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·临床研究·

# 跳跃式颈椎前路减压融合术治疗两节段非连续脊髓型颈椎病的近期疗效

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[摘 要] **目的** 评价跳跃式颈椎前路椎间盘切除减压融合术治疗两节段非连续脊髓型颈椎病的近期疗效。**方法** 回顾分析2014年1月至2016年12月我科34例两节段跳跃式脊髓型颈椎病行颈椎前路椎间盘切除减压融合术患者的手术时间、术中出血量、JOA评分、NDI评分、JOA改善率、节段前凸角度、融合率及末次随访的Odom's临床疗效评定。**结果** 手术时间92~125 min,平均103.28 min;术中失血约50~150 mL,平均90 mL;术后颈椎侧位X射线示颈椎生理弯曲恢复。所有患者均获得随访,平均6个月。末次随访见植骨融合率94.1%,无CAGE下沉、内固定松动脱落、感染等严重并发症发生。末次随访的JOA评分(14.21±0.732)分,NDI评分(3.26±1.14)分;平均改善率58.62%;节段性前凸角度术前(10.75±1.132)°,术后(15.61±1.312)°,差异具有统计学意义($P<0.05$)。根据末次随访时Odom's临床疗效评定:优21例,良9例,中4例,优良率为88.2%。**结论** 颈椎前路间盘切除减压融合术治疗跳跃式两节段脊髓型颈椎病,能较好恢复颈椎生理曲度和椎间高度且其融合率高,近期临床疗效满意。

[关键词] 脊髓型颈椎病;颈椎前路;减压融合术;跳跃式;两节段;非连续

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## Clinical efficacy of two skip-level anterior cervical discectomy and fusion in treatment of two-level noncontiguous cervical spondylotic myelopathy

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**Abstract: Objective** To evaluate the clinical and radiological outcomes of skip-level anterior cervical discectomy and fusion(ACDF) for the treatment of two-level noncontiguous cervical spondylotic myelopathy(CSM). **Methods** There were 34 patients with two-level noncontiguous CSM underwent skip-level ACDF in our department from January 2014 to December 2016. The clinical outcome including surgery time, intraoperative blood loss, Japanese Orthopaedic Association(JOA) scores, Neck dysfunction index(NDI), the improvement rate of JOA, segment lordosis, fusion rate and Odom's criteria were evaluted. **Results** The surgery time was from 92 minutes to 125 minutes, mean operative time 103.28 minutes; the intraoperative blood loss was 50 to 150 mL, with average blood loss of 90 mL. The cervical spine lateral radiographs showed that the cervical physiological curvature had restored. The patients were followed up for average 6 months. The fusion rate of was 94.1% at the lastest follow-up. No cages subside, implant failure or migration and infection occured. The JOA and NDI scores at the latest follow-up were(14.21±0.732) and (3.26±1.14), respectively, the JOA scores improvement rates was 58.62%. The segmental lordosis before surgery was(10.75±1.132)°, the one after surgery was(15.61±1.312)°, the difference was significant($P<0.05$). The Odom's criteria at the lastest follow-up showed that excellent in 21 patients, good in 9 patients and fair in 4 patients, with excellent and good rate of 88.2%. **Conclusion** Skip-level ACDF can achieve good clinical and radiological outcomes including a high fusion rate and well maintainence of spinal curvature and intervertebral height for patients with two-level noncontiguous CSM.

**Keywords:** cevical spondylotic myelopathy; anterior cervical discectomy; decompression and fusion; skip-level; two segments; noncontiguous

非连续型脊髓型颈椎病是一种特殊的颈椎退行性疾病,因为正常间隙常位于退变间隙的中间或及上下水平。当保守治疗无效时,通常选择手术治疗。手术治疗目的是脊髓、神经根减压以及稳定。对于单节段脊髓型颈椎病,使用前路钛板及椎间融合器行颈椎前路间盘切除减压融合术(anterior cervical discectomy and fusion, ACDF),因其临床效果好,融合率高已成为颈椎退行性疾病的标准手术方式[1]。对于多节段脊髓型颈椎病的手术治疗方式还包括颈椎前路椎体次全切除减压椎间融合术(anterior cervical corpectomy and fusion, ACCF)、后路单开门或双开门椎管成形、椎板切除减压以及前后联合入路手术等。但对于两节段或以上的非连续型脊髓型颈椎病,ACCF融合率相对较低,且容易发生早期内固定失效[2-3]。由于担心上下节段融合而给中间带来的应力,许多外科医生倾向将中间正常节段也融合在内,但这是以降低颈椎正常活动度为代价,也增加了不融合的风险[4]。目前对于非连续节段的脊髓型颈椎病的手术方式仍存争议,跳跃式颈

