



THE DIAGNOSTIC VALUE OF LAPAROSCOPY FOR THE EVALUATION OF PATENT BUT ABNORMAL TUBES ON HYSTEROSALPINGOGRAPHY

HİSTEROSALPİNGOGRAFİDE PATENT FAKAT ANORMAL TUBAL YAPI SAPTANAN HASTALARIN DEĞERLENDİRİLMESİNDE LAPAROSKOPİNİN TANISAL DEĞERİ

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Abstract

Objective: The diagnostic value of hysterosalpingography (HSG) findings suggestive of subtle tubal pathologies is controversial. The gold standard method to evaluate the fallopian tubes is laparoscopy. The aim of this study is to explore the laparoscopic findings of patients with abnormal findings but patent tubes detected on HSG.

Methods: The study population included infertile women undergoing laparoscopy for further evaluation of abnormal tuba-related findings on HSG. The HSG views were evaluated for the presence of tubal patency and the convoluted tubes, loculation of the dye in the peritubal area, tubal ectasia, and fimbrial phimosis. The type and frequency of pelvic pathologies detected on laparoscopic examination and the predictive value of patent but abnormal fallopian tube finding on HSG were analyzed.

Results: A total of 73 laparoscopy cases were eligible. Of these, 18 (25%) had normal laparoscopic findings. In 75% of the cases, there was at least one pelvic pathology detected during laparoscopy. The most common pelvic pathology detected was tubal adhesions. Tubal adhesions were detected in 21 cases (29%). Fimbrial phimosis was detected in 11 cases (13%). Paratubal cysts were detected in 7 cases (10%).

Conclusion: While evaluating a HSG, focusing only on tubal patency may result in the failure of detecting subtle tubal pathologies. Clinicians should be familiar with abnormal HSG findings suggestive of tubal abnormalities. Careful examination of the HSG views regarding other tubal pathologies is warranted as these subtle conditions may impair fertility and laparoscopic correction of these pathologies has a positive impact on fertility.

Keywords: Fallopian tube, hydrosalpinx, infertility, laparoscopy, hysterosalpingography.

Öz

Amaç: Tubal açıklığın olduğu durumlarda, tubal patolojileri düşündüren diğer histerosalpingografi (HSG) bulgularının tanisal değeri tartışmalıdır. Fallop tüplerini değerlendirmek için altın standart kabul edilen yöntem ise laparoskopidir. Bu çalışmanın amacı HSG’de tubal açıklık saptanan ancak anormal bulguları olan hastaların laparoskopik bulgularını araştırmaktır.

Yöntem: Çalışma popülasyonu, HSG’de saptanan anormal tubal bulguların ileri değerlendirmesi için laparoskopisi yapılan infertil kadınları içermektedir. HSG görüntüleri tubal açıklık, kıvrımlı tüpler, peritubal alanda boyanın göllenmesi, tubal ektazi ve fimbrial fimosis varlığı açısından değerlendirilmiştir. Laparoskopik değerlendirmede saptanan pelvik patolojilerin tipi ve sıklığı araştırılmıştır.

Bulgular: Toplam 73 laparoskopisi vakası çalışmaya dahil edilmiştir. Bunların 18’inde (%25) normal laparoskopik bulgular saptanmıştır. Vakaların %75’inde laparoskopisi sırasında en az bir pelvik patoloji tespit edilmiştir. En sık saptanan pelvik patoloji tubal adezyonlardır. 21 olguda (%29) tubal adezyon saptanmıştır. Vakaların %23’ünde endometriotik implantlar saptanmıştır. 11 olguda (%13) fimbrial fimosis, 7 olguda (%10) ise paratubal kistler tespit edilmiştir.

Sonuç: HSG değerlendirmesi esnasında sadece tubal açıklığa odaklanmak, diğer tubal patolojilerin tespit edilememesine neden olabilir. Klinisyenler, tubal anormallikleri düşündüren anormal HSG bulgularına aşina olmalıdır. Bu patolojilerin infertiliteye sebep olması ve laparoskopik tedavilerinin fertilité üzerinde olumlu etkisi olması, HSG görüntülerinin bu patolojiler açısından dikkatli bir şekilde incelenmesini gerekli kılmaktadır.

Anahtar Kelimeler: Fallop tüpü, hidrosalpink, histerosalpingografi, infertilite, laparoskopisi.

