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磁共振检查对复杂性肛瘘手术治疗的指导价值及术后复发的危险因素分析*

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摘要 目的:探讨磁共振成像技术(MRI)对复杂性肛瘘诊断和术前评估的指导意义及术后复发的危险因素。**方法:**前瞻性选取2015年6月至2017年12月到我院诊断并接受手术治疗的359例复杂性肛瘘患者,将其随机分为观察组182例和对照组177例。对照组患者术前未行MRI检查,术中行亚甲蓝染色指导手术治疗。观察组术前行MRI检查,术中给予亚甲蓝染色结合术前评估行手术治疗,以术中探查结果为金标准,统计MRI术前检查复杂性肛瘘的准确率,Kappa检验评估MRI检查结果与术中探查结果的一致性,经1-2年的随访统计所有患者复发情况,单因素和多因素Logistic回归分析术后复发的危险因素。**结果:**观察组术中探查共发现瘘管内口281个,合并肛周脓肿57例,多发瘘管及支管151例,MRI术前检查瘘管内口、合并肛周脓肿、多发瘘管及支管的准确率分别为98.22%(276/281)、85.96%(49/57)、96.03%(145/151),观察组中MRI结果与术中探查结果对患者Parks分型通过一致性检验显示,两结果一致性较好($k=0.890, P=0.001$)。单因素分析结果显示,肛瘘位置、内口位置、合并肛周脓肿、既往肛瘘手术史及术前是否行MRI检查均会影响复发率(均 $P<0.05$),Logistic回归多因素分析显示,术前未进行MRI检查、高位肛瘘、内口位于后正中线、既往肛瘘手术史是复杂性肛瘘术后复发的危险因素(均 $P<0.05$)。**结论:**MRI检查复杂性肛瘘能够术前明确瘘管及内口数量,可较为精确地识别瘘管Parks分型,有助于提高手术疗效,合并肛周脓肿、术前未进行MRI检查、高位肛瘘、内口位于后位、既往肛瘘手术史是复杂性肛瘘术后复发的危险因素。

关键词:复发率;肛瘘;磁共振成像;Kappa系数;Parks分型;危险因素

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The Guiding Value of Magnetic Resonance Imaging in the Treatment of Complex Anal Fistula and the Risk Factors of Postoperative Recurrence*

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ABSTRACT Objective: To explore the guiding significance of magnetic resonance imaging (MRI) in the diagnosis and preoperative evaluation of complex anal fistula and the risk factors for postoperative recurrence. **Methods:** 359 patients with complex anal fistula who were diagnosed and operated in our hospital were selected prospectively from June 2015 to December 2017. They were randomly divided into observation group with 182 cases and control group with 177 cases. In the control group, MRI was not performed before surgery, and methylene blue staining was performed intraoperatively to guide surgical treatment. The observation group received preoperative MRI examination, intraoperative methylene blue staining combined with preoperative evaluation for surgical treatment. Taking the results of intraoperative exploration as the gold standard, the accuracy of preoperative MRI examination for complex anal fistula was observed, the consistency of MRI examination results and intraoperative exploration results was evaluated by Kappa test. The recurrence status of all patients was counted through follow-up within 1-2 years, and risk factors of postoperative recurrence was analyzed by univariate and multivariate Logistic regression. **Results:** 281 fistulas were found in the observation group, 57 cases with crissum abscess, 151 cases with multiple fistula and branch pipe were found. MRI examination fistula in mouth, with crissum abscess, multiple fistula and branch pipe of accuracy was 98.22% (276/281), 85.96% (49/57), 96.03% (145/151), MRI in the observation group results for patients with intraoperative exploration results Parks, according to the classification by consistency check two results were in good consistency ($k=0.890, P=0.001$). Single factor analysis results show that the position of anal fistula, the location of internal orifice, merge crissum abscess, history of anal fistula operation and preoperative MRI check whether all can influence the recurrence rate (all $P<0.05$), Logistic regression analysis

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showed that multiple factors, not preoperative MRI check, high anal fistula, after the port was located in the posterior median line, history of anal fistula operation complexity anal fistula were risk factor for recurrence (all $P < 0.05$). **Conclusion:** MRI examination of complex anal fistula can clarify the number of fistula and internal orifice before surgery, and identify fistula Parks more accurately, which is helpful to improve the surgical efficacy. Complicated perianal abscess, no MRI examination before surgery, high anal fistula, internal orifice in the posterior position, and previous history of anal surgery are risk factors for postoperative recurrence of complex anal fistula.

