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多层螺旋计算机断层扫描联合磁共振成像对早期中央型肺癌及术后复发的诊断价值*

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摘要 目的:探讨多层螺旋计算机断层扫描(MSCT)联合磁共振成像(MRI)对早期中央型肺癌及术后复发的诊断价值。**方法:**选取2015年8月到2017年2月我院收治的早期中央型肺癌患者98例,所有患者均经MSCT和MRI检查。分析并对比单独MSCT的诊断结果及MSCT联合MRI的诊断结果。随访1年,观察并比较疑似复发的患者单独MSCT的诊断结果及MSCT联合MRI的诊断结果,并比较其对复发诊断的灵敏度、特异度。**结果:**MSCT联合MRI对早期中央型肺癌诊断的准确率、误诊率、漏诊率分别为94.90%、1.02%、4.08%,与单独MSCT诊断的82.65%、9.18%、8.16%比较,MSCT联合MRI诊断的准确率明显升高,误诊率明显降低($P<0.05$),而两种诊断方法的漏诊率比较差异无统计学意义($P>0.05$)。随访1年后,98例患者共复查122例次,共有49例复发。MSCT联合MRI诊断早期中央型肺癌患者术后复发的灵敏度、特异度分别为97.96%、93.15%,均高于单独MSCT诊断的83.67%、82.19%($P<0.05$)。**结论:**MSCT联合MRI诊断早期中央型肺癌准确率较高,且在诊断术后复发中可提高灵敏度、特异度。**关键词:**多层螺旋计算机断层扫描;磁共振成像;早期;中央型肺癌;复发;诊断
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The Diagnostic Value of MSCT Combined with MRI for Early Central Lung Cancer and Postoperative Recurrence*

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ABSTRACT Objective: To investigate the diagnostic value of multi-slice spiral computed tomography (MSCT) combined with magnetic resonance imaging (MRI) for early central lung cancer and postoperative recurrence. **Methods:** 98 patients with early central lung cancer who were treated in our hospital from August 2015 to February 2017 were selected. All patients were examined by MSCT and MRI. The diagnostic results of separate MSCT and MSCT combined with MRI were analyzed and compared. Follow up for 1 year, the diagnosis results of separate MSCT and MSCT combined with MRI in patient with a suspected relapse were observed and compared, and the sensitivity and specificity to the diagnosis of recurrence between them were compared. **Results:** The accuracy rate, misdiagnosis rate and missed diagnosis rate of MSCT combined with MRI were 94.90%, 1.02% and 4.08% respectively, compared with 82.65%, 9.18% and 8.16% of separate MSCT, the accuracy rate of MSCT combined with MRI diagnosis was increased significantly, and the misdiagnosis rate was decreased significantly ($P<0.05$), there was no significant difference in missed diagnosis rate between the two diagnostic methods ($P>0.05$). Follow up for 1 year, 98 patients were reexamined 122 times, and 49 cases recurred. The sensitivity and specificity of MSCT combined with MRI in diagnosis of postoperative recurrence were 97.96% and 93.15%, which were significantly higher than 83.67% and 82.19% of separate MSCT ($P<0.05$). **Conclusion:** MSCT combined with MRI has high accuracy rate in the diagnosis of early central lung cancer, and it can improve sensitivity and specificity in diagnosis of postoperative recurrence.

Key words: Multi-slice computed tomography; Magnetic resonance imaging; Early stage; Central lung cancer; Recurrence; Diagnosis

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前言

肺癌是我国最常见的恶性肿瘤之一,具有较高的致死率,据统计,肺癌患者的5年生存率甚至不足10%^[1]。随着近年来多种靶向治疗药物的临床应用、射频消融等微创治疗技术的不断发展,我国对于肺癌的治疗水平得到了很大改善,然而中晚期

肺癌患者的预后仍不十分理想^[2]。改善肺癌患者的预后,关键在于早期诊断与及时治疗。手术是治疗早期肺癌的主要方式,但术后仍然不可避免部分患者的复发情况,对复发情况进行早期诊断也是改善患者预后的重要环节^[3-5]。中央型肺癌约占所有肺癌的60%~70%,早期患者癌灶局限于支气管壁内,无脏器和淋巴结转移等情况,并对周围肺实质无侵犯现象,临床症状不明

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显^[67]。影像学检查是目前诊断中央型肺癌以及诊断患者复发情况的主要方法^[8]。多层螺旋计算机断层扫描 (multi-slice computed tomography, MSCT) 图像可进行多方位重建, 对支气管结构有较为清晰的显示, 对气道病的诊断效果较好, 目前也已广泛应用于肺癌的检查中^[9,10]。然而报道显示^[11], MSCT 对早期中央型肺癌的诊断仍存在一定的误诊、漏诊情况。我院在对早期中央型肺癌患者进行 MSCT 检查的同时采用磁共振成像 (magnetic resonance imaging, MRI) 进行补充诊断, 取得了较好的效果。整理报道如下。

