

三维能量多普勒超声对子宫内膜良恶性病变的诊断价值

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[摘要] 目的: 分析三维能量多普勒超声对子宫内膜良恶性病变的诊断价值, 总结诊断依据。方法: 将我院312例已确诊的子宫内膜病变患者纳入此次研究, 良性组(n=195), 恶性组(n=36)。比较两组患者二维、三维超声参数, 比较不同临床分期子宫内膜恶性病变患者各项参数差异, 并运用受试者工作特征曲线(ROC), 计算各项超声参数鉴别诊断子宫内膜良恶性病变的灵敏度、特异性及曲线下面积(AUC), 分析其诊断价值。结果: 良性组搏动指数(PI)、阻力指数(RI)及收缩期血流峰值速度(PSV)高于恶性组, 其内膜厚度低于恶性组, 差异有统计学意义($P < 0.05$)。良性组内膜容积(V)、血管化指数(VI)、血流指数(FI)及血管-血流指数(VFI)均低于恶性组, I期组V、VI、FI、VFI亦低于II~III期组, 差异有统计学意义($P < 0.05$)。以病理诊断结果为金标准, 以V、VI、FI、VFI为检验变量绘制ROC曲线, 结果显示, VFI诊断子宫内膜良恶性病变的AUC最高, 为0.971, V诊断子宫内膜病变的灵敏度最高, 为79.15%。结论: 通过三维能量多普勒超声获取子宫内膜血流参数, 能够为子宫内膜病变性质及恶性病变分期的判断提供客观且可靠的参考。

[关键词] 三维能量; 多普勒超声; 子宫内膜病变; 鉴别诊断

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Three-dimensional power Doppler ultrasound analysis in diagnosing endometrial benign and malignant lesion ZHOU Jiangying, ZHANG Yi. Department of rheumatology, The First Affiliated Hospital of Chengdu Medical College, Chengdu 610500, China

[Abstract] **Objective:** The objective of this study was to analyze the three-dimensional power Doppler in predicting endometrial benign and malignant lesion, and to conclude the basis for diagnosis. **Methods:** A total of 312 cases of endometrium lesion patients treated in our hospital were divided into benign group (n=195) and malignant group (n=36). The three-dimensional ultrasound and two-dimensional ultrasound index were compared between the two groups. The parameters of endometrium lesion patients in different clinical stages were compared. The sensitivity and specificity and area under the curve (AUC) of various indexes in detecting the endometrium lesions was calculated using receiver operating characteristic curve (ROC), and their diagnosing values were analyzed. **Results:** The pulsatility index (PI), resistant index (RI) and peak systolic velocity (PSV) in the benign group were higher than those in the malignant group, while their endometrial thickness was thinner than the latter group, and the differences were statistically significant ($P < 0.05$). The endometrium volume (V), vascularization index (VI), blood flow index (FI) and vascular - blood flow index (VFI) in the benign group were lower than those in the malignant group; V, VI, FI and VFI in the stage I group was lower than those in the II ~ III groups, and the differences were statistically significant ($P < 0.05$). The ROC was drawn and V, VI, FI and VFI were used as variables, based on the pathological study which is the "gold standard". The results showed that VFI's AUC ranked the highest in diagnosing endometrial benign and malignant lesion, which was 0.971, and V had the highest sensitivity, which reached 79.15%. **Conclusions:** Endometrium blood flow index obtained through three-dimensional power Doppler can provide reliable reference for judging the endometrial benign and malignant lesion and its stages.

[Key words] three-dimensional power Doppler ultrasound; endometrium lesion; differential diagnosis

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子宫内膜病变包括内膜息肉、内膜良性增生及内膜癌等,常导致阴道不规则出血、月经异常、腹痛等临床表现^[1]。分段诊断性刮宫及宫腔镜是诊断子宫内膜良恶性病变的常用方法,但均为有创检查,可能造成子宫感染甚至穿孔等严重不良后果^[2]。与二维超声相比,三维能量多普勒超声技术不仅提高了超声分辨率,还可实时再现器官三维立体形态结构、清晰显示肿块内部细小血管,为子宫内膜良恶性病变的诊治提供了新的思路^[3]。此次研究就该技术诊断子宫内膜良恶性病变的价值进行了前瞻性分析,现将研究过程与结论报道如下。

