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磁共振胰胆管成像联合血清 CA125、CA19-9、CEA 对良恶性梗阻性黄疸的诊断价值*

宋维通 王 坤 靳 晶 杨尚文 陆芳菲[△]

(南京大学医学院附属鼓楼医院医学影像科 江苏 南京 210008)

摘要 目的:研究磁共振胰胆管成像(MRCP)联合血清糖类抗原 125(CA125)、糖类抗原 19-9(CA19-9)、癌胚抗原(CEA)对良恶性梗阻性黄疸的诊断价值。**方法:**将医院从 2018 年 1 月~2020 年 2 月期间收治的 90 例良恶性梗阻性黄疸患者纳入研究。将其按照良恶性的差异分为良性梗阻性黄疸 51 例以及恶性梗阻性黄疸 39 例。分别对所有患者进行 MRCP 检测,并分析良恶性梗阻性黄疸 MRCP 影像学表现特征的差异。此外,采集所有患者清晨空腹静脉血,检测血清 CA125、CA19-9、CEA 水平并进行对比。通过受试者工作特征(ROC)曲线分析明确 MRCP 联合血清 CA125、CA19-9、CEA 对良恶性梗阻性黄疸的诊断价值。**结果:**恶性梗阻性黄疸部位为十二指肠乳头区人数占比明显高于良性梗阻性黄疸,而胰头上区、胰头区人数占比均明显低于良性梗阻性黄疸;且恶性梗阻性黄疸梗阻重度扩张人数占比明显高于良性梗阻性黄疸,而梗阻轻度扩张人数占比明显低于良性梗阻性黄疸,差异均有统计学意义(均 $P < 0.05$)。恶性梗阻性黄疸患者血清 CA125、CEA 水平均明显高于良性梗阻性黄疸患者(均 $P < 0.05$);而两组血清 CA19-9 水平对比不明显($P > 0.05$)。MRCP 联合血清 CA125、CA19-9、CEA 诊断良恶性梗阻性黄疸的曲线下面积、灵敏度、特异度、约登指数均明显高于 MRCP 和血清 CA125、CA19-9、CEA 单独诊断。**结论:**MRCP 联合血清 CA125、CA19-9、CEA 对良恶性梗阻性黄疸的诊断价值较高,值得临床推广应用。

关键词:磁共振胰胆管成像;梗阻性黄疸;糖类抗原 125;糖类抗原 19-9;癌胚抗原

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Diagnostic Value of Magnetic Resonance Cholangiopancreatography Combined with Serum CA125, CA19-9 and CEA in Benign and Malignant Obstructive Jaundice*

SONG Wei-tong, WANG Kun, JIN Jing, YANG Shang-wen, LU Fang-fei[△]

(Department of Medical Imaging, Gulou Hospital Affiliated to Medical College of Nanjing University, Nanjing, Jiangsu, 210008, China)

ABSTRACT Objective: To study the diagnostic value of magnetic resonance cholangiopancreatography (MRCP) combined with serum carbohydrate antigen 125 (CA125), carbohydrate antigen 19-9 (CA19-9) and carcinoembryonic antigen (CEA) in benign and malignant obstructive jaundice. **Methods:** A total of 90 patients with benign and malignant obstructive jaundice who were admitted to our hospital from January 2018 to February 2020 were included in this study. According to the difference between benign and malignant, they were divided into benign obstructive jaundice with 51 cases and malignant obstructive jaundice with 39 cases. MRCP detection was performed on all subjects respectively, and the differences of MRCP imaging features between benign and malignant obstructive jaundice were analyzed. In addition, the morning fasting venous blood of all subjects was collected, and the levels of serum CA125, CA19-9 and CEA were detected and compared. The diagnostic value of MRCP combined with serum CA125, CA19-9 and CEA in benign and malignant obstructive jaundice was determined by receiver operating characteristic (ROC) curve analysis. **Results:** The proportion of patients with malignant obstructive jaundice in duodenal papilla area was significantly higher than that in benign obstructive jaundice, while the proportion of patients with upper pancreatic head area and pancreatic head area was significantly lower than that in benign obstructive jaundice. And the proportion of malignant obstructive jaundice with severe obstructive dilatation was significantly higher than that of benign obstructive jaundice, while the proportion of mild obstructive dilatation was significantly lower than that of benign obstructive jaundice, the differences were statistically significant (all $P < 0.05$). The levels of serum CA125 and CEA in patients with malignant obstructive jaundice were significantly higher than those in patients with benign obstructive jaundice (all $P < 0.05$). There was no significant difference in serum CA19-9 level between the two groups ($P > 0.05$). The area under the curve, sensitivity, specificity and Youden index of MRCP combined with serum CA125, CA19-9 and CEA in the diagnosis of benign and malignant obstructive jaundice were significantly

