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不孕症女性三维子宫输卵管造影联合阴道二维超声的诊断意义*

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摘要 目的:探讨不孕症女性三维子宫输卵管造影联合阴道二维超声的诊断意义。**方法:**2019年3月至2020年10月选择在西安医学院第二附属医院和陕西省人民医院诊治的不孕症女性患者90例,所有患者都给予三维子宫输卵管造影联合阴道二维超声检查,记录成像质量与疼痛情况。以X线子宫输卵管造影为金标准,判断诊断价值。**结果:**检查过程中三维超声造影患者的疼痛评分高于二维超声,对比差异无统计学意义($P>0.05$)。三维超声造影的成像质量优良率为100.0%(90/90),高于二维超声的93.3%(84/90),对比差异有统计学意义($P<0.05$)。在90例患者中,三维超声造影判断为卵巢周围组织弥散1级59例,2级16例,3级10例,4级5例。三维子宫输卵管造影联合阴道二维超声判断为输卵管通畅55例,通而不畅25例,阻塞10例。X线子宫输卵管造影判断为输卵管通畅53例,通而不畅26例,阻塞11例,三维子宫输卵管造影联合阴道二维超声诊断的准确性为96.7%(87/90)。**结论:**三维子宫输卵管造影联合阴道二维超声在不孕症女性的应用并不会增加患者疼痛,且能提高成像质量,也有利于合理评价与判断患者的输卵管通畅情况。

关键词:三维子宫输卵管造影;阴道二维超声;不孕症;疼痛;成像质量

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Diagnostic Significance of Three-dimensional Hysterosalpingography Combined with Two-dimensional Vaginal Ultrasound in Infertile Women*

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ABSTRACT Objective: To explore the diagnostic significance of three-dimensional hysterosalpingography combined with two-dimensional vaginal ultrasound in women with infertility. **Methods:** From March 2019 to October 2020, 90 cases of female patients with infertility diagnosed and treated in Second Affiliated Hospital of Xi'an Medical College and Shaanxi Provincial People's Hospital were selected as the research objects. All patients were given three-dimensional hysterosalpingography combined with two-dimensional vaginal ultrasound, recorded the imaging quality and pain. X-ray hysterosalpingography was used the gold standard to judge the diagnostic value. **Results:** During the examination, the pain score of patients with three-dimensional contrast-enhanced ultrasound was higher than that of two-dimensional ultrasound, and compared the difference were not statistically significant ($P>0.05$). The excellent and good imaging quality rate of three-dimensional contrast-enhanced ultrasound is 100.0%(90/90), which is higher than that of two-dimensional ultrasound of 93.3%(84/90). The difference is statistically significant($P<0.05$). In the 90 patients, the three-dimensional contrast-enhanced ultrasonography judged that the periovarian tissue were diffused in 59 cases at grade 1, 16 cases in grade 2, 10 cases in grade 3, and 5 cases in grade 4. Three-dimensional hysterosalpingography combined with two-dimensional vaginal ultrasound judged that the fallopian tubes were unobstructed in 55 cases, unobstructed in 25 cases, and obstructed in 10 cases. X-ray hysterosalpingography determined that the fallopian tubes were unobstructed in 53 cases, unobstructed in 26 cases, and obstructed in 11 cases. The diagnostic accuracy of three-dimensional hysterosalpingography combined with vaginal two-dimensional ultrasound was 96.7%(87/90). **Conclusion:** The application of three-dimensional hysterosalpingography combined with two-dimensional vaginal ultrasound in infertile women will not increase the patient's pain, and can improve the imaging quality, and is also conducive to the reasonable evaluation and judgment of the patient's tubal patency.

Key words: Three-dimensional hysterosalpingography; Two-dimensional vaginal ultrasound; Infertility; Pain; Imaging quality

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前言

近年来不孕症的发病率逐年上升,多数为输卵管病变导致的不孕症,约占 35.0 %左右^[1]。输卵管为正常受精的场所,具有运送精子和早期胚胎、拾取卵子等多种功能^[2]。其在形态结构上起自双侧子宫角部,管腔远端开口于腹腔,近端与子宫腔相通^[3]。不过整条输卵管并非在一个平面上,部分走行盘绕与迂曲^[4]。当输卵管出现病变乃至阻塞时,就可能导致不孕,涉及的病因包括输卵管炎症、性传播疾病、子宫内膜异位症、盆腔炎、盆腔腹膜炎等^[5]。为此评价输卵管通畅性对于诊断不孕症具有重要价值^[6]。阴道二维超声具有操作方便、无创精确等特点,但是在多数情况下只能节段显示部分输卵管,且对操作者的经验、操作要求比较高^[7]。随着医学技术的发展,三维超声改善了二维超声的不足,成像效果接近人体解剖图像特点,能够全程立体显影输卵管状态^[8,9]。特别是三维子宫输卵管造影能够得到输卵管走行、形态、通畅和阻塞部位等重要信息,能够避免周围组织与造影剂成像之间的重叠,也有利于较长时间扫描各个切面,从而进一步提高超声对输卵管病变的诊断能力^[10,11]。本文具体探讨了不孕症女性三维子宫输卵管造影联合阴道二维超声的诊断意义,以评价联合检查方法的准确性。现总结报道如下。