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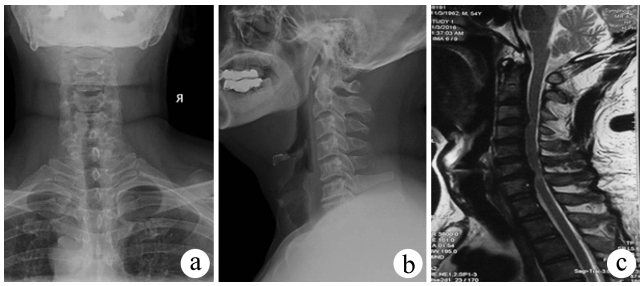
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椎前路减压融合术对于两节段非连续性颈椎退行性疾病的治疗中有减压彻底、融合率高等优势。本文通过回顾性分析2014年1月至2016年12月我科34例两节段非连续脊髓型颈椎病患者治疗的临床效果及影像学随访结果,评价行跳跃式颈椎前路减压融合术的近期临床疗效。

## 1 资料与方法

### 1.1 临床资料

本组两节段非连续型脊髓型颈椎病患者34例,术前均通过临床症状体征及影像学评估明确诊断为两节段非连续性脊髓型颈椎病,术前影像学检查均包含颈椎正侧位X射线、颈椎间盘CT、颈椎MR平扫(图1)。排除标准:①既往曾行颈椎手术治疗;②发育性椎管狭窄;③长节段连续后纵韧带骨化;④由后结构造成的严重脊髓受压;⑤合并重度骨质疏松、感染、肿瘤等疾病。患者临床症状均为颈椎间盘突出压迫脊髓引起的脊髓损伤症状,经过严格保守治疗且无效。全部患者均由同一组术者行跳跃式颈椎前路间盘切除减压融合术治疗。纳入患者男21例,女13例。年龄36~75岁,平均年龄53岁。其中$C_3/C_4$~$C_6/C_7$节段20例,$C_4/C_5$~$C_6/C_7$节段14例。




a:术前正位X射线片;b:术前侧位X射线片;c:术前MR示$C_3/C_4$、$C_6/C_7$椎间盘突出,脊髓受压明显

**图1 两节段非连续型颈脊髓型颈椎病术前检查图片**

### 1.2 方法

全身麻醉后患者取仰卧位,经右侧胸锁乳突肌内侧做斜行切开。全部病例均由同一组手术医生完成,行颈椎前路跳跃式椎间盘切除减压融合术。常规显露完成后,C型臂透视定位椎体,依次拟切除$C_3/C_4$、$C_6/C_7$椎间盘或$C_4/C_5$、$C_6/C_7$椎间盘。分别于椎体置入椎体钉后,放入Caspar牵开器并适度牵开间隙,使用尖刀及髓核钳切除相应水平的椎间盘后,椎板咬骨钳进一步潜行减压。神经剥离子探查减压充分后,刮除终板软骨及软骨下骨。对于椎管内静脉丛出血可使用流体明胶、明胶海绵及双极电凝等进行止血。止血后根据试模大小植入已填充好自体松质骨或人工骨的颈椎椎间融合器(cervical interbody cage,CAGE),并安放前路钛板固定于椎体。同理行另一椎间盘切除减压及融合固定。再次透视确定CAGE及钛板螺钉位置满意后,仔细止血,冲洗后放置负压引流,逐层缝合切口。术后使用第二代头孢菌素24~48 h预防感染,20%甘露醇及甲强龙80 mg静脉注射使用2~3 d,雾化排痰。根据引流量于术后24~48 h内拔除引流管,并复查颈椎正侧位X射线片,佩戴颈托保护下床活动,行四肢康复功能锻炼。

