

超声弹性成像鉴别诊断肝脏良恶性肿瘤的准确性及其影响因素分析

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【摘要】目的:探讨超声弹性成像鉴别诊断肝脏良恶性肿瘤的准确性及其影响因素。**方法:**选取疑似肝脏肿瘤患者共186例,其中采用超声进行诊断共计56例,超声弹性成像诊断共计77例,超声联合造影剂诊断共计53例。根据不同的诊断方法分为A、B、C 3组,以病理诊断结果为金标准,对比3组诊断结果的准确率、灵敏度和特异性,并建立回归模型对超声弹性成像鉴别诊断的影响因素进行分析。**结果:**B、C组检测方法的灵敏性、特异性和准确性均优于A组,但B、C两组之间的灵敏性、特异性和准确性无显著差异;B、C组检测方法的总体效能均大幅高于A组,但B、C两组之间的效能无显著差异;肿瘤尺寸、钙化、血流情况、病灶软硬情况均对超声弹性成像鉴别诊断有一定的影响,但肿瘤尺寸、钙化及血流情况的影响程度较为轻微,病灶软硬情况影响较为显著。**结论:**超声弹性成像鉴别诊断肝脏良恶性肿瘤具备较高的效能,而且能够大幅降低患者的治疗成本,值得在临床上进行推广。

【关键词】肝脏肿瘤;超声弹性成像;造影剂;灵敏度;特异性

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Accuracy of ultrasound elastography in differential diagnosis of benign and malignant liver tumors and analysis of its influencing factors

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Abstract: Objective To investigate the accuracy and influencing factors of differential diagnosis of benign and malignant liver tumors with ultrasound elastography. **Methods** A total of 186 cases with suspected liver cancer were selected, including 56 cases diagnosed with ultrasound (group A), 77 diagnosed with ultrasound elastography (group B), and 53 diagnosed with ultrasound combined with contrast agent (group C). Using the diagnostic results on the medical records as the gold standards, the accuracy, sensitivity and specificity of the 3 groups were compared. Then a regression model was established to analyze the factors affecting the differential diagnosis of ultrasonic elastography. **Results** Group B and C were superior to group A in the sensitivity, specificity and accuracy of diagnosis, but no significant differences were found between group B and C. The overall efficacy in group B and C were significantly higher than that in group A, but group B and C didn't showed any significant differences. The tumor size, calcification, blood flow, and the softness/hardness of the lesions had some effects on the differential diagnosis of ultrasonic elastography. The impacts of tumor size, calcification and blood flow were relatively mild, while the effects of the softness/hardness of the lesions were more significant. **Conclusion** Ultrasound elastography has a high efficacy in the differential diagnosis of benign and malignant liver tumors and greatly reduces the cost of treatment, worthy of clinical promotion.

Keywords: liver tumor; ultrasound elastography; contrast agent; sensitivity; specificity

前言

肝脏肿瘤是临床上较为常见的肿瘤疾病之一,其

发病初期的临床症状并不明显,且就目前的临床治疗手段来说,仍然以根治手术为主^[1-3],但大多数临床患者在进行治疗时已经进入肿瘤的中晚期,即使在手术成功后仍然有多数患者出现癌细胞扩散,5年存活率较低^[4-5],并且随着病情的加重,所需切除的病灶部位增大,使得患者即使成功进行治疗但在术后也会对患者的恢复造成较大的影响^[6-8],同时由于肝功能的急剧下降,使得后续的化疗、患者日常生活均受到了较为严重的影响,甚

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至使患者丧失劳动能力^[9]。因此,如何在肿瘤初期对患者进行准确的诊断成为近年来此类疾病的研究热点。虽然传统的造影手段很难在肿瘤初期进行有效诊断,但近年来造影剂的加入使得这种现象有了较大的改观,但造影剂大幅提高了诊断成本,在实际应用中并未对肿瘤早期诊断难这一现象产生多大的改观。本次研究旨在探讨超声弹性成像鉴别诊断肝脏良恶性肿瘤的准确性及其影响因素。