1 资料与方法

1.1 研究对象

2019 年 3 月至 2020 年 10 月选择在西安医学院第二附属医院和陕西省人民医院诊治的不孕症女性患者 90 例,纳入标准:符合不孕症的诊断,有正常性生活未避孕未孕 1 年以上;已婚女性,有生育要求;男方精液分析正常,精子穿透试验阳性;患者愿意接受并自愿签署知情同意书;年龄 20~45 岁;本研究得到医院伦理委员会的批准;无生殖器官急性炎症,阴道分泌物常规;检查阴道无真菌、滴虫、细菌感染。排除标准:合并全身性或心、肺、血管等重要器官疾病;对造影剂过敏的患者;有阴道炎、急性盆腔炎的患者。

在 90 例患者中,年龄最小 21 岁,最大 43 岁,平均年龄 29.21 ± 2.42 岁;不孕年限最短 1 年,最长 8 年,平均为 4.15 ± 0.33 年;经产妇 38 例,初产妇 52 例;平均流产次数为 1.76 ± 0.22 次;平均产次 0.87 ± 0.09 次;平均孕次 1.76 ± 0.21 次。

1.2 检查方法

所有患者都给予三维子宫输卵管造影联合阴道二维超声检查,检查时间:患者月经干净后 3~7 d,造影前 3 d 禁止性生

活,无阴道流血。检查设备:迈瑞公司 R6 超声仪,配有 DE10-3WU 阴式探头(频率为 3.0~11.0 MHz)。在阴道二维超声中,消毒及宫腔置管经阴道常规超声检查子宫、输卵管有无病变,横切面观察输卵管与子宫的相对位置。

在三维造影中,使用声诺维(SonoVue)造影剂,配置成微泡混悬液。暴露及固定患者的宫颈,宫腔内放置子宫输卵管造影导管。调节三维采集角度为 120° ,经导管匀速注入微泡混悬液 10~20 mL,当看到双侧或者目标侧输卵管伞端喷射状造影剂回声时,停止注入造影剂。观察患者的身心状况,采集容积数据并存储以备重建图像分析。造影结束后调出容积图像,降低增益,清晰显示三维图像,从而显示全程输卵管图像。

1.3 观察指标

(1)记录所有患者在检查中的疼痛状况,0 分:没有明显反应或不适感;1 分:轻度疼痛,较经期疼痛轻;2 分:中度疼痛,与经期痛相同;3 分:轻微的血管迷走神经反应,但不需要卧床休息;4 分:严重的血管迷走神经反应,且需要卧床休息或治疗。(2)记录图像质量,优:清晰显示全程或大部分子宫、输卵管组织;良:部分或节段清晰显示子宫、输卵管组织;差:无达到上述标准甚或恶化。 $(\text{优} + \text{良}) / \text{组内例数} \times 100.0 \% = \text{总有效率}$ 。(3)记录与观察卵巢周围组织弥散情况,1 级:卵巢周围见环状造影剂增强回声;2 级:卵巢周围见半环状造影剂增强回声;3 级:卵巢周围仅见少许造影剂增强回声;4 级:卵巢周围无造影剂增强回声。(4)输卵管通畅程度超声诊断标准(由两位具有五年以上工作经验的超声医师进行评估),输卵管通畅:输卵管全程走行自然、柔和,造影剂填充整个宫腔,快速流入输卵管并在输卵管伞末端喷射;输卵管通而不畅:输卵管走行僵硬、成角、盘绕,输卵管显影断续,或输卵管伞端可见造影剂喷射或溢出;输卵管阻塞:输卵管全程或部分不显影,伞端未见造影剂喷射,可出现宫角膨隆。(5)诊断效果:以 X 线子宫输卵管造影为金标准,判定实时超声联合诊断的敏感性与特异性。

1.4 统计方法

选择 SPSS 20.00 软件进行分析,计量数据采用 $\bar{x} \pm s$ 表示(对比为 t 检验),计数数据采用百分比表示(对比为卡方检验分析等),当 $P < 0.05$ 时,认为差异有统计学意义。

2 结果

2.1 检查疼痛情况对比

检查过程中三维超声造影患者的疼痛评分高于二维超声,对比差异无统计学意义($P > 0.05$),见表 1。

表 1 不同检查方法的患者疼痛评分对比(分, $\bar{x} \pm s$)

Table 1 Comparison of pain scores of patients with different examination methods (scores, $\bar{x} \pm s$)

Inspection methods	n	Pain score
Three-dimensional ultrasound	90	1.00 ± 0.12
Two-dimensional ultrasound	90	0.78 ± 0.09

