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剪切波弹性成像在乳腺实性病变良恶性鉴别中的诊断价值

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摘要 目的:探讨剪切波弹性成像在乳腺实性病变良恶性鉴别中的诊断价值。**方法:**收集 2012 年 3 月-2013 年 6 月于我院收治的乳腺实性病变患者 54 例,共 65 个病灶,先后给予乳腺二维超声检查与剪切波弹性成像检查,采用弹性模量值与钼靶 BI-RADS 分级方法诊断,比较两种方法诊断的准确性。**结果:**良性病灶组弹性最小、最大值以及平均值、标准差与恶性病灶组比较差异具有统计学意义($P<0.05$);ROC 曲线分析显示,在乳腺实性病变良恶性的鉴别中,弹性最大值明显优于弹性均值;剪切波弹性成像对乳腺实性病变良恶性鉴别的敏感度、特异度、准确度、阳性预测值、阴性预测值高于二维超声技术($P<0.05$)。**结论:**剪切波弹性成像在乳腺实性病变良恶性鉴别中具有良好的诊断价值,能够提高诊断的准确性。

关键词:剪切波弹性成像;乳腺实性病变;良恶性鉴别;诊断价值

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The Value of Shear Wave Elastography in Differential Diagnosis of Benign and Malignant Solid Breast Lesions

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ABSTRACT Objective: To investigate the value of shear wave elastography in differential diagnosis of benign and malignant solid breast lesions. **Methods:** 54 cases of patients with breast solid lesions who were treated in our hospital from March 2012 to June 2013 year, with 65 lesions, were successively given the breast ultrasound examination and shear wave elasticity imaging, the elastic modulus and mammography diagnosis accuracy of BI-RADS classification method were used, the veracity of two diagnostic methods were compared. **Results:** the elastic minimum, maximum value and average value, standard deviation of the benign lesions group had significant difference compared with the malignant lesions group ($P<0.05$); ROC curve analysis showed that, for the differential diagnosis of benign and malignant breast solid lesions, elastic maximum value was significantly better than that of elastic average value. The sensitivity, specificity, accuracy, positive predictive value, and negative predictive value of shear wave elastography in differentiating benign and malignant breast solid lesions was higher than those of the two-dimensional ultrasound technology ($P<0.05$). **Conclusion:** Shear wave elasticity imaging has a good diagnostic value in the differential diagnosis of benign and malignant solid breast lesions, it can improve the accuracy of diagnosis.

Key words: Shear wave elasticity imaging; Solid lesions breast lesions; Differential diagnosis of benign and malignant; Diagnostic value

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前言

近年来,乳腺肿瘤的发病率呈现上升的趋势,临床将准确诊断乳腺肿瘤作为一大课题^[1]。研究显示,触诊的硬度在对鉴别诊断乳腺良恶性病变的过程中存在着重要的意义,但触诊也存在着很大的局限性,依靠个人经验准确性不高^[2-3]。临床更加重视客观地手段进行评估,弹性成像技术是近年来新兴的超声技

术,其作用机理是评估组织的弹性变化^[4]。剪切波弹性成像是通过评估剪切波运行速度的变化计算组织的弹性值,能够准确对病灶进行定量,实现声波下的触诊,具有客观性地评^[5-6]。本研究探讨剪切波弹性成像在乳腺实性病变良恶性鉴别中的诊断价值,取得了良好的效果,现报道如下。

1 资料与方法

1.1 一般资料

收集 2012 年 3 月-2013 年 6 月于我院收治的手术及病理证实为乳腺实性病变患者 54 例,共 65 个病灶,年龄 21 - 60 岁,平均年龄(43.3 ± 5.0)岁;病灶最大直径 0.45-6.81 cm,平均

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直径(1.76 ± 1.25)cm。

1.2 方法

采用西门子 IS2000, 将其探头频率确定在 8~12 MHz 之间。首先采用仪器对患者进行乳腺二维超声检查, 记录评估二维声像, 然后将仪器切换至弹性成像模式, 不予施压, 确定病灶区域, 静置 3-5s, 测量评估弹性值, 具体包括病灶弹性的最小、最大值以及平均值、标准差。每个病灶均测量 3 次, 取平均值。对所得图像按照 BI-RADS 分级标准进行定量^[7], 其中 ≤ 3 表示良性, ≥ 4 表示恶性, 比较两种方法诊断的准确性。