1 资料与方法

1.1 一般资料

将我院2015年9月—2017年9月明确诊断的312例子宫内膜病变患者纳入此次研究,开展前瞻性对照分析。子宫内膜良性病变(良性组)病理类型:子宫内膜增生94例,子宫内膜息肉91例,粘膜下肌瘤10例。子宫内膜恶性病变(恶性组)病理类型:腺癌31例,乳头状瘤3例,鳞腺癌2例;宫颈癌国际妇产科联盟(FIGO)分期^[4]: I期21例, II期12例, III期3例。

1.2 检查方法

入组前未行超声检查或检查时间>1个月或超声资料不符合分析要求的,均接受三维能量多普勒超声检查,使用Voluson E8三维彩色多普勒超声诊断仪(美国GE公司),配套凸阵腔内容积探头,探头频率5~9 MHz。选用脉冲多普勒模式,测量3个周期取平均值计算搏动指数(PI)、阻力指数(RI)及收缩期血流峰值速度(PSV)^[5]。将探头固定于子宫矢状切面以显示子宫内膜长轴,启动三维能量多普勒模式,感兴趣区(ROI)覆盖全部子宫,嘱患者屏气,三维扫描ROI,持续3~5 s,扫描期间旋转探头以获取ROI血液分布三维立体图像;扫描参数^[6]:成像质量高,扫描角度70°,彩色增益4.4,脉冲重复频率0.6 MHz。虚拟器官计算机辅助分析(VOCAL)软件操作步骤:于A平面每15°选取切面各1个,各病灶共选取12个切面,手动将病变区域包络线画出,VOCAL软件自动计算内膜容积(V)、血管化指数(VI)、血流指数(FI)及血管-血流指数(VFI),各病灶测量3次,以平均值为最终测量结果^[7]。

1.3 分析方法

比较两组患者二维超声参数(PI、RI、PSV、内膜厚度)以及不同脉冲重复频率下三维能量多普勒超声参数(V、VI、FI、VFI)差异,并比较恶性组不同FIGO分期患者上述参数间差异。运用受试者工作特征曲线(ROC),计算各项三维能量多普勒超声参数鉴别诊断子宫内膜良恶性病变的灵敏度、特异性及曲线下面积(AUC),分析其诊断价值。

2 结果

良性组PI、RI、PSV高于恶性组,其内膜厚度低于恶性组,差异有统计学意义($P < 0.05$)。良性组V、VI、FI、VFI均低于恶性组, I期组V、VI、FI、VFI亦低于II~III期组,差异有统计学意义($P < 0.05$)。见表1、表2。

表1 2组二维、三维超声参数比较($\bar{x} \pm s$)

| 参数 | 良性组(n=195) | 恶性组(n=36) | P值 |
|------------|--------------|--------------|--------|
| PI | 0.65 ± 0.08 | 0.21 ± 0.05 | < 0.05 |
| RI | 0.62 ± 0.10 | 0.19 ± 0.04 | < 0.05 |
| PSV (cm/s) | 8.27 ± 0.60 | 6.25 ± 1.39 | < 0.05 |
| 内膜厚度(mm) | 13.62 ± 2.84 | 26.04 ± 5.29 | < 0.05 |
| V (mL) | 7.03 ± 1.99 | 8.75 ± 2.38 | < 0.05 |
| VI (%) | 7.71 ± 2.06 | 22.45 ± 4.29 | < 0.05 |
| FI | 27.31 ± 2.65 | 32.08 ± 4.77 | < 0.05 |
| VFI | 0.85 ± 0.13 | 5.56 ± 1.05 | < 0.05 |

表2 不同分期子宫内膜恶性病变的三维能量多普勒参数比较($\bar{x} \pm s$)

| 参数 | I期组(n=21) | II~III期组(n=15) | P值 |
|--------|--------------|----------------|--------|
| V (mL) | 7.71 ± 2.05 | 9.24 ± 2.26 | < 0.05 |
| VI (%) | 16.89 ± 3.71 | 25.07 ± 3.99 | < 0.05 |
| FI | 30.35 ± 4.46 | 35.91 ± 4.20 | < 0.05 |
| VFI | 3.81 ± 0.97 | 6.30 ± 0.86 | < 0.05 |

以病理诊断结果为金标准,以V、VI、FI、VFI为检验变量绘制ROC曲线,结果显示,VFI诊断子宫内膜良恶性病变的AUC最高,为0.971,V诊断子宫内膜病变的灵敏度最高,为79.15%。见表3、图1。

