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不同入路椎间孔镜下髓核摘除术治疗 L₅/S₁ 椎间盘突出症 近期疗效的对比研究 *

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摘要 目的:对比经皮椎间孔入路椎间孔镜下髓核摘除术(PETD)、经皮椎板间入路椎间孔镜下髓核摘除术(PEID)治疗 L₅/S₁ 椎间盘突出症(LDH)近期疗效。**方法:**选取 2016 年 3 月~2019 年 1 月期间福建省立医院南院收治的 L₅/S₁LDH 患者 60 例的临床资料。根据入路方式的不同分为 PETD 组(n=27)和 PEID 组(n=33)。记录两组手术时间、X 线放射次数、术中出血量、住院天数。记录两组术后并发症发生情况。于术前、术后 1 周、术后 6 个月、术后 12 个月采用日本骨科学会(JOA)评分、视觉模拟评分法(VAS)评分、Oswestry 功能障碍指数(ODI)评分评价患者疼痛及功能恢复情况。根据改良 Macnab 疗效评定标准计算患者术后临床效果优良率。**结果:**两组术中出血量、住院天数比较无差异($P>0.05$),PEID 组手术时间短于 PETD 组,X 线放射次数少于 PETD 组($P<0.05$)。两组优良率组间比较无差异($P>0.05$)。两组术后 1 周、术后 6 个月、术后 12 个月 VAS、ODI 评分均较术前降低,JOA 评分均较术前升高($P<0.05$),两组术后 1 周、术后 6 个月、术后 12 个月 VAS、JOA、ODI 评分组间比较差异无统计学意义($P>0.05$)。两组并发症发生率对比差异无统计学意义($P>0.05$)。**结论:**PEID、PETD 治疗 L₅/S₁LDH 的疗效相当,均可较好的减轻临床症状及促进功能恢复,然而 PEID 在缩短手术时间、减少 X 线放射次数方面更具优势。

关键词:椎板间入路;椎间孔入路;髓核摘除术;L₅/S₁ 椎间盘突出症;近期疗效

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Comparative Study on Short-term Efficacy of Different Approaches of Endoscopic Discectomy for L₅/S₁ Disc Herniation*

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ABSTRACT Objective: To compare the short-term efficacy of percutaneous endoscopic discectomy (PETD) and percutaneous endoscopic lumbar discectomy (PEID) in the treatment of L₅/S₁ disc herniation (LDH). **Methods:** The clinical data of 60 patients with L₅/S₁LDH in South Hospital of Fujian Provincial Hospital from March 2016 to January 2019 were selected. According to the different approaches, they were divided into PETD group (n=27) and PEID group (n=33). The operation time, X-ray radiation times, intraoperative blood loss and hospitalization days of the two groups were recorded. The postoperative complications of the two groups were recorded. Japanese Orthopaedic Association (JOA), Visual analogue scale (VAS) and Oswestry disability index (ODI) were used to evaluate the pain and functional recovery before operation, 1 week after operation, 6 months after operation and 12 months after operation. According to the modified Macnab evaluation standard, the excellent and good rate of postoperative clinical effect was calculated. **Results:** There was no significant difference in intraoperative blood loss and hospitalization days between the two groups ($P>0.05$). The operation time of PEID group was shorter than that of PETD group, and the X-ray radiation times was less than that of PETD group ($P<0.05$). There was no significant difference in the excellent and good rate between the two groups ($P>0.05$). The VAS and ODI scores in the two groups at 1 week, 6 months and 12 months after operation were lower than those before operation and JOA scores were higher than those before operation ($P<0.05$). There were no significant differences in VAS, JOA and ODI scores between the two groups at 1 week, 6 months and 12 months after operation ($P>0.05$). There was no significant difference in the incidence of complications between the two groups ($P>0.05$). **Conclusion:** The efficacy of PEID and PETD in the treatment of L₅/S₁LDH is similar, which can reduce clinical symptoms and promote functional recovery. However, PEID has more advantages in shortening operation time and reducing the X-ray radiation times.