1.3 统计学方法

所得结果用 SPSS17.0 统计学软件进行处理, 各组指标以均数 $\pm$ 标准差($\bar{x} \pm s$)表示, 进行 t 检验, 计数资料采用 χ^2 检验, 采用 ROC 曲线, 计算诊断界值, 检验值 $P < 0.05$ 表示差异具有

显著性。

2 结果

2.1 病理结果

病理诊断显示, 54 例患者中良性病灶 50 个, 其中纤维腺瘤 21 个, 纤维腺瘤合并乳腺增生症 6 个, 乳腺病症 22 个, 乳腺病合并腺瘤样增生 3 个, 导管内乳头状肿瘤 2 个。

恶性病灶 15 个, 其中浸润性导管肿瘤 13 个, 导管内肿瘤 2 个。

2.2 良性病灶与恶性病灶弹性模量值比较

质地硬的组织呈现红色, 质地软的组织呈现蓝色。图像显示, 纤维腺瘤呈现出均匀蓝色, 浸润性导管癌呈现红色的区域, 也可呈现出红黄蓝相兼, 见图 1、2。

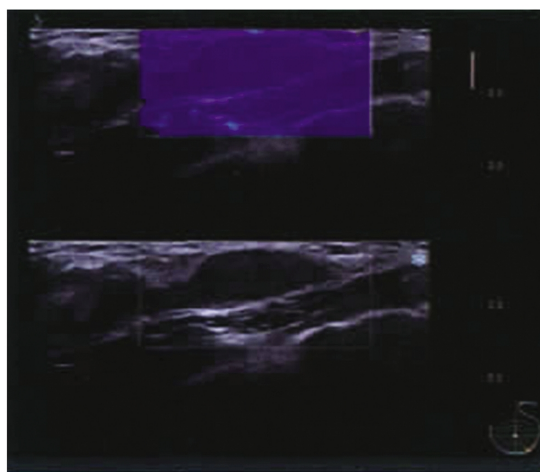


图 1 Fig. 1

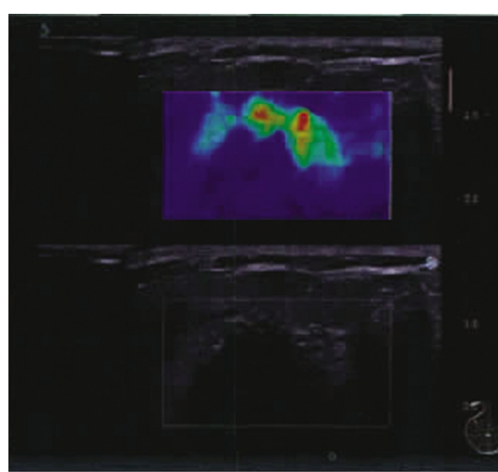


图 2 Fig. 2

良性病灶组弹性最小、最大值、平均值、标准差均与恶性病灶组比较差异具有统计学意义($P < 0.05$), 见表 1。

表 1 良性病灶弹性模量值比较($\bar{x} \pm s$)

Table 1 Comparison of the elastic modulus of benign and malignant lesions($\bar{x} \pm s$)

组别 Groups	最小值 Minimum	最大值 Maximum	平均值 Average	标准差 Standard deviation
良性病灶组 Benign lesions group	$38.23 \pm 30.24 \blacktriangle$	$12.86 \pm 7.39 \blacktriangle$	$24.14 \pm 15.36 \blacktriangle$	$6.04 \pm 6.54 \blacktriangle$
恶性病灶组 Malignant lesions group	104.62 ± 44.35	23.71 ± 2.84	58.20 ± 34.61	20.31 ± 12.35

注: 与恶性病灶组比较, $\blacktriangle P < 0.05$ 。

Note: compared with malignant lesions group, $\blacktriangle P < 0.05$.