2.2 成像质量优良率对比

三维超声造影的成像质量优良率为 100.0 % (90/90),高于二维超声的 93.3 % (84/90),对比差异有统计学意义($P < 0.05$),

见表 2。

2.3 周围组织弥散情况

在 90 例患者中,三维超声造影判断为卵巢周围组织弥散

1 级 59 例,2 级 16 例,3 级 10 例,4 级 5 例。

2.4 联合诊断效果

在 90 例患者中,三维子宫输卵管造影联合阴道二维超声判断为输卵管通畅 55 例,通而不畅 25 例,阻塞 10 例。X 线子

宫输卵管造影判断为输卵管通畅 53 例,通而不畅 26 例,阻塞 11 例,三维子宫输卵管造影联合阴道二维超声诊断的准确性为 96.7%(87/90),见表 3。

表 2 不同检查方法的成像质量优良率对比(例,%)

Table 2 Comparison of the good rate of imaging quality of different inspection methods (n, %)

Inspection methods	n	Excellent	Good	Poor	Rate of excellence
Three-dimensional ultrasound	90	68	22	0	90(100.0)*
Two-dimensional ultrasound	90	59	25	6	84(93.3)

Note: compare with the two-dimensional ultrasound, * $P<0.05$.

表 3 三维子宫输卵管造影联合阴道二维超声诊断不孕症女性的准确性(n=90)

Table 3 The accuracy of three-dimensional hysterosalpingography combined with two-dimensional vaginal ultrasound in the diagnosis of infertility women (n=90)

Combined diagnosis	X hysterosalpingography			Total
	Unobstructed	Not smooth	Block	
Unobstructed	53	2	0	55
Not smooth	0	24	1	25
Block	0	0	10	10
Total	53	26	11	90

3 讨论

不孕症是临床上常见的社会和医学问题,其中主要为女性因素。而导致女性不孕症的主要原因之一为输卵管因素,输卵管是精子和受精卵的通道,可将子宫与卵巢连成一体,具备非常精细和复杂的生理功能,是受精卵形成的部位^[12,13]。输卵管在结构与功能上发生病变,可影响其拾卵以及运输卵子、受精卵的作用,就有可能导致女性不孕^[14]。

X 线造影为判断输卵管病变的主要方法,也是诊断的金标准,但是为有创性检查,且辐射性比较大,很多患者在身心上难以接受,为此在临床上选择更合适的方法准确评价输卵管通畅性具有重要价值^[15]。阴道二维超声也具有一定的应用局限性,比如输卵管走行迂曲,在单一扫查平面上采集到完整的输卵管图像。在三维超声造影中,能以选定的频率发射超声波束,可避免周围组织与造影剂成像之间的重叠,滤掉周围组织的宽波信号,从而获得输卵管的三维立体图像^[16,17]。并且三维超声造影可以较容易的采集完整输卵管影像,对操作者经验和技术的要求相对可以降低^[18]。本研究显示检查过程中三维超声造影患者的疼痛评分高于二维超声,对比差异无统计学意义;三维超声造影的成像质量优良率为 100.0%,高于二维超声的 93.3%,表明三维超声造影虽然可造成患者一定的疼痛,但是可提高成像质量。同时在 90 例患者中,三维超声造影判断为卵巢周围组织弥散 1 级 59 例,2 级 16 例,3 级 10 例,4 级 5 例。从机制上分析,三维超声造影避免了二维超声输卵管节段成像的缺点,能实现对图像的瞬间捕捉,获取的图像信息量更多,可获取输卵管的整个图像,以补充诊断信息^[19-21]。

当前女性不孕症的发病率有逐年上升的趋势,准确评价输

卵管通畅性对于诊断女性不孕症具有重要价值^[22]。X 线子宫输卵管造影是目前较常用的诊断输卵管通畅性的金标准,但是存在一定的风险,不能作为不孕症女性的常规检查方法^[23]。输卵管通畅的声像图表现为输卵管走行自然、柔和,伞端可见造影剂溢出,管径粗细均匀、光滑^[24,25]。输卵管通而不畅患者可表现为输卵管局部纤细,输卵管显影速度稍慢,走行明显迂曲、盘绕上举。输卵管近段阻塞时比较容易判断,但输卵管远段阻塞在诊断上存在一定的困难,主要表现为盆腔内未见微气泡回声与卵巢周围无环状强回声带^[26,27]。本研究显示三维子宫输卵管造影联合阴道二维超声判断为输卵管通畅 55 例,通而不畅 25 例,阻塞 10 例,诊断的准确性为 96.7%。从机制上分析,三维子宫输卵管造影能够避免肠气干扰对输卵管的判断,可显示整条输卵管的走行,有助于实时观察子宫肌壁血管逆流过程,可以避免因输卵管造影剂充盈不足而难以判断通畅性,也有助于帮助区分血管、输卵管的走行^[28,29]。并且在造影过程中可根据病变情况移动探头追踪输卵管显影,且对于走行迂曲盘绕的输卵管也可获得理想图像,从而提高诊断效果^[30]。不过联合诊断方法也缺乏实时性、动态性,有时宫腔内水囊过度充盈时,可引起输卵管阻塞的假象^[31]。同时本研究调查的病例数量比较少,对于不孕症患者没有进行随访,将在后续研究中进行探讨。

总之,三维子宫输卵管造影联合阴道二维超声在不孕症女性的应用并不会增加患者疼痛,且能提高成像质量,也有利于合理评价与判断患者的输卵管通畅情况。

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