Key words: Interlaminar approach; Foramen approach; Nucleus pulposus resection; L₅/S₁ disc herniation; Short-term efficacy

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前言

腰椎间盘突出症(LDH)是骨科的常见病和多发病,好发于L4/5椎间盘,L₅/S₁次之^[1]。由于L₅/S₁LDH被定义为夹在硬膜囊和神经根之间的突出,往往临床症状较为严重^[2]。而临床针对LDH症状较轻者,经规范非手术治疗后通常能够得到缓解,而症状较为严重者保守治疗效果往往不佳,故手术是治疗其的有效方式^[3,4]。现临床常用的手术方案有经皮椎间孔入路椎间孔镜下髓核摘除术(PETD)^[5,6]、经皮椎板间入路椎间孔镜下髓核摘除术(PEID)^[7,8],两种手术方案各有优点和适应证,但有关于它们应用于L₅/S₁LDH的疗效尚存在一定的争议。鉴于此,本研究选取福建省立医院南院收治的60例L₅/S₁LDH患者的临床资料,回顾性分析两种入路方式的近期疗效、并发症情况,总结经验并提出操作注意要点,以期临床椎间孔镜下髓核摘除术治疗L₅/S₁LDH入路方式的选择提供参考。

1 资料与方法

1.1 一般资料

回顾性选取2016年3月~2019年1月期间福建省立医院南院收治的L₅/S₁LDH患者60例的临床资料。纳入标准:(1)均经X线、MRI等影像学手段证实为L₅/S₁LDH;(2)均符合手术指征者,手术由同一组医师完成;(3)经正规保守治疗无效者;(4)临床资料完整者。排除标准:(1)复发型LDH;(2)脊柱化脓性炎症和结核;(3)伴有马尾综合征者;(4)中央型椎管狭窄者;(5)脊柱不稳,伴有腰椎滑脱者;(6)既往有腰椎手术史者。根据入路方式的不同分为PETD组(n=27)和PEID组(n=33)。其中PETD组男10例,女17例,年龄34~65岁,平均(47.61±3.58)岁;体质量指数20~28 kg/m²,平均(23.94±1.13)kg/m²;病程2~9月,平均(5.19±0.82)月;突出类型:中央型9例,旁中央型10例,游离脱出型8例。PEID组男13例,女20例,年龄36~65岁,平均(47.12±4.36)岁;体质量指数21~27 kg/m²,平均(23.81±0.96)kg/m²;病程2~8月,平均(5.06±0.74)月;突出类型:中央型11例,旁中央型12例,游离脱出型10例。两组一般资料对比无差异(P>0.05),具有可比性。

1.2 方法

(1)PETD组:患者取俯卧位,腹部悬空。行硬膜外麻醉,经前后位与侧位C臂透视,确认L₅/S₁节段及穿刺点,选取18号脊柱穿刺针与腰部皮肤面呈20°~30°穿刺,紧贴胸腰筋膜及上关节突腹侧滑入椎间孔内,随后略微后退穿刺针并将其固定于胸腰筋膜及上关节突腹侧。穿刺成功后将针芯取出,置入导丝,并沿穿刺点周围切7 mm皮肤切口。沿导丝将导棒敲入

椎间孔内,扩张软组织,采用超级环锯技术使椎间孔扩大,将工作套管置入突出椎间盘内,随后置入脊柱内镜系统。依次去除游离骨块及肥厚黄韧带,取出突出髓核,生理盐水连续冲洗,射频电极消融絮状髓核并将纤维环烧灼皱缩成形,检查无明显性活动出血后撤出工作套管,1%罗哌卡因术区局部浸润镇痛,缝合伤口并覆盖无菌敷料。(2)PEID组:患者取俯卧位,腹部悬空。行硬膜外麻醉,透视定位手术节段椎板间隙,选取L₅/S₁节段后正中线旁开1~1.5 cm插入穿刺针,取出针芯置入导丝,沿导丝作一7 mm纵行手术切口,切开腰背筋膜。置入软组织扩张器至黄韧带表面,再沿扩张器置入工作套管、内窥镜,双极射频清理黄韧带后方的脂肪、肌肉等组织,把工作套管伸入黄韧带孔并沿L₅下关节突旋入椎管,最终暴露硬膜囊及S₁神经根,视野对准椎间盘,切除突出髓核组织,双极射频电极彻底止血,消融絮状髓核并烧灼纤维环皱缩成形。取出工作管道,缝合并用无菌敷料覆盖。(3)术后处理:术后予以脱水、营养神经、抗感染等对症处理,术后6 h佩戴腰围下床简单活动。术后1个月内避免扭转身体、提重物、弯腰和久坐等活动。术后1个月去除腰围逐渐恢复正常活动。