Introduction

Infertility is defined as failure to conceive despite 12 months of unprotected sexual intercourse.¹ Infertility can be related to various factors including tubal factor, ovulatory disorders, uterine pathologies, and male factor. Among these, tubal factor infertility is the most common cause of female infertility.² Tubal factor accounts for 35% of female infertility cases and is also associated with perinatal complications.³ Therefore, tubal status should be carefully investigated during infertility workup. There are several methods to assess tubal condition such as hysterosalpingography (HSG), sonohysterosalpingography, hystero-contrast sonography, and laparoscopy.⁴ Among these, HSG has been considered the initial step to screen tubal patency. It is a minimally invasive, safe fluoroscopic method with high sensitivity.^{5,6}

The main tubal pathology detected on HSG includes hydrosalpinx with distal occlusion which undoubtedly requires further investigation.⁷ However, there are other tubal abnormalities such as tubal ectasia, fimbrial phimosis and collection of the dye around the fimbrial end where tubal patency is intact. Although blocked tubes on HSG warrant further evaluation, the optimal management of these HSG abnormalities with patent tubes is less clear.

This study aimed to explore the laparoscopic findings of patients with abnormal findings but patent tubes detected on HSG.

Methods

Ethical approval for this research was obtained from the Institutional Review Board of Kocaeli University (approval number: GOKAEK-2022/10.16, approval date: 09/06/2022). All patients gave informed consent to participate in the study. All procedures performed in this study were in accordance with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

This was a retrospective cross-sectional study conducted at the Kocaeli University Department of Obstetrics and Gynecology. The study population included infertile women undergoing laparoscopy for tubal assessment between January 2020-March 2022. The inclusion criteria consisted of infertile women having patent tubes but abnormal tuba-related findings on HSG, and undergoing laparoscopy for tubal evaluation. Women with previous tubal surgery, having a blocked tube on HSG, and undergoing laparoscopy for non-tubal pathologies were excluded.

The HSG views were evaluated by an expert gynecologist who has special training in infertility. The HSG views were evaluated for the presence of the convoluted tubes, loculation of the dye in the peritubal area, tubal ectasia, and fimbrial phimosis. If one or more findings were present on HSG with patent tubes, these patients were included in the study.

During the study period, 75 laparoscopy cases were eligible for the study. The main outcome measure was to determine the type and frequency of pelvic pathologies detected on laparoscopic examination and the diagnostic value of patent but abnormal fallopian tube finding on HSG.

Laparoscopy Technique

The laparoscopy procedure was performed under general anesthesia. The patient was placed in a low lithotomy position. A rubin cannula was inserted through the cervical canal and bladder catheterization was performed. After the establishment of CO₂ pneumoperitoneum, a 10-mm infraumbilical trocar was inserted. Then, the camera was introduced through the port. An additional 5-mm port was placed in the right lower quadrant under direct endoscopic visualization. The pelvis was carefully inspected for peritoneal adhesions, adhesions between organs, and endometriotic implants. The fallopian tubes were evaluated for the presence of hydrosalpinx, peritubal adhesions, fimbrial adhesions, and phimosis. Then, tubal patency was tested by chromopertubation. Methylene blue dye was introduced through the rubin cannula to inspect the passage of the dye through the fallopian tubes and spill into the peritoneal cavity. The procedure was completed after the removal of the instruments and deflation of the pneumoperitoneum.

Statistical Analysis

All statistical analyses were conducted using the Statistical Package for Social Sciences (SPSS) version 21.0 (IBM Corp., Armonk, NY, USA). Continuous data were expressed as mean \pm standard deviation. Categorical data were expressed as numbers and percentages. The laparoscopic evaluation was considered the gold standard method to assess tubal condition.

Results

A total of 75 laparoscopy procedures were performed to evaluate the HSG finding of abnormal but patent tubes. Two laparoscopic procedures were converted to laparotomy due to technical difficulties. The remaining 73 laparoscopic procedures were completed successfully. No major complication occurred in any of these procedures. The mean female age was 33,2 \pm 6,0 with a range between 23 and 48 years. The age distribution of the patients is shown in Table 1.

Of 73 cases, 18 (25%) had normal laparoscopic findings with no tubal or peritoneal pathology. Therefore, in 75% of the cases, there was at least one pelvic pathology detected during laparoscopy. Chromopertubation was performed in all cases. The dye passed through both tubes and spilled into the peritoneal cavity in 59 cases (81%). In 14 cases, the dye couldn't pass through either one tube or both tubes.

The most common pelvic pathology detected was tubal adhesions (Table 2). Tubal adhesions were detected in 21 cases (29%). Of these 21 cases, 5 cases had only peritubal adhesions while the others had more widespread adhesions. The endometriotic implants were detected in 17 (23%) cases. Hydrosalpinx was detected in 17% of the patients, and these patients underwent salpingectomy. Two patients had blocked tubes without hydrosalpinx. Tubal ectasia was detected in 13 cases (18%).

Fimbrial phimosis was detected in 11 cases (13%). Paratubal cysts were detected in 7 cases (10%). Chlamydial inclusions were detected in three cases. These cases also had peritubal and peritoneal adhesions. Tubal diverticulum was detected in one case.

