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甲状腺结节良恶性的彩色多普勒超声特征及其诊断价值分析*

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摘要 目的:研究甲状腺结节良恶性的彩色多普勒超声特征及其诊断价值。**方法:**选取从2016年3月~2019年2月于我院接受手术治疗的甲状腺疾病患者300例作为研究对象,均予以彩超检查,比较甲状腺良恶性结节的超声特征(主要包括直径、钙化情况、边界、回声、血流状况)。以病理活检结果为金标准,分析彩超诊断甲状腺结节良恶性的敏感性、特异性以及准确度。对比甲状腺良性结节的血流分型情况以及各项血流动力学参数。**结果:**恶性结节超声特征直径 ≥ 2 cm、有钙化、边界模糊、无回声/低回声、血流丰富人数占比均高于良性结节(均 $P < 0.05$)。以手术病理组织活检结果作为金标准,彩色多普勒超声诊断甲状腺结节的敏感性、特异性以及准确度分别为97.73%、86.11%、96.33%。甲状腺良性结节血流分型为I型、II型人数占比高于恶性结节,而III型、IV型人数占比低于恶性结节(均 $P < 0.05$)。甲状腺良性结节的收缩期峰值血流速度(PSV)、阻力指数(RI)均低于恶性结节,而舒张末期血流速度(EDV)高于恶性结节(均 $P < 0.05$)。**结论:**彩色多普勒超声对甲状腺结节良恶性的鉴别价值较高,且具有较高的敏感性、特异性以及准确度,可为甲状腺良恶性结节的早期诊断、临床治疗提供重要的参考依据。

关键词:甲状腺结节;彩色多普勒超声;诊断;血流动力学

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Color Doppler Ultrasound Characteristics and Diagnostic Value of Benign and Malignant Thyroid Nodules*

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ABSTRACT Objective: To study the color Doppler ultrasonographic characteristics of benign and malignant thyroid nodules and its diagnostic value. **Methods:** 300 patients with thyroid diseases who underwent surgery in our hospital from March 2016 to February 2019 were selected as the study subjects. All patients were examined by color Doppler ultrasonography to compare the sonographic features of benign and malignant thyroid nodules (including diameter, calcification, boundary, echo and blood flow). The sensitivity, specificity and accuracy of color Doppler ultrasonography in the diagnosis of benign and malignant thyroid nodules were analyzed based on the results of pathological biopsy. The blood flow patterns and hemodynamic parameters of benign and malignant thyroid nodules were compared. **Results:** The proportion of malignant nodules with diameter ≥ 2 cm, calcification, blurred boundary, anechoic/hypoechoic and rich blood flow was higher than that of benign nodules (all $P < 0.05$). The sensitivity, specificity and accuracy of color Doppler ultrasonography in the diagnosis of thyroid nodules were 97.73%, 86.11% and 96.33%, respectively. The proportion of benign thyroid nodules with blood flow types I and II was higher than that of malignant nodules, while the proportion of type III and IV was lower than that of malignant nodules (all $P < 0.05$). The peak systolic blood flow velocity (PSV) and resistance index (RI) of benign thyroid nodules were lower than those of malignant thyroid nodules, while the end diastolic blood flow velocity (EDV) of benign thyroid nodules was higher than that of malignant thyroid nodules (all $P < 0.05$). **Conclusion:** Color Doppler ultrasonography is of high value in differentiating benign and malignant thyroid nodules, and has high sensitivity, specificity and accuracy. It can provide important reference for early diagnosis and clinical treatment of benign and malignant thyroid nodules.

Key words: Thyroid nodules; Color Doppler ultrasound; Diagnosis; Hemodynamics

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前言

甲状腺结节是临床甲状腺疾病中常见的症状、体征,相关流行病学数据显示,随着近年来人们生活方式的不断改变以及

生活环境的逐渐恶化,甲状腺恶性结节的发病率正呈逐年上升趋势^[1,2]。甲状腺良恶性结节的治疗方式与预后存在明显差异,为了有效减轻患者家庭以及社会的经济负担,缓解患者身心压力,对甲状腺结节患者的良恶性予以鉴别诊断显得极为重要,

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亦是临床治疗方案的制定以及改善预后的关键^[3,4]。目前,病理学检查依旧是临床上对甲状腺结节性质进行确诊的“金标准”,但其也存在一定的创伤性,可对患者造成不同程度的损害,甚至有部分患者无法耐受,存在一定的局限性^[5,6]。因此,寻找一种更加有效的无创诊断方式显得尤为重要。随着近年来超声技术的不断完善,彩色多普勒超声开始被广泛应用于甲状腺结节良恶性的诊断中,且效果明显^[7,8]。鉴于此,本文通过研究甲状腺结节良恶性的彩色多普勒超声特征及其诊断价值,旨在为彩超鉴别诊断甲状腺结节的良恶性提供理论依据,现作以下报道。