1 资料与方法

1.1 一般资料

选取2013年1月~2017年3月在西安工会医院进行治疗的疑似肝脏肿瘤患者共186例,其中采用超声造影进行诊断共计56例,超声弹性成像诊断共计77例,超声联合造影剂诊断共计53例。根据不同的诊断方法分为A、B、C3组,其中A组男34例,女22例,年龄37~68岁,平均年龄(41.5±6.3)岁;B组男49例,女28例,年龄33~62岁,平均年龄(43.8±5.1)岁;C组男31例,女22例,年龄39~62岁,平均年龄(42.7±7.2)岁。3组参试人员之间的一般情况无显著差异,所有参与研究人员均同意并签署知情同意书。

1.2 纳入指标

① 年龄25~70岁;② 无其他心脑血管疾病;③ 有一定的自理能力;④ 自我意识清晰;⑤ 女性不在妊娠期或哺乳期;⑥ 预计存活时间>1年。

1.3 诊断方法和指标^[10]

诊断方法:3组患者均使用日立HI Vision Preirus多普勒超声仪进行检测,探头选用C532,频率设定为3~8 MHz。A组患者使用超声进行检测,患者取左侧卧位,进行常规扫查肝脏病灶部位。B组患者采用超声弹性成像诊断,患者取左侧卧位,仪器开启超声弹性成像模式,在保证探头稳定的前提下轻度加压,观察肝脏及周边组织。C组患者采用超声联合造影剂诊断,患者取左侧卧位,仪器开启超声造影模式,将Sono Vue造影剂通过肘静脉注射,对患者肝脏及周边部位进行观察。

诊断指标:A组和C组患者均参考半定量评分法,总分>4分为恶性;B组患者由于其诊断除直观图像外还有周边组织的弹性指数参与其中,因此参考Itoh's 5分评分法,评分>3分为恶性。

1.4 统计学方法

采用SPSS 22.0统计软件进行数据分析。连续变量用均数±标准差表示,计量资料采用独立样本 t 检验,计数资料采用 χ^2 检验, $P<0.05$ 认为差异具有统计学意义。使用SPSS 22.0软件对初期的样本数据进

行分析,考察各统计因素对因变量的影响,拟建立回归模型,连续变量在统计时采用对数统计;计算显著水平,显著水平小于0.1则说明该因素对因变量具有显著影响,主要考察肿瘤尺寸、钙化、血流情况、病灶软硬情况对诊断结果的影响。以灵敏度为纵坐标,1-特异度为横坐标绘制的受试者工作特征曲线(Receiver Operating Characteristic Curve, ROC),以曲线下面积作为标准,对比各诊断方案的效能,Z检验比较ROC曲线下的面积(Area Under Curve, AUC)的差异,检验水准 $\alpha=0.05$ 。

2 结果

2.1 3组患者的检测结果

3组患者的检测结果A组的良性、恶性数量分别为14和42,B组分别为16和61,C组分别为12和41。

2.2 3种检测方法的敏感性、特异性和准确性

3种检测方法的灵敏性、特异性和准确性如表1所示,B、C组检测方法的灵敏性、特异性和准确性均优于A组,但B、C两组之间的灵敏性、特异性和准确性无显著差异。

表1 3种检测方法的灵敏性、特异性和准确性(%)

Tab.1 The sensitivity, specificity and accuracy of 3 kinds of diagnostic methods (%)

| Group | Accuracy | Sensitivity | Specificity |
|-------|----------|-------------|-------------|
| A | 63.71 | 77.11 | 66.59 |
| B | 89.63* | 83.64* | 87.93* |
| C | 91.32* | 85.77* | 88.66* |

A: Ultrasound; B: Ultrasound elastography; C: Ultrasound combined with contrast agent; *: Compared with group A, $P<0.05$

2.3 ROC分析结果

ROC分析结果如表2和图1所示,B、C组检测方法的总体效能均大幅高于A组,但B、C两组之间的效能无显著差异。

表2 ROC分析结果

Tab.2 Analysis results of receiver operating characteristic curve

| Group | Standard error | AUC | 95% CI |
|-------|----------------|-------|-----------|
| A | 0.5 | 0.64 | 0.61-0.79 |
| B | 0.4 | 0.86* | 0.82-0.91 |
| C | 0.5 | 0.87* | 0.83-0.92 |

AUC: Area under curve; 95% CI: 95% confidence interval; *: Compared with group A, $P<0.05$

