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Editorial

Is hysterosalpingography a good tool to confirm the patency of tubes?

Hysterosalpingography (HSG) plays a crucial role in determining the anatomic causes of female subfertility and/or infertility, especially for uterine structure and tubal status abnormalities.[1] These structural abnormalities include septum or tumor of the intrauterine cavity, adhesion or filling defect of the intrauterine cavity, and hydrosalpinx, tubal adhesion, or tubal occlusion, which may be detected by HSG examination. However, reliability of HSG is always questionable, especially for the diagnosis of tubal occlusion. Spasms of the lower genital tracts might be one of the single most factors contributing to pseudo-obstruction of tubes during HSG examination. In fact, HSG is still considered to be a relatively uncomfortable and an even painful procedure, which might be bothersome to women during examination.[2,3] However, tubal occlusion, when the diagnosis is made, may result in different therapeutic choices for the affected couples. In theory, it is impossible to use less invasive and more economically assisted reproductive techniques, such as an intrauterine insemination,[4] to facilitate these infertile couples with tubal occlusion. By contrast, a true tubal occlusion should be treated with recanalization either through an advanced technological method such as robotic surgery or microscopic surgery,[5] and directly by *in vitro* fertilization and/or embryo transplantation,[6] which is not required for tubal spasm. Therefore, an accurate determination of the potential causes of female infertility is required to facilitate effective treatment and avoid pitfalls related to inappropriate or delayed therapy. Subsequent confirmation of tubal problems is especially critical when assisted reproductive techniques are planned. Laparoscopy might be the optimum and thus the "gold standard" procedure for this purpose.[7] Therefore, it is not surprising that Kahyaoglu and colleagues[8] used diagnostic laparoscopy as a reference to evaluate the reliability and accuracy of HSG in infertile women in their study published in this issue of the *Journal of the Chinese Medical Association*.

The study by Kahyaoglu and colleagues[8] examined 89 infertile women who had received HSG and diagnostic laparoscopy procedures simultaneously, and found that women with diagnostic laparoscopy-confirmed tubal patency might have shorter time-period intervals between the first HSG and distal tubal filling than those with tubal occlusion (8.4 seconds vs. 12.0 seconds, $p = 0.057$). Based on the absence of statistical significance, the authors concluded that it remained uncertain as to the value necessary to detect the clinically reliable objective time-period interval for finalizing the HSG procedure and proceeding with diagnostic laparoscopy.[8] This study is interesting and worthy of further discussion.

It is necessary to exclude the potential pitfalls during the HSG examination, including tubal spasm, mucus plugging, infection, prior surgery, and granulomatous salpingitis.[9] Adequate pain control, delayed radiography, the use of a spasmolytic agent, three-dimensional hysterosalpingo-contrast-sonography (3-D sono-HSG) or hysterosalpingosonography (sono-HSG), and repeated HSG examination might be performed to help differentiate tubal spasm from true tubal occlusion in infertile women with suspicious structure abnormalities.[9–12] In addition, the use of sono-HSG should be reconsidered in place of conventional HSG as the tool of choice to diagnose structural abnormalities in infertile women, based on the following advantages of sono-HSG over HSG: obviating ionizing radiation, the risk of iodine allergy, and sono-HSG's greater sensitivity and specificity in detecting abnormalities of the uterine cavity and permitting concomitant visualization of the ovaries and myometrium.[11] A recent systematic review with meta-analysis showed that 3-D sono-HSG has pooled estimated sensitivity of 98% [95% confidence interval (CI): 91–100), pooled estimated specificity of 90% (95% CI: 83–95), positive likelihood ratio of 10.3 (95% CI: 5.6–18.7), and negative likelihood ratio of 0.02 (95% CI: 0.00–0.21), suggesting that 3-D sono-HSG is an accurate test for diagnosing tubal occlusion in infertile women.[12] Therefore, for infertile women who are supposed to have tubal occlusion during conventional HSG examination, the above-mentioned strategies might be first attempted to minimize the use of considerably more invasive procedures such as diagnostic laparoscopy or otherwise. Ultimately, using the sono-HSG in place of conventional HSG for infertile women might be highly recommended as the first step to investigate the structure abnormalities of the uterine cavity and tubes.