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作者简介:宋维通(1980-),男,本科,主管技师,研究方向:放射医学技术,E-mail: weitongsong@yeah.net

△ 通讯作者:陆芳菲(1977-),女,本科,副主任技师,研究方向:放射医学技术,E-mail: 13584038729@126.com

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higher than those of MRCP and serum CA125, CA19-9 and CEA alone. **Conclusion:** MRCP combined with serum CA125, CA19-9 and CEA has a high diagnostic value in benign and malignant obstructive jaundice, which is worthy of clinical application.

Key words: Magnetic resonance cholangiopancreatography; Obstructive jaundice; Carbohydrate antigen 125; Carbohydrate antigen 19-9; Carcinoembryonic antigen

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前言

梗阻性黄疸又被称之为外科性黄疸,主要是因肝外或肝内胆管部分或完全机械性梗阻,从而导致胆汁通过胆管进入肠道的过程受阻,继而引起胆汁淤积、酯型胆红素反流入血引发的黄疸^[1,2]。于此过程中,因胆汁和一系列成分难以顺利流回肠道内,从而在一定程度上增加了胆管内压,刺激肝血流变化,继而导致机体内生物学、免疫功能以及脏器功能出现改变,对机体正常功能造成严重影响,甚至威胁患者生命健康安全^[3,4]。相关研究报道显示,梗阻性黄疸病因较为复杂,临床治疗难度较大,尤其是恶性梗阻性黄疸患者预后往往较差^[5-7]。因此,早期鉴别诊断梗阻性黄疸具有极其重要的临床意义,可为治疗方案的制定提供参考依据,进一步达到改善患者预后的目的。随着近年来影像学技术的日益发展,磁共振胰胆管成像(MRCP)作为一种新型影像学手段开始被应用于肝胆疾病的临床诊断中,且具有一定价值^[8]。此外,糖类抗原 125(CA125)、糖类抗原 19-9(CA19-9)、癌胚抗原(CEA)均是目前临床上应用较为广泛的肿瘤标志物,在多种良恶性肿瘤的鉴别诊断中起着至关重要的作用^[9]。鉴于此,本文通过研究 MRCP 联合血清 CA125、CA19-9、CEA 对良恶性梗阻性黄疸的诊断价值,以期为临床诊治提供新靶点,报道如下。

1 对象与方法

1.1 一般资料

将医院从 2018 年 1 月~2020 年 2 月期间收治的 90 例良恶性梗阻性黄疸患者纳入研究。其中包括男性 49 例,女性 41 例;年龄 31~77 岁,平均(51.32±7.42)岁;病程 3~60 d,平均(24.52±6.22)d。纳入标准:(1)所有入选对象均经手术病理组织活检确诊;(2)年龄>20 岁;(3)入选研究前并未接受相关治疗;(4)无临床病历资料缺失;(5)所有患者知情且签署同意书。排除标准:(1)存在相关检查禁忌症者;(2)合并其他恶性肿瘤者;(3)神志异常或合并神经系统疾病者;(4)正参与其他研究者。将其按照良恶性的差异分为良性梗阻性黄疸 51 例以及恶性梗阻性黄疸 39 例。本研究与《赫尔辛基宣言》相关要求相符。

1.2 研究方法

(1)MRCP 检查:所有患者于检查前禁食 6-8 h,禁水 4h,医护人员指导患者进行屏气训练,患者采取仰卧体位,头部先进,使用仪器为 3.0T 超导装置 (Ingenia 3.0; Philips Medical System),实施体线圈成像。以呼吸门控实现对 T2WI 和 MRCP 扫描的触发,以胰胆管区域作为扫描目标。参数设置:① 常规自旋回波 T1WI 扫描:TR/TE/NSA=491 ms/12 ms/3。② 快速自旋回波 T2WI 扫描:TR/TE/NSA=1800 ms/100 ms/5,以 25 作为回波链长度。③ 与② 扫描的 FOV 均取 370 mm×296 mm,层厚/层