### 1.3 观察评定指标

手术指标:①手术时间;②术中出血量。临床疗效指标:①日本骨科协会(JOA)评分17分评分法;②颈椎功能障碍指数(NDI);③末次随访时Odom's临床疗效评级;④改善率[改善率=(术后JOA评分-术前JOA评分)/(17-JOA术前评分)×100%]。影像学指标:术后复查颈椎正侧位X射线片,末次随访复查颈椎正侧位及动力位片,在颈椎X射线片上测量节段性前凸角。融合情况判定标准:CAGE中骨与终板的界面模糊,上下终板见有连续的骨小梁通过,CAGE周围无透光影。

评价标准:改善率大于等于85%为优,60%~84%为良,25%~59%为中,0~24%为差。末次随访时Odom's临床疗效评定:优,所有术前症状均消失,可以进行日常活动,无功能障碍;良,术前症状明显减轻,可以没有明显障碍进行日常活动;一般,术前症状部分减轻,但运动明显受限;差,症状无明显改变或加剧。

### 1.4 统计学分析

应用SPSS 23.0软件对统计数据进行处理,计量资料用均数±标准差($\bar{x} \pm s$)表示。并对术前、术后及末次随访时的JOA评分、NDI评分、节段性前凸角度进行配对$t$检验,$P<0.05$表示差异有统计学意义。

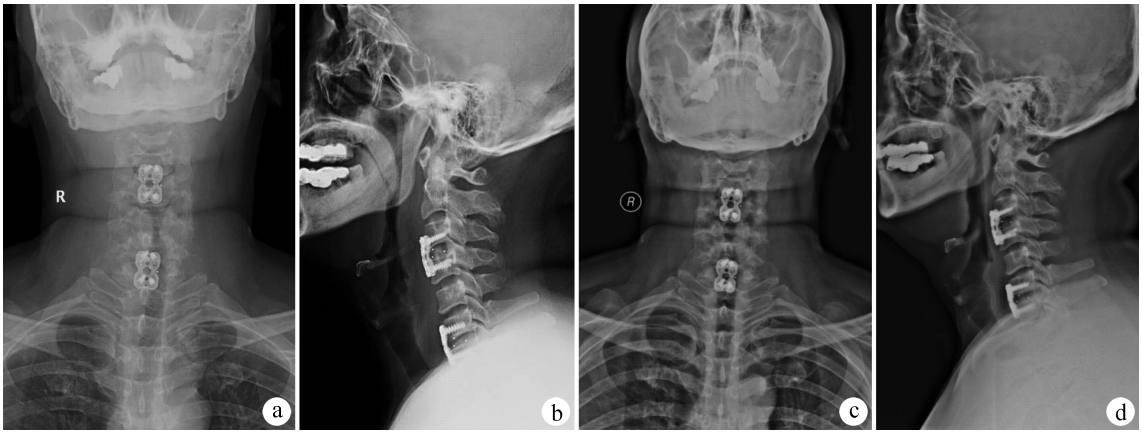
## 2 结果

### 2.1 手术情况

手术时间92~125 min,平均103.28 min;术中失血50~150 mL,平均90 mL。

### 2.2 影像学观察

术后颈椎侧位X射线示颈椎生理曲度、椎间高度均恢复(图2);全部患者均获得3~12个月的随访,平均6.13个月;末次随访植骨融合率94.1%,2例未融合考虑时间较短,继续给予颈托保护,末次随访均未见内固定松动、下沉等现象。



a:术后3个月正位X射线片显示内固定位置满意;b:术后3个月侧位X射线片显示颈椎序列恢复,可见植骨融合;c:术后6个月正位X射线片显示钛板螺钉位置良好;d:术后6个月侧位X射线片显示椎间高度无丢失,可见骨性融合,无内固定松动、失效

**图2 跳跃式前路减压术后患者复查X射线片**

2.3 *疗效观察*

全部随访患者神经功能得到不同程度改善,均无CAGE下沉、内固定松动脱落、脑脊液漏及感染等严重并发症发生。术前、术后末次随访的JOA评分、NDI评分及改善率结果见表1,末次随访时Odom's临床疗效评定:优21例,良9例,中4例,优良率为88.2%。全部患者均无脑脊液瘘、脊髓、食管损伤等严重并发症发生,3例患者术后3 d时出现吞咽困难,给予激素等对症支持治疗后缓解。