Key words: Recurrence rate; Anal fistula; Magnetic resonance imaging; Kappa coefficient; Parks parting; Risk factors

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前言

复杂性肛瘘手术治疗的失败率和复发率较高,外科结合内科药物治疗目前较为常用的治疗方法^[1]。但是,由于复发率高,治疗效果仍然不理想,有报道称术后复发风险可高达 57%^[2],这可能与被忽略的继发性瘘管或较小的脓肿所致,因此术前检查并进行全面的术前评估来指导制定肛瘘手术治疗方案显得尤为关键。在磁共振成像技术(Magnetic resonance imaging, MRI)应用于肛瘘术前评估之前,瘘管造影技术被用于肛瘘术前评估,但诊断准确性较低,无法可视化多发性继发性瘘管、脓肿以及肝门括约肌复合体,因此该检查手段不能提供有关瘘管与肛门括约肌关系的信息^[3,4]。超声内镜检查是第一项可提供肛管的解剖细节的成像技术^[5],它不仅可以用于脓肿和肛管内瘘的诊断且对鉴别原发性瘘管和内口位置的准确率特别高,但可视化是该技术的固有局限性,无法评估原发瘘管以及复杂的多发瘘管及支管的延展范围^[6,7]。相比之下 MRI 被认为是目前检测和评估瘘管状态的最佳方案,可准确全面地评估原发瘘管、支管和脓肿情况^[8]。为确认 MRI 术前检查对复杂性肛瘘患者的指导价值,本研究对我院收治的复杂性肛瘘患者予以术前 MRI 检查并分析了术后复发的危险因素,报道如下。

1 资料与方法

1.1 一般资料

本研究纳入 2015 年 6 月至 2017 年 12 月于我院诊断并接

受手术治疗的复杂性肛瘘患者 359 例,纳入标准:(1)于我院确诊为复杂性肛瘘^[9](有两个或两个以上外口或内口;两条以上瘘管或有支管;瘘管较长弯曲);(2)拟行手术治疗患者;(3)患者或家属自愿签署知情同意书。排除标准:(1)合并心血管、肝、血液系统等严重疾病;(2)克罗恩病、溃疡性肛瘘、结核性肛瘘所致的复杂性肛瘘;(3)依从性差或不能耐受手术,中途退出治疗的患者。随机分为观察组 182 例及对照组各 177 例,观察组男 117 例,女 65 例,年龄 22-63 岁,平均(35.48± 6.77)岁,病程 1-5 年,平均(2.33± 0.38)年;对照组男 121 例,女 56 例,年龄 23-61 岁,平均(36.82± 5.74)岁,病程 1-5 年,平均(2.27± 0.43)年,两组年龄病程及性别比例经比较无差异($P > 0.05$),具有可比性,研究通过我院伦理委员会审核。

1.2 方法

1.2.1 检查方法 两组均行常规检查,在此基础上观察组术予以 MRI 检查 采用 1.5T 超导型磁共振成像仪(Magnetom Avanto,德国西门子医疗有限公司),体部相控阵 6 通道体线圈,患者取仰卧位,自主呼吸,自髂前上棘扫描至肛管下缘,层厚 4 mm,分别做轴位、矢状位、冠状位平扫,静脉注射钆喷酸葡胺 0.2 mmol/kg,再进行冠状位、矢状位、轴位的 FS T1W TSE 图像扫描。MRI 序列参数如表 1 所示。影像学结果由两名从事肛瘘 MRI 方面工作 5 年以上放射科医生分析,如果两位医师所得最终结果存在争议,则请另一高级放射医师进行最终评估确认,并根据肛瘘 Parks 分型进行分类。

表 1 肛瘘患者术前评估的 MRI 序列

Table 1 MRI sequence of preoperative evaluation in patients with anal fistula

Sequence	Position	TR(ms)	TE(ms)	FOV(mm ²)	Matrix	Layer thickness (mm)
T1W TSE	Axial position	544	10	200× 200	320× 224	4
FS T2W TSE	Axial position	670	10	200× 200	320× 224	4
T2W TSE	Sagittal position	4570	86	230× 230	320× 256	4
T2W TSE	Axial position	5000	86	200× 200	320× 240	4
FS T2W TSE	Axial position	5160	86	200× 200	320× 240	4
FS T2W TSE	Coronal position	3220	74	250× 250	320× 240	4

Note: TSE: fast spin echo sequence; FS: lipid suppression sequence; TR: repetition time; TE: echo time; FOV: imaging field.