1 资料与方法

1.1 一般资料

选取 2015 年 8 月到 2017 年 2 月我院收治的早期中央型肺癌患者 98 例。纳入标准: ① 所有中央型肺癌患者均经活检或术后病理证实; ② TNM 分期^[12]为 Ia、Ib 期; ③ 初次诊断及复发诊断时均采用 MSCT 及 MRI 检查; ④ 临床资料完整者。排除标准: ① 存在 MSCT 或 MRI 禁忌症者; ② 合并其它恶性肿瘤者; ③ 随访失访者。所有患者中男性 60 例, 女性 38 例, 年龄 36~67 岁, 平均 (53.37±7.62) 岁, 病理分型: 鳞癌 61 例、腺癌 37 例; TNM 分期: Ia 期 54 例, Ib 期 44 例。所有患者或家属均知情同意并签署知情同意书, 研究经医院伦理委员会准许同意。

1.2 方法

1.2.1 MSCT 检查方法 采用 Aquilion 64 排螺旋 CT, 参数设定如下: 电压 120kV, 电流 130 mA, 矩阵 640×640, 层厚和层距均为 1 mm, 一次屏气下自肺尖至膈顶进行扫描, 采用以 2.5~3.0 mL/s 的速度注射碘海醇 100 mL, 动脉期扫描时间通过触发扫描来确定, 触发层面于降主动脉约胸椎 5~6 节水平, 触发阈值 180HU, 延迟扫描时间约为 3 min。利用 Vitrea 2 软件对扫描后传至工作站的图像进行多维重建处理、观察和分析。

1.2.2 MRI 检查方法 仪器采用超导型磁共振扫描仪 (GE Signa HDc 1.5T, 美国), 扫描前指导患者如何屏气与吸气, 使其尽量做到呼吸均匀一致, 以减少伪影。患者扫描前 3~4 h 禁水禁食, 仰卧位, 头先入, 常规平扫 T1WI、T2WI 轴位、T2WI 冠状位及 DWI 轴位, 自双肺尖至膈肌横断扫描。利用 MRD13 对采集到的图像进行处理、分析。

1.2.3 治疗方法 所有患者确诊后均采用以手术为主, 结合放

化疗、中西医结合治疗与生物细胞免疫治疗的综合治疗。

1.3 观察指标

分析并对比采用单独 MSCT 的诊断结果及 MSCT 联合 MRI 的诊断结果。采用电话回访及定期复查的方式随访 1 年, 观察并比较疑似复发的患者采用单独 MSCT 的诊断结果及 MSCT 联合 MRI 的诊断结果, 并比较其对复发诊断的灵敏度、特异度。灵敏度 = 真阳性人数 / (真阳性人数 + 假阴性人数) * 100%; 特异度 = 真阴性人数 / (真阴性人数 + 假阳性人数) * 100%。

1.4 统计学方法

采用 SPSS19.0 软件对研究数据进行分析, 计量资料以 ($\bar{x} \pm s$) 表示, 实施 t 检验, 计数资料以 [n(%)] 表示, 实施 χ^2 检验, 检验标准设为 $\alpha=0.05$ 。

2 结果

2.1 早期中央型肺癌患者 MSCT 及 MRI 诊断特征分析

MSCT 诊断特征: ① 出现典型胸膜反应表现, 如胸膜炎、胸膜增厚等。② 增强扫描呈不均匀强化, 肺门见不规则软组织肿块影, 直径为 1~5 cm。③ 无法观察到肿块与肺门大血管或纵膈之间的脂肪影。④ 支气管管腔狭窄、阻塞等, 内壁呈现不规则增厚, 支气管外有肿块包绕其生长。⑤ 受累支气管多段受阻, 肺组织膨胀不良, 远侧呈阻塞性肺炎表现。⑥ MSCT 扫描受累支气管远侧肺组织密度明显增高, 呈肺不张表现。⑦ 增强扫描纵膈淋巴结有增大者提示有淋巴结转移。

MRI 诊断特征: ① 在肺门区有肿块形成。② 支气管管腔内肿块、管壁增厚、管腔狭窄与闭塞, 出现壁外肿块。③ 出现腔内结节状中等信号提示存在下腔静脉瘤栓。④ 纵膈结构周围脂肪高信号带消失。⑤ 阻塞性肺气肿改变。

2.2 MSCT 诊断结果及 MSCT 联合 MRI 诊断结果

单独 MSCT 诊断的准确率、误诊率、漏诊率分别为 82.65%、9.18%、8.16%。MSCT 联合 MRI 诊断的准确率、误诊率、漏诊率分别为 94.90%、1.02%、4.08%, 与单独 MSCT 诊断比较, MSCT 联合 MRI 诊断的准确率明显升高, 误诊率明显降低 ($P<0.05$), 而两种诊断方法的漏诊率比较差异无统计学意义 ($P>0.05$)。见表 1。

表 1 MSCT 诊断结果及 MSCT 联合 MRI 诊断结果比较[n(%)]

Table 1 Comparison of MSCT diagnostic results and MSCT combined MRI diagnostic results[n(%)]