1.3 观察指标

(1)记录两组住院天数、手术时间、X线放射次数、术中出血量。(2)记录两组术后并发症发生情况。(3)术后采用门诊复查的方式随访1年,于术前、术后1周、术后6个月、术后12个月采用视觉模拟评分法(VAS)^[9]评分、日本骨科学会(JOA)^[10]评分、Oswestry功能障碍指数(ODI)^[11]评分评价患者疼痛及功能恢复情况。其中VAS评分0~10分,分数越高,疼痛感越强烈。ODI评分总分50分,分数越高,腰椎功能障碍越严重。JOA评分0~30分,分数越高,腰椎功能越好。(4)根据改良Macnab疗效评定标准^[12]计算患者术后临床效果优良率。优良率=优率+良率。优:恢复原来的工作和生活,症状完全消失。良:工作生活受到的影响不大,症状基本消失。可:症状减轻,活动受限,对患者生活、工作有一定影响。差:治疗前后无差别甚至加重症状。

1.4 统计学方法

采用SPSS25.0进行数据处理,用[n(%)]描述计数资料,采用 χ^2 检验,计量资料采用($\bar{x} \pm s$)描述,采用t检验,检验标准设置为 $\alpha=0.05$ 。

2 结果

2.1 两组围术期指标比较

两组术中出血量、住院天数比较差异无统计学意义(P>0.05),PEID组手术时间短于PETD组,X线放射次数少于PETD组(P<0.05),详见表1。

表1 两组围术期指标比较($\bar{x} \pm s$)

Table 1 Comparison of perioperative indicators between the two groups($\bar{x} \pm s$)

Groups	Operation time(min)	X-ray radiation times(times)	Intraoperative blood loss(mL)	Hospitalization day(d)
PETD group (n=27)	88.57±6.78	16.54±2.08	18.32±1.59	5.45±1.17
PEID group (n=33)	56.25±7.84	8.25±1.36	17.93±1.26	5.26±0.73
t	16.868	18.569	1.049	0.769
P	0.000	0.000	0.298	0.445

2.2 两组疗效比较

两组优良率比较无差异($P>0.05$),详见表 2。

表 2 两组疗效比较【例(%)】

Table 2 Comparison of curative effect between the two groups [n(%)]

Groups	Excellent	Good	Can	Bad	Excellent and good rate
PETD group (n=27)	7(25.93)	12(44.44)	6(22.22)	2(7.41)	19(70.37)
PEID group (n=33)	11(33.33)	16(48.48)	5(15.15)	1(3.03)	27(81.82)
χ^2					1.088
P					0.297

2.3 两组相关评分比较

术前两组 VAS、ODI、JOA 评分比较无差异($P>0.05$),两组术后 1 周、术后 6 个月、术后 12 个月 VAS、ODI 评分均较术前降低,JOA 评分均较术前升高($P<0.05$),两组术后 1 周、术后 6

个月、术后 12 个月 VAS、JOA、ODI 评分组间比较无差异($P>0.05$),详见表 3。

2.4 两组并发症发生情况比较

两组并发症发生率对比无差异($P>0.05$),详见表 4。表 3 两组相关评分比较($\bar{x}\pm s$,分)Table 3 Comparison of related scores between the two groups ($\bar{x}\pm s$, scores)

Groups	Time points	VAS	JOA	ODI
PETD group (n=27)	Before operation	7.76 $\pm$ 1.31	8.75 $\pm$ 1.17	43.26 $\pm$ 2.87
	1 week after operation	2.43 $\pm$ 0.27 ^a	15.24 $\pm$ 1.14 ^a	38.85 $\pm$ 3.18 ^a
	6 months after operation	1.38 $\pm$ 0.24 ^{ab}	25.36 $\pm$ 1.79 ^{ab}	13.27 $\pm$ 2.63 ^{ab}
	12 months after operation	1.34 $\pm$ 0.19 ^{ab}	25.73 $\pm$ 3.16 ^{ab}	13.28 $\pm$ 2.76 ^{ab}
PEID group (n=33)	Before operation	7.68 $\pm$ 1.75	8.87 $\pm$ 1.18	43.26 $\pm$ 3.38
	1 week after operation	2.41 $\pm$ 0.26 ^a	15.37 $\pm$ 2.97 ^a	38.95 $\pm$ 3.43 ^a
	6 months after operation	1.36 $\pm$ 0.21 ^{ab}	25.86 $\pm$ 2.63 ^{ab}	13.38 $\pm$ 3.97 ^{ab}
	12 months after operation	1.30 $\pm$ 0.18 ^{ab}	25.91 $\pm$ 2.28 ^{ab}	13.43 $\pm$ 2.34 ^{ab}

Note: compared with before operation, ^a $P<0.05$; compared with 1 week after operation, ^b $P<0.05$.