1.2.2 手术方法 所有患者术前均行直肠指检及肛门镜检查,必要时行超声检查。术前常规肠道准备,抗生素应用,手术均采用肛瘘切开挂线术,单发肛瘘一期手术,多发肛瘘如合并高位肛瘘则需二期手术,二期手术 2-3 周后进行,所有手术均由副

主任及以上医师主刀完成。

1.3 观察指标

收集观察组患者 MRI 检查结果,结合术中探查结果,评价 MRI 检查对诊断肛瘘内口、多发瘘管、支管及脓肿的准确率。

1.4 随访

对所有入组患者进行电话随访或门诊复查,随访时间 1-2 年,若中途失访则终止随访,统计复发情况。

1.5 统计分析

使用 SPSS 22.0 软件进行统计分析。符合正态分布的计量数据统计描述为平均值± 标准偏差,行 t 检验。计数资料的描述采用百分比。Kappa 系数评估 MRI 检查与术中检查瘘管 Parks 分型结果之间的一致性,其中差($k < 0.2$),中等($0.2 \leq k < 0.4$),中等($0.4 \leq k < 0.6$),良好($0.6 \leq k < 0.8$)或非常好($k \geq 0.8$)。采用单因素分析和多因素 Logistic 回归分析肛瘘术后复发的危险因素。 $P < 0.05$ 判定为差异有统计学意义。

2 结果

2.1 术前肛瘘 MRI 检查的诊断性分析

以术中探查结果为金标准, 观察组 182 例患者术中探查共发现瘘管内口 281 个,合并肛周脓肿 57 例,多发瘘管及支管的准确率分别为 98.22%(276/281)、85.96%(49/57)、96.03%(145/151)。

2.2 MRI 检查与术中发现原发瘘管 Parks 分型的一致性分析

术中在观察组 182 例患者中检测到 314 条原发瘘管,其中括约肌间型瘘管有 213 条(67.83%),经括约肌型瘘管有 79 条(25.16%), 如表 2 所示。通过 Kappa 一致性检验表明, 术前 MRI 评估瘘管 Parks 分型与术中探查结果有较好的一致性($k=0.890, P=0.001$)。

表 2 MRI 检查与术中观察原发瘘管 Parks 分型的一致性检验

Table 2 Consistency test between MRI and parks classification of primary fistula observed during operation

MRI diagnosis	Intraoperative exploration				
	Intersphincter anal fistula	Trans sphincter anal fistula	Superior sphincter anal fistula	Sphincter external anal fistula	No primary sinus
Intersphincter anal fistula	204	1	1	0	0
Trans sphincter anal fistula	3	75	0	0	1
Superior sphincter anal fistula	2	0	16	0	0
Sphincter external anal fistula	3	2	0	2	0
No primary sinus	1	1	1	1	0
Total	213	79	18	3	1

2.3 复杂性肛瘘术后复发危险因素的单因素分析

经随访发现 359 例患者有 45 例复发, 单因素分析结果显示,不同肛瘘位置、内口位置、是否合并肛周脓肿、既往有无肛

瘘手术史、是否术前行 MRI 检查的复发率相比,差异有统计学意义(均 $P < 0.05$),详见表 3。

表 3 复杂性肛瘘术后复发危险因素单因素分析

Table 3 Single factor analysis of risk factors for postoperative recurrence of complex anal fistula

Factors	Recurrence rate(%)	χ^2	P	
Gender	Male	13.69(36/263)	1.193	0.275
	Female	9.37(9/96)		
Age	<40 years	11.11(23/207)	0.904	0.342
	≥ 40 years	14.47(22/152)		
Position of anal fistula	Low anal fistula	10.04(25/249)	4.613	0.032
	High anal fistula	18.18(20/110)		
Location of internal orifice	Located in the posterior median line	16.67(28/168)	4.917	0.027
	Others position	8.95(17/191)		
Merge diabetes mellitus	Yes	14.52(9/62)	0.268	0.604
	No	12.12(36/297)		
Merge crissum abscess	Yes	19.23(20/104)	5.880	0.014
	No	9.80(25/255)		
History of previous anal fistula operations	Yes	19.39(19/98)	5.774	0.016
	No	9.96(26/261)		
Preoperative MRI check	Yes	8.79(16/182)	4.719	0.030
	No	16.38(29/177)		

2.4 术后复发影响因素的 Logistic 回归分析

以患者是否复发为因变量(是=1,否=0),以表3中有统计学意义的因素为自变量(赋值说明见表下注释),结果显示,内口

位于后正中、高位肛瘘、合并肛周脓肿、既往有肛瘘手术史、术前未行MRI检查是术后复发的危险因素($P<0.05$),见表4。

表4 肛瘘术后复发因素的 Logistic 回归分析

Table 4 Logistic regression analysis of recurrence factors after anal fistula operation