Table 1. The age distribution of the patients

Age (years)	n	%
21-30	29	40
31-40	34	46
>40	10	14

Table 2. The laparoscopic findings of the patient

Laparoscopic findings	Number of patients (n=73)	%
Normal laparoscopy	18	25
Adhesions	21	29
Endometriotic implants	17	23
Hydrosalpinx	12	17
Tubal ectasia	13	18
Fimbrial phimosis	11	13
Paratubal cysts	7	10
Chlamydial inclusions	3	4
Blocked tubes without hydrosalpinx	2	3
Tubal diverticulum	1	1

Discussion

HSG has been considered the standard method to evaluate tubal patency.⁸ The diagnostic accuracy of HSG for proximal and distal tubal obstruction has been extensively studied.^{6,9} However, HSG can also provide information regarding tubal architecture, fimbrial phimosis, and peritubal adhesions.⁸ In this study, we examined the laparoscopic correlation of the conditions where HSG documents patent but abnormal tubes. According to our results, at least one pelvic pathology was detected during laparoscopic examination in three-quarters of the patients. Therefore, this study suggests that laparoscopy may be a viable option for further evaluation when HSG suggests tubal abnormality even if the tubes are patent.

In the present study, laparoscopic examination of the cases with patent but abnormal tube finding on HSG revealed that half of the cases had pelvic adhesions, endometriotic implants, or both. Peritoneal factors may affect the tubes and impair fertility. Pelvic adhesions may distort the normal anatomic relationship between ovaries and fallopian tubes and interfere with the capture of the oocyte by the fallopian tube.¹⁰ Similarly, endometriosis may impair tubal function and cause infertility.¹¹ Furthermore, laparoscopic correction of these pathologies may improve fertility which makes the diagnosis of these conditions more essential.^{12,13}

Laparoscopy makes the definitive diagnosis of peritoneal factors.¹⁴ However, laparoscopy is not recommended as a routine procedure in the evaluation of infertile women.⁸ Rather, it is spared for cases with suspected pelvic pathology. Physical examination and transvaginal ultrasonography are rarely useful for the diagnosis of peritoneal factors unless there is a visible endometrioma on ultrasound.⁸ The diagnostic value of HSG is also low for

peritoneal factors. However, a previous study suggested that the diagnostic accuracy of HSG for peritubal adhesions can be increased by searching signs such as convoluted tubes, and loculation of the dye in the peritoneum.¹⁵ In agreement with this previous study, we also detected a high prevalence of endometriotic implants and peritoneal adhesions in our cases where HSG showed convoluted tubes, loculation of the dye in the peritubal area, tubal ectasia, or fimbrial phimosis.

The main pathological HSG findings regarding the distal end of the tube are hydrosalpinx and fimbrial phimosis. Hydrosalpinx refers to a dilated and tortuous tube with a blocked distal end.¹⁶ Fimbrial phimosis is the narrowing of the distal end of the tube.¹⁷ Dilatation of the ampullary portion of the tube on HSG is suggestive of fimbrial phimosis. Not only hydrosalpinx but also fimbrial phimosis has a negative impact on fertility.^{7,17} Furthermore, laparoscopic fimbrioplasty has been suggested as an effective treatment option to increase pregnancy rates in patients with distal tubal end pathology.^{7,18} In the present study, the prevalence of hydrosalpinx was 17% and the incidence of fimbrial phimosis was 13%. In sum, 30% of the patients had distal end pathology that requires surgical treatment. These cases would be undiagnosed and untreated if the absence of tubal factor was diagnosed based exclusively on tubal patency on HSG. In line with our results, previous studies also suggest that HSG is a useful screening method for fimbrial and peritoneal pathologies.^{19,20}

Conclusion

Focusing only on tubal patency during HSG evaluation may result in the failure of detecting subtle tubal pathologies. Clinicians should be familiar with abnormal HSG findings suggestive of tubal abnormalities. Careful examination of the HSG views regarding other tubal pathologies is warranted as these subtle conditions may impair fertility and laparoscopic correction of these pathologies has a positive impact on fertility.

Limitations

The main limitations of the study were its retrospective nature, and the small sample size. However, our study is important in terms of raising awareness among clinicians about detecting subtle tubal pathologies on HSG. Further prospective studies with larger sample sizes are required to explore the diagnostic accuracy of HSG for subtle tubal pathologies.

Conflict of Interest

The authors declare no conflicts of interest.

Compliance with Ethical Statement

Ethical approval for this research was obtained from the Institutional Review Board of Kocaeli University (approval number: GOKAEK-2022/10.16, approval date: 09/06/2022).

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Author Contributions

Study hypothesis: OSYC, MZ; Study design: OSYC, AMK, MZ; Project development: ED, AMK; Literature search:

OSYC, MZ; Analysis: MZ, AMK, ED; Manuscript writing: OSYC, AMK; Critical review: MZ, OSYC, ED

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