1 资料与方法

1.1 一般资料

选取自2016年3月到2019年2月在我院接受手术的甲状腺疾病患者300例,其中男性患者与女性患者的人数分别为189例、111例,年龄22~76岁,平均年龄(50.32±17.42)岁;结节性质:良性结节264例,恶性结节36例。纳入标准^[9]:(1)所有受试者入院查体时可触及到甲状腺的肿块;(2)拟行手术;(3)实性结节亦或是实性为主的异常结节。排除标准:(1)既往已确诊的甲状腺结节者;(2)合并其他的内分泌疾病或恶性肿瘤者;(3)入院前接受过相关抗肿瘤治疗者;(4)患有交流沟通能力障碍或伴有精神疾病者。本研究已获得纳入对象知情同意,并获得我院伦理委员会批准。

1.2 研究方法

所有研究对象均接受彩色多普勒超声检查,具体操作如下:使用仪器为东芝-780型超声诊断仪,其高频线阵的探头频率主要设置6.0~14.0MHz。实施检查前取患者的仰卧位,并将颈部垫高,确保充分暴露。以二维超声对颈前部的有关纵/横

切面实施多断面的扫描,并给予声像图特征的记录,检查项目包括:①结节的数目;②形态;③边界情况;④回声;⑤钙化;⑥直径等,再通过彩超血流显像(Color doppler ultrasound blood flow imaging, CDFI)对结节内部和周边血流分布实施观察。

1.3 观察指标

(1)比较甲状腺良恶性结节的超声特征(主要包括直径、钙化情况、边界、回声、血流状况)。(2)以手术切除的病理组织的活检结果为金标准,计算彩超对甲状腺结节良恶性进行诊断的敏感性和特异性以及准确度。(3)对比甲状腺良恶性结节的血流分型情况以及各项血流动力学参数。其中甲状腺结节血流分型情况评价标准如下^[10]:血流呈星点状或短线状分布即为I型;周边呈弧形血流,且向结节内部伸出分支,即呈“轮辐状”即为II型;呈团状的不规则血流即为III型;血流呈穿入性即为IV型。血流动力学参数指标主要包括收缩期峰值血流速度(Peak systolic blood flow velocity, PSV)、舒张末期血流速度(End diastolic velocity, EDV)以及阻力指数(Resistance index, RI)。

1.4 统计学方法

统计分析主要是依靠SPSS20.0软件完成,且以[n(%)]表示计数资料,其比较行 χ^2 检验。采用 $(\bar{x} \pm s)$ 表示计量资料,比较行t检验,以 $P < 0.05$ 表示差异有统计学意义。

2 结果

2.1 甲状腺良恶性结节的彩色多普勒超声特征对比

恶性结节超声特征直径 ≥ 2 cm、有钙化、边界模糊、无回声/低回声、血流丰富人数占比均高于良性结节(均 $P < 0.05$),见表1。

表1 甲状腺良恶性结节的彩色多普勒超声特征对比[n(%)]

Table 1 Comparison of color Doppler ultrasound features of benign and malignant thyroid nodules[n(%)]

Ultrasonic feature		Malignant nodules (n=36)	Benign nodules (n=264)	χ^2	P
Diameter (cm)	<2	6(16.67)	247(93.56)	141.773	0.000
	≥ 2	30(83.33)	17(6.44)		
Calcification condition	No	7(19.44)	140(53.03)	14.300	0.000
	Yes	29(80.56)	124(46.97)		
Boundary	Limpid	13(36.11)	188(71.21)	17.654	0.000
	Vague	23(63.89)	76(28.79)		
Echo	No Echo/Low Echo	34(94.44)	175(66.29)	11.885	0.001
	High echo/ equal echo	2(5.56)	89(33.71)		
Blood flow condition	Lack of blood flow	11(30.56)	137(51.89)	5.771	0.016
	Rich in blood flow	25(69.44)	127(48.11)		

2.2 彩色多普勒超声诊断甲状腺结节的敏感性、特异性以及准确度分析

以病理活检结果作为金标准,彩超诊断甲状腺结节的敏感性、特异性以及准确度分别为97.73%(258/264)、86.11%(31/36)、96.33%(289/300),见表2。

2.3 甲状腺良恶性结节的血流分型情况对比

甲状腺良性结节血流分型为I型、II型人数占比高于恶性结节,而III型、IV型人数占比低于恶性结节(均 $P < 0.05$),见表3。

2.4 甲状腺良恶性结节的血流动力学参数对比

甲状腺良性结节的PSV、RI均低于恶性结节,而EDV高于恶性结节(均 $P < 0.05$),见表4。

表 2 彩色多普勒超声诊断甲状腺结节的敏感性、特异性以及准确度分析

Table 2 Sensitivity, specificity and accuracy of color Doppler ultrasound in the diagnosis of thyroid nodules