表 4 两组并发症发生情况比较【例(%)】

Table 4 Comparison of complications between the two groups [n(%)]

Groups	Lumbar interstitial infection	Bowel perforation	Spinal cord and high pressure	Area ooze blood	Total incidence rate
PETD group (n=27)	2(7.41)	1(3.70)	1(3.70)	1(3.70)	5(18.52)
PEID group (n=33)	1(3.03)	0(0.00)	1(3.03)	1(3.03)	3(9.09)
χ^2					1.142
P					0.285

3 讨论

LDH 是腰腿痛的主要原因之一,好发于中老年群体,L₅/S₁是其常见的发病部位^[13]。退变的椎间盘内除了结构异常外还存在组织代谢功能紊乱,产生的细胞因子可导致持续性的慢性腰痛,引起神经根性疼痛,降低患者生活质量^[14,15]。手术是治疗经保守治疗无效的 LDH 患者的最有效方案,传统的开放性手术通过将病变的椎间盘切除,以使腰腿痛缓解,但开放性手术后具有较大的创伤且患者卧床时间较久,同时还会引起术后血肿压迫等并发症发生,不利于患者术后恢复^[16-18]。近年来,微创逐渐成为外科手术的主要方向,其可有效减轻机体组织损伤,并达到快速康复的目的^[19]。目前报道的手术有 PEID、PETD 两

种入路方式,其中 PEID 通过椎板间穿刺进入椎间盘突出的部位,该入路方式每一步都在术者的视野监视下完成,无手术盲区。尽管 PEID 穿刺相对简单,但其操作限于椎管内,其适应证为中央、旁中央、游离脱垂型 LDH,因此极外侧型为禁忌证,且在处理中央型 LDH 时尤须注意挤压等造成硬膜囊、神经根的损伤^[20,21]。相对而言,PETD 通过椎间孔穿刺进入椎间盘突出的部位,其适应证更为广泛,中央、游离脱垂、旁中央、极外侧型 LDH 均为其适应证。但该入路方式操作较为复杂,对术者要求高,存在一定的穿刺盲目性,且存在并发症的发生,如硬膜囊和神经根的损伤^[22,23]。故临床有关两种入路方式的选择仍存在一定的争议。

本研究通过对 60 例 L₅/S₁LDH 患者的临床资料进行分析,

结果显示,两组优良率组间比较无差异,且两组术后1周、术后6个月、术后12个月VAS、JOA、ODI评分均较术前改善,组间比较无差异。说明PEID、PETD均是有效的微创治疗方式,疗效确切。相对于PETD,PEID的治疗优势体现在可缩短手术时间,减少X线放射次数。PETD术式的穿刺难度相对较高,在腰椎解剖中,椎间孔由上至下逐渐变小,直至L₅/S₁节段最为狭小,需多次透视才能最终确定目标靶点,同时在穿刺过程中偶尔需将椎间孔扩大成形,受高髂嵴阻挡又会增加穿刺难度,目前仍没有绝对安全的椎间孔成形技术,致使其学习曲线十分陡峭,以上种种原因均可增加总透视次数,延长手术时间^[24-26]。且有研究证实^[27],与PEID相比,PETD术中透视的射线放射量更高。PEID的穿刺难度相对较低,同时该入路方式更符合脊柱医生的操作习惯,从解剖学角度分析,L₅/S₁节段的椎板间隙最宽,且S₁神经根相较于L₅/S₁椎间盘有一定弧度的出射角,故突出的髓核可将S₁神经根挤压至外侧,导致硬膜与神经根间的间隙加宽,但也正是这个间隙利于PEID入路操作,使之在可操作性、镜下视野方面均更优^[28,29]。PEID入路时仅需切开5~6 mm黄韧带,且无需进行椎间盘造影、打磨上关节突等操作,有效减少透视次数。而两组在并发症发生率方面也未见明显差异。理论上而言,PEID对脊柱后方结构的破坏更小,可避免因PETD反复穿刺增加的组织损伤,其可能会有明显更低的并发症发生率^[30],但本研究两种入路方式并发症发生率对比无统计学差异,考虑与本研究的样本量有关。

综上所述,PEID、PETD治疗L₅/S₁LDH的疗效相当,均可较好地改善临床症状及促进功能恢复,其中PEID在缩短手术时间、减少X线放射次数方面更具优势。临床上应严格把握适应证,与患者解剖学结构相结合,根据术者技术水平来选择合适的入路方式,并避免严重并发症的发生。

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