

脊柱内镜经椎板间入路治疗腰椎滑脱症的现状与前景

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摘要

腰椎融合术是治疗腰椎滑脱症的常见手术方式, 传统开放腰椎融合术可应用的手术入路较多, 其中经后路腰椎融合术(PLIF)是治疗腰椎滑脱的常用术式, 近年来, 脊柱内镜作为一项治疗腰椎滑脱的新技术, 其手术入路有椎间孔和椎板间两种入路方式, 其中经皮内镜经椎板间入路(PE-PLIF)因创伤小, 恢复快等优点逐渐得到关注, 而现有文献对其技术的全面总结较少, 故本文对脊柱内镜融合手术适应症, 手术技术, 历史、现状及前景展开叙述。

关键词

腰椎滑脱, 脊柱内镜, 综述

Present Situation and Prospect of Spinal Endoscopic Interlaminar Approach in the Treatment of Lumbar Spondylolisthesis

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Abstract

Lumbar interbody fusion is a common surgical method for the treatment of lumbar spondylolisthesis. Traditional open lumbar fusion can be used in many ways, among which posterior lumbar

fusion (PLIF) is a common method for the treatment of lumbar spondylolisthesis. In recent years, spinal endoscopy as a new technique for the treatment of lumbar spondylolisthesis, has two surgical approaches: intervertebral foramen and interlaminar approach. Among them, percutaneous endoscopic interlaminar approach (PE-PLIF) has been paid more and more attention because of its advantages of less trauma and rapid recovery, but there is little comprehensive summary of its techniques in the existing literature. Therefore, this paper describes the indications, surgical techniques, history, present situation and prospect of spinal endoscopic fusion.

Keywords

Lumbar Spondylolisthesis, Spinal Endoscopic, Review

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1. 定义

腰椎融合术脊椎滑脱症的定义是上一椎体相对于下一个椎体向前滑移, 导致节段不稳, 从而导致椎管内神经、血管受压发生慢性持续性腰痛、下肢放射性疼痛等症状[1] [2]。腰椎滑脱症的分型包括退行性和峡部裂型, 其中以退行性腰椎滑脱为老年人常见退行性脊柱疾病类型之一, 通常伴有腰椎椎管狭[3] [4], 保守治疗效果欠佳的老年患者通常需要手术治疗。

2. 历史回顾

Cloward 等在 20 世纪 40 年代提出的经后路腰椎椎体间融合技术(posterior lumbar interbody fusion, PLIF), 而经椎间孔入路腰椎椎体间融合术(transforaminal lumbar interbody fusion, TLIF)由 Blume 等 20 世纪 80 年代提出, 在 90 年代后期 Harms 等推广下被广泛应用, 虽然两种术式治疗腰椎滑脱可以取得良好的效果, 但存在对椎旁肌的剥离损伤较大, 术中出血多, 导致术后腰背部疼痛, 住院时间延等问题。为了减少软组织损伤和术中出血量, 2002 年 Foley [5]等提次提出了微创经椎间孔腰椎椎体间融合术(minimally invasive transforaminal lumbar interbody fusion, MIS-TLIF), 并取得了良好的临床效果, 该技术是通过可扩张管状通道于肌间隙入路, 最大限度的减少了对椎旁肌的剥离, 减少了术中出血, 降低并发症发生率[6] [7] [8]。但是由该工作通道狭长, 手术视野受限, 需要较长时间的学习和练习以保证手术安全。近年来, 随着手术器械的进步以及人们对微创概念的普及, 内窥镜技术应运而生, 并且用来治疗脊柱疾病逐渐增多。从最初单纯用于治疗腰椎间盘突出症的髓核摘除[9] [10]到目前的腰椎融合术, 已获得一系列临床证实和研究报告[11]-[19]。根据手术入路不同, 经皮腰椎融合术入路分为经椎间孔入路和经椎板间入路。

3. 手术适应症

对于极外侧型、中央型及复发性的椎间盘突出, 经椎间孔入路更适合椎间孔入路, 而双侧和中央管严重狭窄的患者椎板间入路更有优势, 这种入路比椎间孔入路更容易进入对侧。全内窥镜腰椎间融合术的适应症与开放腰椎融合术的适应症相似: 椎间盘突出、椎管狭窄或侧隐窝单节段不稳、腰椎滑脱引起的椎间盘源性背痛都被认为是主要的适应症, 随着 PE-PLIF 技术的改进, 多节段融合和经椎板间入路的双侧椎体减压术也可能被逐渐应用。