**表1 术前、术后及末次随访时JOA评分、NDI评分及改善率、阶段性前凸角度比较**

| 指标 | JOA评分(分) | NDI评分(分) | 改善率(%) | 节段性前凸角度(°) |
|---|---|---|---|---|
| 术前 | 10.75±1.13 | 13.81±0.73 | | 10.75±1.13 |
| 术后 | 13.08±1.78 | 3.37±1.03* | 49.72 | 15.61±1.31* |
| 末次随访 | 14.21±0.73* | 3.26±1.14* | 59.73 | |

*:与术前比较,$P<0.05$

## 3 讨论

脊髓型颈椎病多由椎体后缘增生的骨质、骨赘及椎间盘突出等多种病理改变压迫脊髓从而引起相应脊髓功能障碍。通过手术解除脊髓压迫、恢复颈椎序列及稳定性重建是目前治疗脊髓型颈椎病的最有效的治疗方法[5]。近20年来,颈前路椎间盘切除减压融合术一直是治疗脊髓型颈椎病的经典术式之一[6]。

多节段非连续型脊髓型颈椎病在临床相对较少,是一类特殊病例。目前为止,对于多节段非连续性颈椎病的治疗方式争议不断。前路减压融合术可以直接解除来自前方的脊髓压迫,术后症状改善明显,融合率高[7-8]。为了预防相邻节段退变,一些医生将中间正常节段也一并融合,但因此牺牲了更多颈椎活动范围。而通过跳跃减压融合与融合包含正常中间节段的方式进行生物力学对比研究,Yilmaz等[9]发现跳跃式前路减压融合的生物力学稳定性及螺钉在轴向旋转抗拔出能力更佳,从而为跳跃式减压可以获得更好融合率提供了理论支持。本组患者末次随访时JOA评分、NDI评分及改善率均较术前明显改善,且植骨融合率为94.1%,表明颈椎前路跳跃式减压融合术对于两阶段非连续型脊髓型颈椎病减压彻底,症状改善满意,融合率较高。

我们选择跳跃式颈椎前路减压融合术的主要原因考虑如下:①脊髓的压迫主要来自前方,如突出的椎间盘、增生的骨赘,前路可以进行直接彻底的减压;②责任节段均为两节段跳跃,行后路减压需对颈椎后方椎旁肌等结构进行广泛剥离,对正常节段后方结构进行破坏,从而对颈椎的稳定性造成影响,且若行后路减压融合术会将正常节段融合;③患者术前的颈椎生理曲度欠佳,表现为生理曲度消失或后凸或合并节段不稳,行后路椎管扩大成形对改善患者颈椎的生理曲度无益,且对于节段不稳的患者更是相对禁忌。

一般认为融合的节段越多,则邻近节段需要的代偿活动也越多,从而引起相邻节段退变可能性越大。Park等[10]报道了颈椎两节段融合与单节段融合相比,相邻节段椎间盘的代偿压力明显增加。对于非连续型多节段脊髓型颈椎病行跳跃式颈椎前路椎间盘切除减压融合,中间的节段理论上会承担更多来自上下融合节段的应力。为了预防相邻节段退变,对于非连续型多节段脊髓型颈椎病,一些外科医生主张将融合节段扩大至包含中间的正常节段。然而,最近有一项在尸体标本上进行的生物力学实验对中间节段应力提出不同观点。Finn等[11]通过生物力学评估在颈椎2节段非连续融合或3节段的连续融合,中间及相邻节段应力变化,他们发现在连续3节段融合中,上下位椎体的

应力显著增加,而在2节段非连续融合中,中间节段的应力却呈现中等水平。根据该结果,对于两节段非连续型脊髓型颈椎病,应选择跳跃式两节段非连续融合,而不是将正常节段融合在内。以牺牲正常的活动节段来预防相邻节段退变可能并非正确,故在本组病例中,我们选择了跳跃式颈椎前路椎间盘切除减压融合术。