表3 三维能量多普勒超声参数诊断子宫内膜良恶性病变的ROC参数

| 参数 | 截断值 | AUC | 95%CI | 灵敏度(%) | 特异性(%) |
|-----|--------|-------|---------------|--------|--------|
| V | 7.725 | 0.855 | 0.785 ~ 0.926 | 79.15 | 85.36 |
| VI | 2.648 | 0.966 | 0.931 ~ 1.000 | 57.89 | 83.40 |
| FI | 28.741 | 0.915 | 0.826 ~ 0.974 | 59.96 | 82.94 |
| VFI | 0.895 | 0.971 | 0.938 ~ 1.003 | 51.68 | 85.36 |

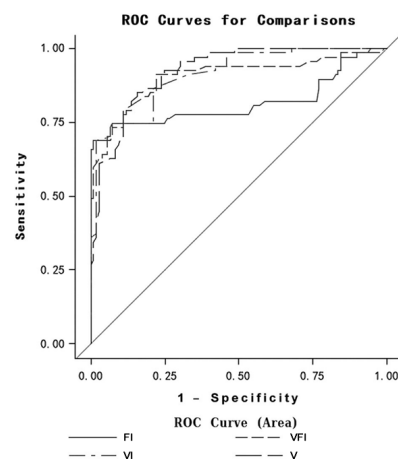


图1 三维能量多普勒超声参数诊断子宫内膜良恶性病变的ROC曲线

3 讨论

随着女性年龄增加,子宫内膜良恶性病变发生风险持续升高^[8]。诊断性刮宫、宫腔镜均可鉴别子宫内膜病变良

恶性^[9-10]。既往有研究将经阴道超声用于子宫内膜良恶性病变的鉴别诊断,结果显示,阴道超声鉴别诊断子宫内膜良恶性病变的灵敏度与诊断性刮宫一致,且快速、无创、重复性好、经济性佳^[11]。然而,二维超声的阳性预测值偏低,常造成假阳性结果,可能导致过度诊治,给患者带来不必要的痛苦与经济损^[12],其原因主要与女性子宫位置随年龄增长而变化有关,同时,血管钙化、内膜与肌层分界模糊,也进一步导致临床诊治难度上升^[13]。与二维超声相比,三维能量多普勒超声不仅大幅提高了超声分辨率,还结合了VOCAL体积测量、三维能量多普勒血流测量等多种技术,借助子宫内膜形态与功能的多角度分析,有望为子宫内膜良恶性病变的鉴别诊断提供更为全面的参考^[14]。

此次研究就三维能量多普勒超声鉴别良恶性子宫内膜病变的效能进行了分析,V、VI、FI、VFI参数中,根据 $V \geq 7.725$ mL 诊断恶性子宫内膜病变的灵敏度、特异性分别达到79.15%、85.36%,说明子宫内膜容积的变化能够有效反映病变性质,其原因与良性病变多为局限性改变,而恶性病变常导致宫腔内膜弥漫性改变并伴有肌层浸润有关^[15-16]。VI主要反映组织内血管数量,故恶性病变更高的血管生成程度往往伴随着更高的VI;FI代表三维扫描瞬间组织血细胞通过量的均值,FI升高意味着组织血流丰富,有着更高的恶变可能;VFI为VI与FI的乘积,能够综合反映ROI内血管与血流的综合特征,恶性病变内严重血管增殖或坏死对血流情况造成的明显影响^[17],使得VFI在诊断子宫内膜良恶性病变中拥有着更高的AUC。

超声检查参数设置可能对其诊断效能造成一定影响,如有研究指出,以0.9 MHz为脉冲重复频率,所得血流参数测量值与0.6 MHz存在明显差异,而以0.6 MHz为脉冲重复频率时,超声对组织内血管更为敏感、血流信号显示更为丰富,可更为客观地反映组织内血流分布^[18]。此外,仪器自身分辨率、宫腔形态、病灶与子宫肌层间灰阶差异、声衰减等因素也可能导致血管参数测量误差,在今后的临床实践中应予以重视。

综上所述,作为一项安全无创的检测技术,三维能量多普勒超声参数变化能够为子宫内膜良恶性病变的鉴别诊断提供客观参考,有望成为子宫内膜病变的首选早期筛查手段,值得广泛关注。

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