4. 手术方法及学习曲线

全麻生效后, 患者取俯卧位, 使用 C 形臂透视相应责任阶段并标记, 于责任阶段一侧旁开 2 cm 处切开约 0.8 cm 切口, 放入工作通道, 透视确认位置良好, 连接脊柱内镜操作系统, 打开光源: 经工作通道放置脊柱内镜, 见病椎向前滑脱, 使用射频切开黄韧带, 避开硬脊膜及神经根, 将工作通道固定于责任阶段椎间隙, 用环钻去除部分下关节突及椎板扩大椎管成形, 用镜下咬骨钳去除神经根管后侧残余黄韧带及增生骨质减压神经根管, 探查见纤维环破裂髓核突出压迫神经根, 用髓核钳摘除全部髓核, 用半圆形套筒, 环形刮除终板, 用环形锯铰处理软骨终板, 将咬下的碎骨及 4 g 骨修复材料打压置入大小合适的融合器中, 将融合器植入上下椎间隙内, 探查神经根再无压迫, 检查未见明显出血, 取出工作通道。以穿刺针定位上下椎体双侧椎弓根, 行椎弓根穿刺, 透视位置良好后, 取 4 个椎弓根投影各 1 cm 切口, 插入导丝、套管, 依次于上下椎体的双侧椎弓根置入 4 枚适合长度空心螺钉, 透视见 4 枚空心螺钉位置良好, 用配套器械双侧安置连接棒, 分别拧入内锁固定连接棒, 透视位置良好。切口用生理盐水反复冲洗, 查无活动性出血; 清点纱布器械无误后逐层缝合关闭伤口。在学习曲线问题上, Tan [20] 等一项研究结果表明 FE-PLIF 的学习曲线在初始阶段是陡峭的, 手术时间较长, 其原因可能与重复透视、缺乏经验以及增加支架和经皮螺钉置入有关。但经过最初的十次练习, 技能可以很好地掌握, 根据该研究的学习曲线图表明提示随着手术经验的增加, 手术时间可控制在 3 h 以内。为了提高安全性和效率, 建议对外科医生进行更高级的内窥镜操作培训。此外, 内窥镜器械的开发有助于改善 FE-PLIF 的学习曲线。

5. 临床疗效

对于已有的内镜下经椎板间入路治疗腰椎滑脱的文献总结, 与传统开放腰椎后路减压手术及可扩张通道 MIS-TLIF 手术相比, 该术式早期疗效更有优势, 中短期临床疗效无明显差异。在 Li [21] 等对 22 例腰椎滑脱的患者行 PE-PLIF 手术研究结果表明, 与 MIS-TLIF 相比, 术后一周腰背部 VAS 评分有显著差异表明 PE-PLIF 手术较 MIS-TLIF 手术术后早期腰背部疼痛缓解更快, 这一原因可能与内镜的切口较短, 对椎旁肌损伤较小有关。PE-PLIF 的皮肤切口仅需 8 mm 的手术切口, 并且在内镜的可视化下清楚显示硬膜囊、神经根层次, 并利用通道保护神经根, 减小神经损伤的发生率, 在直视下进行射频消融, 清除软组织, 提前止血, 并且仅对关节突关节及椎板骨性结构最小限度的予以切除、保留了韧带及肌肉的完整性, 对脊柱稳定性的影响较小, 显著减少了手术创伤。先前几项研究表明, 在融合率方面, 脊柱内镜与传统的腰椎融合术无明显差异。

6. 总结及前景

脊柱内镜下治疗腰椎滑脱的应用前景广阔, 与 C 型臂相比, 如果在术中与 CT 导航技术结合, 可显著减少患者术中透视次数[22] [23]。对于 Kambin 三角狭窄的患者, 如果将工作通道放置在太靠近出口神经根的位置, 可能会刺激神经根, 导致术后感觉障碍, 与脊柱内镜经 trans-Kambin 三角入路不同的是, PE-PLIF 手术是经椎板间入路, 即使是脊柱内镜的初学者, 在熟悉的手术视野下同样有利于达到病变结构。此外, PE-PLIF 入路对于关节突关节的部分切除不仅对 cage 的置入提供了足够的工作空间, 而且通过保留上关节突的外侧壁来保护椎间孔内和孔外的神经根。尤其是在 L5/S1 由于椎板间隙较宽, 且不存在髂骨阻挡的问题, 因此经椎板间入路比经椎间孔入路需要更少的去除关节突关节骨质。内镜下经后路腰椎椎体间融合是一个新兴且可行的手术。它实现了充分的神经减压, 为需行融合手术的患者提供了除传统开放手术和 MIS-TLIF 的另一种选择, 但其远期疗效仍需完善大样本临床研究以及长期随访。

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