吞咽困难是颈椎前路减压融合术的常见并发症之一,当放置前路钛板时发生率可达3% ~21%[12-13]。随着内固定技术的发展,一些文献报道使用Zero-P系统等零切迹椎间融合系统来替代传统的CAGE及钛板行颈椎前路间盘切除减压融合术[14-15],通过减少椎体前方钛板厚度来减少颈部不适、吞咽困难等,但相关报道相对较少,缺乏长期对照研究。Duan等[16]通过Meta分析比较在单节段或多节段颈椎间盘退行性疾病行ACDF手术治疗中,使用Zero-P零切迹内固定系统及传统的CAGE钛板在节段性前凸角、融合率及手术时间等方面差异均无统计学意义。Fujibayashi等[17]在单节段ACDF手术中,对钛板固定与单独CAGE植入进行了比较,发现单独CAGE植入时CAGE下沉及颈椎序列恢复丢失高达44%。为了提供即刻稳定性及提高融合率,前路钛板放置仍是推荐的。Zero-P系统价格相对昂贵,加重了患者的经济负担。除了前路钛板的影响,术后发生吞咽困难的原因还包括术中对食管等组织牵拉、术后椎前软组织无菌性炎症造成肿胀、血肿等[18-21]。本组43例患者中有3例术后3 d诉吞咽困难,通过给予脱水及激素治疗后缓解。对于颈椎前路术后吞咽困难的预防,我们建议:①选择合适长度的低切迹前路钛板并进行合理预弯;②减少术中对食管的持续牵拉,间断释放休息;③对于潜在咽部不适或吞咽困难的患者,术后给予脱水及类固醇治疗。

基于本研究结果,跳跃式颈椎前路间盘切除减压融合术治疗两节段非连续脊髓型颈椎病安全有效,但仍存在一些局限性,在临床中两节段非连续型脊髓型颈椎病的发病率相对较少,本研究仅统计了34例患者,平均随访6.13个月。尚需大样本的长期研究和前瞻性研究。

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·临床研究·

# 增强 CT 在肾癌术前临床分期中的应用价值

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[摘 要] **目的** 评价肾癌增强螺旋 CT 检查在临床分期中的准确性。**方法** 回顾性分析重庆东华医院收治的 48 例有术前增强 CT 检查、且经手术病理证实为肾癌的患者资料,对 CT 资料利用 Robson 分期法进行临床分期,对比评价其准确性及 CT 表现。**结果** CT 分期与术后结果的总体符合率为 91.7%。螺旋 CT 增强扫描有助于明确肿瘤的边界,通过判定增强后肾静脉或下腔静脉静脉充盈缺损情况可显著提高早期肾癌分期的准确性。**结论** 螺旋 CT 增强扫描可提高肾癌临床分期的准确性,为肾癌的临床治疗方案提供指导。

[关键词] 肾肿瘤;临床分期;增强 CT;透明细胞癌

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## Practical value of enhanced CT on clinical staging of renal cell carcinoma

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**Abstract: Objective** To evaluate the accuracy of enhanced spiral CT scans on the clinical staging of renal cell carcinoma. **Methods** The enhancedCT and clinical data of 48 patients with renal carcinoma verified by surgery and pathology in Chongqing Donghua hospital were retrospectively analyzed. Robson's classification was used to determine the clinical stages of CT data, and the staging findings based on CT data were compared with the postoperative and pathological outcomes. **Results** The results showed that the accuracy of preoperative CT on the staging was 91.7%. Enhanced scanning by spiral CT was useful to identify the boundaries of tumor and the filling defect of renal vein or inferior vena cava. **Conclusion** Enhanced scanning using the spiral CT can improve the accuracy of clinical staging for renal carcinoma, which provides guidance about the clinical therapeutic schedules for patients with renal carcinoma.

**Keywords:** renal tumor; clinical staging; enhanced computed tomography; scanning; clear cell carcinoma

肾细胞癌(简称肾癌)起源于肾实质泌尿小管上皮,是最常见的成年人原发性肾肿瘤[1]。肾癌的早期诊断及分型关系到临床治疗方式的选择和患者的预后,影像学检查对肾癌诊断具有重要意义。目前,动态增强 CT 在肾癌的检查中占据重要地位,甚至被欧洲泌尿外科学会推荐为"金标准"[2],其主要价值在于确定肿块的存在,鉴别其性质,并根据侵犯或转移范围对恶性肿瘤分期[3]。肾癌的分期与手术方式选择以及生存期预测密切相关[4-5],目前常用的肿瘤-淋巴结-转移(tumor-node-metastasis,TNM)分期标准在细节上尚存有争议[6],而早先使用的 Robson 标准对预后有关的细节没有进行区分[7]。本研究收集重庆东华医院 2014 年 6 月至 2016 年 6 月资料齐全的 48 例肾癌病例,分析 CT 影像特点与新版 Robson 临床分型的关系,

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