Diagnostic methods	n	Diagnostic results		
		Accuracy	Misdiagnosis	Missed diagnosis
MSCT	98	81 (82.65)	9 (9.18)	8 (8.16)
MSCT combined with MRI	98	93 (94.90)	1 (1.02)	4 (4.08)
χ^2	-	7.373	6.774	1.420
P	-	0.007	0.009	0.233

2.3 复发情况诊断结果比较

随访 1 年, 98 例患者共复查 122 例次, 共有 49 例复发, 记为 "+", 未复发记为 "-", 诊断结果见表 2。MSCT 诊断复发的灵敏度为 83.67% (41/49), 特异度为 82.19% (60/73)。MSCT 联合

MRI 诊断复发的灵敏度为 97.96% (48/49), 特异度为 93.15% (68/73), 均高于单独 MSCT 诊断 ($P<0.05$)。诊断为假阳性的病例主要为纵膈淋巴结肿大及慢性炎性反应。

表 2 复发情况诊断结果比较

Table 2 Comparison of the diagnostic results of recurrence

Diagnostic methods	Diagnostic results	Pathologic diagnosis	
		+	-
MSCT	+	41	13
	-	8	60
MSCT combined with MRI	+	48	5
	-	1	68

3 讨论

早期中央型肺癌缺少特异性的临床症状表现,当患者出现症状到医院诊断时,大多数病情已发展至中晚期,此时,肿瘤已近肺门,易侵犯邻近的纵隔结构及大血管,手术难度大,并具有很高的复发率^[13,14]。有报道表明,此类患者大多在诊治时已不具备手术指征,手术率仅有 30%左右^[15]。而中央型肺癌早期检出有根治的可能,因此及早发现和治疗对于提高患者的治愈率和生存率具有重要的意义^[16,17]。近年来,随着医疗技术的发展,MSCT 在扫描速度、图像显示质量上都有了很大的提高,其图像质量以及工作站对图像结果的处理和重建可以更清晰的显示支气管管壁、管腔的细微结构,也为早期中央型肺癌的早期诊断打下了坚实的基础^[18,19]。MSCT 检查除了可观察到早期中央型肺癌瘤体的形态征象以外,还可以对邻近气道、血管、纵隔淋巴结等有较为清晰的显示。然而在临床实际应用中,MSCT 较易受到外界的干扰,漏诊、误诊情况无法避免,部分患者的病情也因此被延误^[20,21]。

MRI 可以实现多方位扫描,包括冠状位、轴位、矢状位等方向,而在不同序列的符号加权处理下可对各类病变的不同特征进行呈现,以致对病变性质、解剖结构以及与周围组织的关系有较为清楚的显示^[22,23]。MRI 将某频率的射频脉冲施加到静磁场中的人体,这种脉冲通过对人体组织中氢质子发生作用后使其产生磁共振现象,在射频脉冲终止后,质子可感应出磁共振信号,并且可经自身的系统对此类信号进行接收和处理后即产生图像^[24,25]。MRI 可以发射出两种信号,这两种信号在分析扫描成分作用下以不同类型以及不同高低变化的方式进行组合,使分析判断方式也呈现出多样化。而不同物质的两种信号变化特质相对稳定,当这种相对稳定的信号特征失去原有的特性时,就表明人体组织或代谢功能有了变化,有助于病变的发现^[26,27]。在诊断中心型肺癌时,MRI 在软组织显示上不仅能对支气管狭窄、肿块的大小形态等进行有效显示,且对纵隔淋巴结肿大、肿块对周围组织的侵犯情况的早期判断提供较为可靠的依据^[28]。与 MSCT 相比较,MRI 具有良好的组织对比度是其优势,其能通过组织成分和代谢功能、组织性质等对组织进行区分,相比于 MSCT 依靠密度不同进行判断,MRI 对发现病变组织和病变周围浸润情况有更好的显示效果。将 MRI 作为 MSCT 的补充诊断手段时,增厚的支气管粘膜在 DWI 图像上有蔓延状高信号表现,支气管受累征象有更为清晰的显示。

过往研究表明^[29,30],MSCT 联合 MRI 对宫颈癌、直肠癌等均有较高的诊断价值。而本研究中,MSCT 联合 MRI 对早期中

央型肺癌诊断的准确率准确率明显升高,误诊率明显降低。而对于术后复发的诊断,MSCT 联合 MRI 诊断复发的灵敏度、特异度均高于单独 MSCT 诊断。提示 MSCT 联合 MRI 对早期中央型肺癌及术后复发具有较高的诊断价值。值得注意的是,本研究中仍有部分病例出现误诊,其主要原因在于:① 观察者的认识水平不足,只关注肺内的一些改变,而忽略观察其气管管壁病和近端支气管腔内的变化,或是不能结合厚层图像与薄层图像进行分析。② 肺不张、阻塞性肺炎等伴随表现不明显。③ 术后早期,患者体内的炎症反映仍比较活跃,对诊断结果产生误导。

综上所述,MSCT 联合 MRI 对早期中央型肺癌具有较高的诊断价值和应用价值,且在诊断术后复发方面具有较高的灵敏度、特异度。

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