Variable	β	S.E.	Wald χ^2	P	OR	95%CI
High anal fistula	0.518	0.250	4.278	0.038	2.596	1.324~3.864
After the port was located in the posterior median line	0.441	0.181	5.976	0.014	3.643	2.431~4.875
Merge crissum abscess	0.784	0.698	3.877	0.047	1.306	1.078~1.904
History of previous anal fistula operations	0.939	0.449	4.958	0.026	2.718	1.279~5.437
Not preoperative MRI check	0.881	0.429	4.214	0.040	2.414	1.157~3.426

Note: Description of assignment: Position of anal fistula (high=1, low=0), location of internal orifice (located in the posterior median line=1, others=0), merge crissum abscess (yes=1, no=0), History of previous anal fistula operations (yes=1, no=0), preoperative MRI check(yes=1, no=0).

3 讨论

有不少相关研究认为MRI检查是肛瘘术前评估必不可少的影像学检查手段,MRI检查相较于其他影像学检查具有精确呈现瘘管细节特点、相关肛周脓肿以及支管和多发瘘管等优点^[10,11],此外,它可以提供有关瘘管和肛周括约肌、肛提肌、盆底肌的解剖关系的综合图像。这些信息对于外科手术计划的制定、完全消除感染病灶、减少手术并发症和术后复发率有重要作用^[12,13]。

本研究发现MRI术前检查结果与术中探查结果对比,MRI术前检查在原发瘘管 Parks 分型方面存在强烈的一致性($k=0.890$)。MRI检查对瘘管内口、合并肛周脓肿、多发瘘管及支管具有较高的准确率,说明术前MRI评估常规检查可较为精确地反映复杂性肛瘘的病变情况,本研究中MRI检查与术中结果相比,仍存在一定误判,推测这种误判可能归因于放射科医师与外科医师关于瘘管描述存在差异^[14,15]。

术前精确评估内口位置对于手术成功与否至关重要,目前临床多用亚甲蓝及金属探针术探查内口位置^[16-18],但该检查手段为术中操作,不具有肛瘘术前诊疗计划参考价值,且敏感性有限,容易出现术中找不到肛瘘内口的情况^[19,20],这种情况下势必会影响手术效果,增加术后复发率^[21]。随着影像学技术发展,瘘管造影、超声、MRI等应用于肛瘘诊断及术前评估,为肛瘘手术提供了可靠的客观参考资料,提高了手术的成功率,改善治疗后长期效果^[22]。MRI能从矢状位、轴位、冠状位等序列获得较为理想的影像图片,并且能获得肛管直肠周围肌肉软组织呈像,在MRI检查中,内口被定义为瘘管距肛管最近的点,通常在括约肌间隙中,几乎不可能沿着瘘管追踪至其末端及肛管粘膜^[23,24],既往研究指出,在大多数情况下内口位置处于括约肌间隙感染最严重的区域,因此准确定位内口位置对于术中精确处理病灶有着重要意义^[25]。

本研究单因素分析和多因素 Logistic 回归分析还发现,合并肛周脓肿、术前未行MRI检查、内口位于后正中、高位肛瘘、既往有肛瘘手术史的术后复发率均升高,且均是术后复发的危险因素,这是因为瘘管合并脓肿患者存在脓液排出时常为感染加重阶段,脓肿及瘘管内坏死组织较多时,手术探查内口

受到影响,瘘管探查不清晰,影响术者判断是否完全切除瘘管病变组织^[26,27]。肛瘘手术作为有创术式且,患者常因前次手术失败而再次行肛瘘手术治疗,因此较无肛瘘手术史的患者更易复发^[28]。内口位于后正中线的瘘管多为 ParksII、III型、高位肛瘘,该类型肛瘘瘘管走行复杂,术中内口位置较难判断,手术难度较大,容易术后遗留感染瘘管^[29],因此复发率较高。术前行MRI检查的患者复发率显著低于术前未行MRI检查的患者,这可能是术前未行MRI检查导致术前评估不完善,导致术中瘘管或脓肿切除不彻底有关^[30],客观地证实了术前MRI检查在肛瘘患者治疗方案拟定及评估预后方面起着至关重要的作用。

综上所述,MRI检查复杂性肛瘘的准确率较高,可较为精确地识别瘘管 Parks 分型,有助于提高手术疗效,合并肛周脓肿、高位肛瘘、内口位于后正中、既往肛瘘手术史、术前未行MRI检查是复杂性肛瘘术后复发的危险因素。

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