间距=8 mm/1 mm,矩阵取 256×256,扫描百分比 80%,开展 16 层扫描。④ MRCP:TR/TE/NSA=1800 ms/700 ms/2,FOV 取 350 mm×280 mm,矩阵取 256×256,扫描百分比为 80%,以 100 作为回波链长度,自动匀场。以 2 mm 层厚扫描获取 54 层的斜冠状面原始图像,开展时长为 180 s 的扫描,之后通过最大强度投射法对获取的 MRCP 原始冠状位图像实施间隔 15° 重建,采集 12 张差异角度的 MRCP 立体影像。随后经由旋转实现对病变情况实施动态观察。(2)血清 CA125、CA19-9、CEA 水平检测:分别采集所有患者的清晨空腹静脉血 5 mL,进行时长为 10 min 的 3000 r 离心处理,获取血清保存在 -80℃ 冰箱中备用。检测方式均为电化学发光免疫法,操作严格遵循仪器说明书完成,相关仪器为罗氏 Elecsys 2010 化学发光分析仪。所有操作均由医院同一名医生独立完成。

1.3 观察指标

分析良恶性梗阻性黄疸 MRCP 特征,比较良恶性梗阻性黄疸血清 CA125、CA19-9、CEA 水平,以及 MRCP 联合血清 CA125、CA19-9、CEA 对良恶性梗阻性黄疸诊断价值的受试者工作特征(ROC)曲线。

1.4 评价标准

梗阻扩张程度判定标准如下^[10]:胆总管直径 7~10 mm,且仅有肝外胆管扩张即为轻度;胆总管直径 10~13 mm,肝内胆管扩张范围<2/3 即为中度;胆总管直径>13 mm,肝内胆管扩张范围>2/3 即为重度。

1.5 统计学处理

采用 SPSS 22.0 软件对数据进行处理,计数资料以(%)表示,采用 χ^2 检验,计量资料符合正态分布、方差齐性,以($\bar{x} \pm s$)表示,采用 t 检验。通过 ROC 曲线分析明确 MRCP 联合血清 CA125、CA19-9、CEA 对良恶性梗阻性黄疸的诊断价值。 $P<0.05$ 表示差异有统计学意义。

2 结果

2.1 良恶性梗阻性黄疸 MRCP 特征评价及典型病例示例

恶性梗阻性黄疸部位为十二指肠乳头区人数占比明显高于良性梗阻性黄疸,而胰头上区、胰头区人数占比均明显低于良性梗阻性黄疸;且恶性梗阻性黄疸梗阻重度扩张人数占比明显高于良性梗阻性黄疸,而梗阻轻度扩张人数占比明显低于良性梗阻性黄疸,差异均有统计学意义(均 $P<0.05$),见表 1,典型恶性、良性梗阻性黄疸患者 MRCP 表现如图 1~2 所示。其中图 1 为恶性梗阻性黄疸患者,男性,62 岁;MRCP 表现:肝左叶近肝门部截断,肝内胆管明显扩张,胆总管未见明显扩张,胰管未见扩张,胆囊显示不清;诊断结果:肝左叶近肝门部占位,肝内胆管明显扩张,考虑为胆管细胞癌累及肝门部,建议结合增强检查。图 2 为良性梗阻性黄疸患者,女性,75 岁;MRCP 表

现:肝内外胆管明显扩张,胆总管直径约 2.3 cm,胆总管中下段 管中下段占位,肝内外胆管及胆总管上段扩张,胰管扩张。截断,胆囊内未见明显充盈缺损影,胰管扩张;诊断结果:胆总

表 1 良恶性梗阻性黄疸 MRCP 特征评价(n,%)
Table 1 MRCP evaluation of benign and malignant obstructive jaundice(n,%)

Characteristic	Benign obstructive jaundice(n=51)	Malignant obstructive jaundice(n=39)	χ^2	P	
Position	Porta hepatis	5(9.80)	3(7.69)	18.745	0.000
	Upper pancreatic head area	21(41.18)	3(7.69)		
	Pancreatic head area	18(35.29)	5(12.82)		
	Duodenal papilla area	7(13.73)	28(71.79)		
Obstructive dilatation degree	Mild	32(62.75)	3(7.69)	14.233	0.000
	Moderate	12(23.53)	10(25.64)		
	Severe	7(13.73)	26(66.67)		

