 for oil-based compared with 258 (64.8%) of 398 for water-based contrast. This indicates that most of the benefit of HSG with oil-based contrast is seen within the first 6 months. It is also unsurprising that no difference in the rate of conceiving a second pregnancy was found between the groups.

The choice of contrast medium to use will belong to each provider, as he or she assesses what magnitude of benefit the use of oil-based contrast would contribute to improving patient outcomes in their practice. In the H2Oil trial, participants underwent treatment according to the prediction model of Hunault et al. (5), where the good-prognosis patients initially received expectant management. In many practice settings, particularly in the United States, once a diagnosis of infertility is established the couple is unlikely to continue attempting unassisted conception, so the rate of spontaneous pregnancy after HSG may not be as relevant to that provider. Even a small increased risk of complications may not be acceptable in some ambulatory settings.

Additionally, practices often perform HSG procedures on patients who are considered to be at risk for tubal obstruction. These patients have a higher risk of intravasation, in which case water-based contrast may be preferable. The choice then becomes whether to use water-based contrast for all procedures or to stock two different types of contrast media and decide which to use in each case. Staff setting up for the procedure may not be knowledgeable about the patient's history, so they would need to ask the provider which medium to use, adding a step.

In summary, there are risks and benefits to the HSG procedure that may be influenced in part by the choice of contrast medium. Cost and availability may play a role in this decision making. Multiple studies, including this one, indicate an effect of oil-based media on improved pregnancy outcomes. Although this long-term follow-up study confirms the findings of the initial report of the H2Oil trial, the beneficial effect of oil-based contrast can be largely attributed to the first 6 months after the procedure.

Heather R. Burks, M.D.

Karl R. Hansen, M.D., Ph.D.

Department of Obstetrics and Gynecology, University of Oklahoma College of Medicine, Oklahoma City, Oklahoma

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