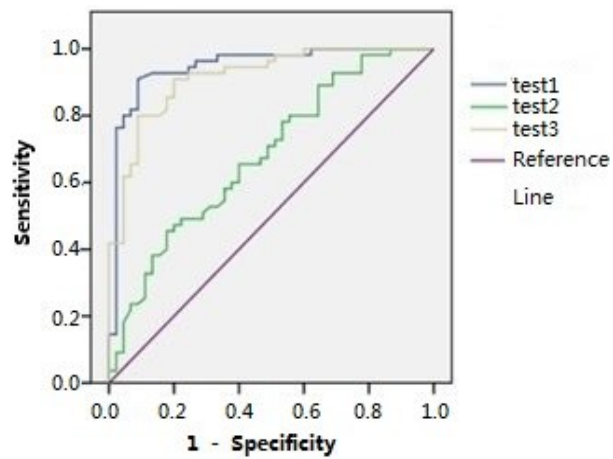


图1 3组数据的ROC曲线分析结果
Fig.1 Analysis of ROC curves among 3 groups of data

2.4 影响因素分析

影响因素的分析结果如表3所示,肿瘤尺寸、钙化、血流情况、病灶软硬情况均对超声弹性成像鉴别诊断均有一定的影响,但肿瘤尺寸、钙化及血流情况的影响程度较为轻微,病灶软硬情况影响较为显著。

3 讨论

肝脏肿瘤顾名思义是一种发生在肝脏部位的肿瘤疾病,大部分肝脏肿瘤为恶性肿瘤或转移性肿瘤,上述两种肿瘤的发病部位不同,其中固有肿瘤多发于胆管上皮、血管、肝细胞索或其他中胚层组织;而另外一种转移性肿瘤则多由其他病灶部位的癌症或肿瘤转移造成。常见的肿瘤一般可分为良性和恶性

表3 影响因素的分析结果
Tab.3 Analysis of influence factors

| Independent variable | Estimated value/cm | Standard error/cm | Wald | P value | Exp(B) |
|----------------------------------|--------------------|-------------------|--------|---------|--------|
| Tumor size | 1.125 | 0.417 | 3.351 | 0.041 | 5.124 |
| Calcification | 1.177 | 0.163 | 3.527 | 0.037 | 5.484 |
| Blood flow | 1.031 | 0.439 | 3.147 | 0.044 | 4.973 |
| Softness/hardness of the lesions | 2.335 | 0.321 | 18.487 | 0.000 | 11.541 |

Wald: Wood statistics; Exp(B): Dominance ratio

两类,两种肿瘤在一定的条件或环境下可以发生相互转化,研究表明恶性肿瘤如果恶性程度较低则其性质可能与良性肿瘤相似,某些肿瘤虽然为良性但其生长部位在于人体重要器官则同样可以对人体造成较大的危害。作为人体内最大的器官,肝脏主要作用是进行体内各类代谢功能,因此,肝脏恶性肿瘤的危害远大于其他病灶部位的肿瘤。同时由于此部位的血流供应较为丰富,因此其肿瘤具备发病隐匿及生长快速等特点,这也是导致此类疾病治疗效果不理想及治疗困难的主要原因^[11-13]。

作为一种新型超声诊断技术,超声弹性成像较之传统超声能够探测到肿瘤及扩散疾病成像,虽然此类技术目前仍处于研究阶段,但其已在临床上应用于包括甲状腺、乳腺、前列腺等在内的疾病。人体内各组织的弹性大多数依赖于组织的分子结构,临床医生使用的触诊便是在这一理论上建立起来的。由于人体各组织的弹性系数不同,便导致了在受力后各组织的变形程度有一定的差异,超声弹性成像就是通过这一原理对各组织的硬度进行考察。弹性成像技术弥补了常规超声的不足,对病变部位进行更加准确生动的定位。据研究表明生物组织的

硬度与病灶特性有一定的关系,所有病灶部位的硬度对诊断有一定的指导意义^[14-16]。

本次研究对比了3种诊断方法,最终结果B、C组检测方法的灵敏性、特异性和准确性均优于A组,但B、C两组之间的灵敏性、特异性和准确性无显著差异;B、C组检测方法的总体效能均大幅高于A组,但B、C两组之间的效能无显著差异;肿瘤尺寸、钙化、血流情况、病灶软硬情况均对超声弹性成像鉴别诊断有一定的影响,但肿瘤尺寸、钙化及血流情况的影响程度较为轻微,病灶软硬情况影响较为显著。本次的研究结果表明超声弹性成像鉴别诊断具备较高的效能,而且能够大幅降低患者的治疗成本,值得在临床上进行推广。

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