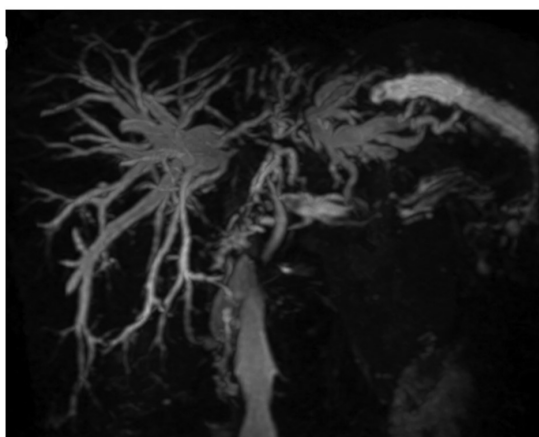


图 1 典型恶性梗阻性黄疸患者

Fig.1 Patients with typical malignant obstructive jaundice

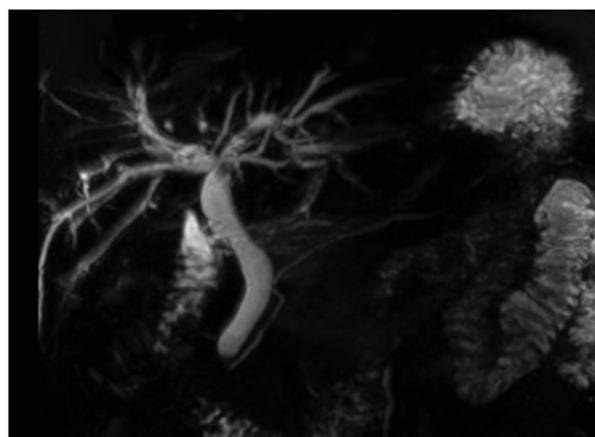


图 2 典型良性梗阻性黄疸患者

Fig.2 Patients with typical benign obstructive jaundice

2.2 良恶性梗阻性黄疸患者血清 CA125、CA19-9、CEA 水平比较

恶性梗阻性黄疸患者血清 CA125、CEA 水平均明显高于

良性梗阻性黄疸患者,差异均有统计学意义(均 $P < 0.05$);而两组血清 CA19-9 水平对比不明显,差异无统计学意义($P > 0.05$),见表 2。

表 2 良恶性梗阻性黄疸患者血清 CA125、CA19-9、CEA 水平比较($\bar{x} \pm s$)

Table 2 Comparison of serum CA125, CA19-9 and CEA levels in patients with benign and malignant obstructive jaundice($\bar{x} \pm s$)

Groups	n	CA125(U/mL)	CA19-9(U/mL)	CEA(ng/mL)
Malignant obstructive jaundice	51	57.39± 11.39	72.01± 17.34	15.23± 3.19
Benign obstructive jaundice	39	18.04± 3.45	69.27± 12.58	6.04± 1.35
t	-	20.832	0.833	16.856
P	-	0.000	0.407	0.000

2.3 MRCP 联合血清 CA125、CA19-9、CEA 对良恶性梗阻性黄疸诊断价值的 ROC 曲线分析

MRCP 联合血清 CA125、CA19-9、CEA 诊断良恶性梗阻性黄疸的曲线下面积、灵敏度、特异度、约登指数均明显高于 MRCP 和血清 CA125、CA19-9、CEA 单独诊断,见表 3、图 3。

3 讨论

梗阻性黄疸的主要病因包括良性疾病以及恶性肿瘤,其中良性疾病有寄生虫、胆管结合、胆管损伤、胆管炎性狭窄以及胆管先天畸形等,恶性肿瘤有壶腹周围癌、胰腺癌、胆囊癌等^[11-13]。不同病因导致的梗阻性黄疸患者临床治疗方案以及预后存在一定的差异,因此要及时明确诊断梗阻性黄疸的良恶性,争取早期采取干预治疗,从而达到改善患者预后的目的^[14-16]。目前,临床上针对梗阻性黄疸的诊断手段包括影像学、肝功能等,由

于肿瘤性梗阻性黄疸患者的早期临床症状存在一定的隐匿性，从而难以对不同病因的梗阻性黄疸进行鉴别诊断，大部分患者

一经确诊便已处于中晚期，预后不良^[17-19]。因此，如何早期鉴别诊断梗阻性黄疸良恶性是医务人员研究的重要课题。

表3 MRCP联合血清CA125、CA19-9、CEA对良恶性梗阻性黄疸诊断价值的ROC曲线分析

Table 3 ROC curve analysis of MRCP combined with serum CA125, CA19-9 and CEA in the diagnosis of benign and malignant obstructive jaundice