Ultrasound	Surgical and pathological tissue biopsies		
	Benign	Malign	Total
Benign	258	5	263
Malign	6	31	37
Total	264	36	300

表 3 甲状腺良恶性结节的血流分型情况对比[n(%)]

Table 3 Comparison of blood flow classification between benign and malignant thyroid nodules[n(%)]

Nodular type	n	I	II	III	IV
Benign nodules	264	130(49.24)	112(42.42)	20(7.58)	2(0.76)
Malign nodules	36	7(19.44)	8(22.22)	13(36.11)	8(22.22)
χ^2	-	11.337	5.387	26.349	45.298
<i>P</i>	-	0.001	0.020	0.000	0.000

表 4 甲状腺良恶性结节的血流动力学参数对比($\bar{x} \pm s$)Table 4 Comparison of hemodynamic parameters of benign and malignant thyroid nodules($\bar{x} \pm s$)

Groups	n	PSV(cm/s)	EDV(cm/s)	RI
Benign nodules	264	30.05± 6.11	17.18± 2.80	0.47± 0.13
Malign nodules	36	34.32± 7.74	14.26± 2.53	0.79± 0.20
<i>t</i>	-	3.801	5.934	12.861
<i>P</i>	-	0.000	0.000	0.000

3 讨论

甲状腺结节属于临床多发病以及常见病之一,主要是由于遗传因素、放射性接触以及碘摄入量异常等多种因素共同作用导致^[11-13],早期有效地诊断有利于改善患者的预后。目前,临床对其诊断的方式较多,包括 CT、核素扫描、病理学穿刺诊断以及磁共振成像等^[14-16]。其中病理学穿刺虽是诊断甲状腺结节的金标准,但属于侵入操作,加之工作量较大及成本较高的不足,使其应用有所限制。CT 以及磁共振成像等影像学检查手段虽能反映结节大小和数目等情况,但无法完成病灶性质的判断,具有较高的假阳性以及假阴性率^[17-19]。由此可知,寻找操作简便、费用低廉、鉴别价值高和耗时短的无创性诊断手段显得尤为重要。

本文结果显示,恶性结节超声特征直径 ≥ 2 cm、有钙化、边界模糊、无回声/低回声、血流丰富人数占比均高于良性结节,这充分表明了甲状腺良恶性结节的彩色多普勒超声特征存在明显的差异,临床工作中可通过彩色多普勒超声完成对甲状腺结节良恶性的鉴别。分析原因,笔者认为彩色多普勒超声可通过多个参数对患者的结节性质予以分析,继而可达到全面反映患者病变部位的病理学特征的作用,进一步为临床医生提供结节的结构以及征象情况,从而达到鉴别诊断的目的。此外,王效青等人的研究证实^[20],彩色多普勒超声对甲状腺结节的良性结节符合率为 88.2%,而恶性结节符合率为 80.6%。本文发现彩超诊断甲状腺结节的敏感性、特异性以及准确度分别为 97.73%、

86.11%、96.33%,说明了彩色多普勒超声诊断甲状腺结节良恶性的能效显著。另外,甲状腺良性结节血流分型为 I 型、II 型人数占比高于恶性结节,而 III 型、IV 型人数占比低于恶性结节。与此同时,甲状腺良性结节的 PSV、RI 均低于恶性结节,而 EDV 高于恶性结节,这提示了甲状腺良恶性结节的血流状态以及血流动力学参数存在明显差异。究其原因,我们认为可能与不同性质结节的生物学特性不同有关^[21,22]。其中良性结节的内部具有的新生血管通常较少,其血液供应来自宿体^[23-25],但恶性结节由于受到血管生成因子的影响,其内部具有大量的新生血管,并且分支增多,整体排列紊乱,且形态并不规则,其血流不仅丰富,而且速度快,从而引起上述各项参数水平的差异^[26-28]。彩色多普勒超声应用于甲状腺结节良恶性的鉴别诊断中可能具有下述几点优势^[29,30]:(1)可清晰和准确地呈现病灶内部的血流时相及速度,再由二维平面得以直观呈现;(2)能定量分析其血流的束面积、宽度以及长度,同时可追踪血流起源。(3)对于观察结节部位、直径大小、数目、形态以及内部回声方面具有优越性。

综上所述,彩色多普勒超声应用于甲状腺结节良恶性鉴别诊断中具有较高的敏感性、特异性以及准确度,且具有即时、方便以及无创等优势,加之其操作比较简单,费用低廉,还具有较佳的重复性,因而有助于推广普及。

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