In conclusion, conventional HSG is still a useful tool to determine the causes of infertility in women. However, the false positive rate of tube occlusion should be always kept in mind. Many strategies could be utilized to overcome the limitations of conventional HSG, including laparoscopy as shown by Kahyaoglu and colleagues[8] in this issue of the *Journal of the Chinese Medical Association*. Considering the better choices that may be available for both patients

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and physicians, further study might be needed to determine the best tools for women with subfertility and/or infertility.

Conflicts of interest

The authors declare that they have no conflicts of interest related to the subject matter or materials discussed in this article.

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References

1. Tsui KH, Lin LT, Cheng JT, Teng SW, Wang PH. Comprehensive treatment for infertile women with severe Asherman syndrome. *Taiwan J Obstet Gynecol* 2014;**53**:372−5.
2. Lee WL, Yen MS, Wang PH. Does a male operator increase the pain perception of women undergoing hysterosalpingography examination? *J Chin Med Assoc* 2015;**79**:427−9.
3. Tokmak A, Kokanali MK, Güzel Aİ, Taşdemir Ü, Akselim B, Yilmaz N. The effect of preprocedure anxiety levels on postprocedure pain scores in women undergoing hysterosalpingography. *J Chin Med Assoc* 2015;**78**:481−5.
4. Lin LT, Tsui KH, Wang PH. The earlier the better: when should intrauterine insemination be done? *J Chin Med Assoc* 2017. http://dx.doi.org/10.1016/j.jcma.2016.07.002. In press.
5. Cheng HY, Chen YJ, Wang PH, Tsai HW, Chang YH, Twu NF, et al. Robotic-assisted laparoscopic complex myomectomy: a single medical center's experience. *Taiwan J Obstet Gynecol* 2015;**54**:39−42.
6. Tsui KH, Lin LT, Chang R, Huang BS, Cheng JT, Wang PH. Effects of dehydroepiandrosterone supplementation on women with poor ovarian response: a preliminary report and review. *Taiwan J Obstet Gynecol* 2015;**54**:131−6.
7. Horng HC, Wang PH. Ovarian cancer presenting as an acute abdomen was successfully diagnosed and managed by laparoscopy. *Taiwan J Obstet Gynecol* 2012;**51**:146−7.
8. Kahyaoglu S, Yumusak OH, Kahyaoglu I, Kucukbas GN, Esercan A, Tasci Y. Evaluation of time lapse for establishing distal tubal occlusion diagnosis during hysterosalpingography procedure performed by using water soluble contrast media. *J Chin Med Assoc* 2017;**80**:313−8.
9. DeBenedectis C, Ghosh E, Lazarus E. Pitfalls in imaging of female infertility. *Semin Roentgenol* 2015;**50**:273−83.
10. Hindocha A, Beere L, O'Flynn H, Watson A, Ahmad G. Pain relief in hysterosalpingography. *Cochrane Database Syst Rev* 2015;**9**:CD006106.
11. Maheux-Lacroix S, Boutin A, Moore L, Bergeron ME, Bujold E, Laberge P, et al. Hysterosalpingosonography for diagnosing tubal occlusion in subfertile women: a systematic review with meta-analysis. *Hum Reprod* 2014;**29**:953−63.
12. Alcázar JL, Martinez-Astorquiza Corral T, Orozco R, Dominguez-Piriz J, Juez L, Errasti T. Three-dimensional hysterosalpingo-contrast-sonography for the assessment of tubal patency in women with infertility: a systematic review with meta-analysis. *Gynecol Obstet Invest* 2016;**81**:289−95.

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