Diagnostic methods	Area under the curve	Sensitivity	Specificity	Youden index
MRCP	0.745	0.74	0.75	0.49
CA125	0.632	0.69	0.57	0.26
CA19-9	0.525	0.53	0.51	0.19
CEA	0.611	0.64	0.54	0.21
MRCP combined with CA125, CA19-9, CEA	0.885	0.91	0.85	0.76

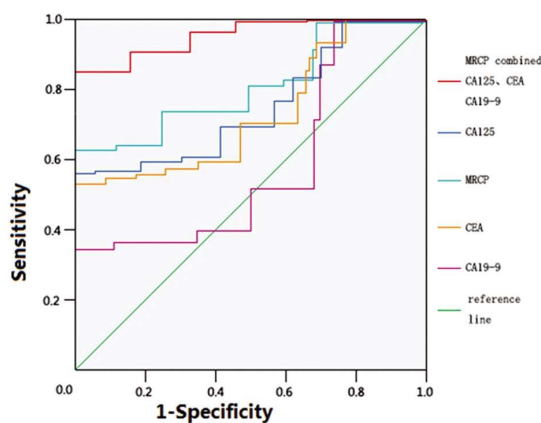


图3 各指标对良恶性梗阻性黄疸诊断价值的ROC曲线

Fig.3 ROC curve of diagnostic value of each index in benign and malignant obstructive jaundice

MRCP属于磁共振水成像技术之一，主要是运用磁共振扫描序列获取重T2WI，使水样结构显影，继而实现对含水器官的显示，帮助医生获取水成像图片，为患者疾病的诊断提供可靠依据^[20,21]。本研究发现，良恶性梗阻性黄疸患者的MRCP影像学特征表现存在明显的差异，即恶性梗阻性黄疸患者病变部位多见十二指肠乳头区，且梗阻多呈重度扩张表现。这在马晓兵等人的研究报告中得以佐证^[22]，说明了MRCP诊断良恶性梗阻性黄疸具有一定的价值。考虑原因可能在于：MRCP图像可从多角度、多方位、直观显示胰胆管的影像学形态，同时可较为准确、清晰地显示病变部位，加之其具有无创、成功率高以及无需对比剂等优势，目前已被广泛应用于胰胆相关疾病的诊断中^[23,24]。肿瘤标志物主要是指由恶性肿瘤在发生、进展、浸润、转移过程中所产生的一类特异性物质，不仅可在肿瘤组织内被检测到，同时可在患者多种体液内被检出，进一步为临床肿瘤疾病的鉴别诊断提供参考依据。本研究发现，恶性梗阻性黄疸患者血清CA125、CEA水平均明显高于良性梗阻性黄疸，差异均有统计学意义。这提示了恶性梗阻性黄疸患者的血清CA125、CEA水平明显升高，亦在庞华春等人的研究报告中得以佐证^[25]：恶性梗阻性黄疸患者血清CA125、CEA水平分别为(58.57±12.76)U/mL、(15.24±5.88)ng/mL，均明显高于良性梗阻性黄疸患者的(16.24±2.08)U/mL、(6.02±1.73)ng/mL。究其原因：CA125属于高分子糖蛋白之一，其在正常人群中的表达较低，但在乳

腺癌^[26]、胃肠道癌^[27]、甲状腺癌^[28]等恶性肿瘤中均异常表达。CEA属于广谱肿瘤标志物，是肿瘤胚胎抗原，在正常生理状态下几乎不表达，而在肿瘤患者的血液中存在明显异常升高^[29]。另外，肖来华等人的研究报告显示^[30]：恶性梗阻性黄疸血清CA19-9水平为(502.1±166.5)U/mL，明显高于良性梗阻性黄疸的(228.4±88.3)U/mL。这与本研究结果不同，其原因可能和梗阻性黄疸病因不同、检测方式不尽相同、入选对象的年龄跨度不同有关，这也值得今后进一步的临床关注。此外，本研究还显示MRCP联合血清CA125、CA19-9、CEA诊断良恶性梗阻性黄疸的效能较佳。其主要原因可能是上述检查联合诊断时具有协同互补作用有关，因此临床可考虑将上述指标纳入到患者的诊疗过程当中，从而更好地改善其预后生存状态。

综上所述，MRCP与血清CA125、CA19-9、CEA联合检测可明显提高良恶性梗阻性黄疸的诊断效能，具有较高的临床推广应用价值。

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