2.3 剪切波弹性成像鉴别乳腺实性病变良恶性的 ROC 曲线分析

对于乳腺实性病变良恶性的鉴别, 弹性最大值明显优于弹性均值; ROC 曲线分析显示, 当弹性平均值设定为 ≤ 40.0 kPa 时, 诊断为乳腺病灶为良性, 则 > 40.0 kPa 时, 乳腺病灶诊断恶性; 弹性最大值采设定 ≤ 57.50 kPa 时, 诊断为良性病灶, 则 > 57.50 kPa 时, 乳腺病灶诊断恶性, 见图 3、4。

2.4 剪切波弹性成像与二维超声技术诊断结果比较

剪切波弹性成像对乳腺实性病变良恶性鉴别的敏感度、特异度、准确度、阳性预测值、阴性预测值高于二维超声技术($P < 0.05$)。

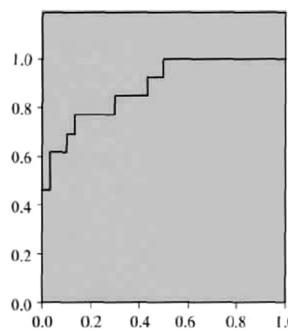


图 3 Fig 3

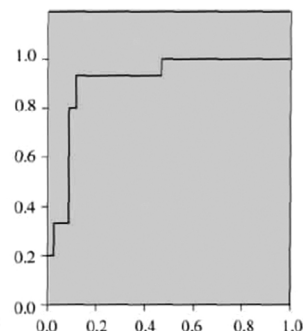


图 4 Fig 4

表 2 剪切波弹性成像与二维超声技术诊断结果比较(%)

Table 2 Comparison of diagnosis results between shear wave elastography and two-dimensional ultrasound technology(%)

组别 Groups	敏感度 Sensitivity	特异度 Apecificity	准确度 Accuracy	阳性预测值 Positive predictive value	阴性预测值 Negative predictive value
BI-RADS 分级 BI-RADS classification	53.24	85.45	75.62	66.73	80.21
弹性模量值 Elastic modulus	90.43 ▲	92.34 ▲	71.90 ▲	81.28 ▲	93.64 ▲

注: 与 BI-RADS 分级比较, ▲P<0.05。

Note:compared with BI-RADS classification, ▲P<0.05.

3 讨论

研究显示, 触诊硬度是鉴别乳腺良恶性病变的重要方式, 但触诊具有很强的主观性, 无法给予客观地评估^[8-10]。弹性成像技术的原理是采用声波下进行触诊, 通过高科技进行分析, 可以客观地评价乳腺病灶的硬度。"弹性成像"的概念最早是由1991年 Ophir 提出, 其定义是对检查组织施加一个有效激励, 利用弹性力学的作用, 使检查组织出现位移、应变或速度等方面的响应, 经过相关处理, 计算出弹性模量^[11-13]。本次研究采用剪切波弹性成像技术, 其作用不同于传统的超声技术, 不仅实现了采用声波触诊, 而且能够计算评估组织弹性的绝对值, 具有客观性、重复性, 是新兴的临床影像技术^[14-16]。

研究报道, 乳腺实性病变弹性值由小到大的依次是: 脂肪、腺体、纤维腺瘤、腺病伴纤维腺瘤形成或导管内乳头状瘤、腺病、浸润性导管癌^[17,18]。正常情况下, 良性病灶的硬度高于正常乳腺组织, 低于恶性病灶组织^[19]。本次研究显示, 乳腺实性病变的弹性模量值均低于国外相关研究结果, 分析其原因可能由于中西方女性乳腺组织结构具有差异密切相关^[20]。

本次研究显示, 良性病灶组弹性最小、最大值以及平均值、标准差与恶性病灶组比较差异具有统计学意义; ROC 曲线分析显示, 对于乳腺实性病变良恶性的鉴别, 弹性最大值明显高于平弹性均值; 剪切波弹性成像对乳腺实性病变良恶性鉴别的敏感度、特异度、准确度、阳性预测值、阴性预测值优于二维超声技术, 提示剪切波弹性成像对乳腺良恶性病变的诊断具有较高的准确性。ROC 曲线分析显示, 当弹性平均值设定为 ≤ 40.0 kPa 时, 诊断为乳腺病灶为良性, 则 > 40.0 kPa 时, 乳腺病灶诊断恶性; 弹性最大值采设定 ≤ 57.50 kPa 时, 诊断为良性病灶, 则 > 57.50 kPa 时, 乳腺病灶诊断恶性。提示剪切波弹性成像技术也可作为鉴别乳腺良恶性病变的重要依据, 也预示在临床研究中需要综合剪切波弹性成像的平均值、最大值及标准差来鉴别诊断乳腺实性病变。

综上所述, 剪切波弹性成像在乳腺实性病变良恶性鉴别中具有良好的诊断价值, 能够提高诊断的准确性。

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