

# 颈椎前路 Hybrid 手术的短期临床疗效观察

陈超, 柳根哲, 尹辛成, 彭亚, 郑皓云, 祝永刚, 赵思浩, 李春根

(首都医科大学附属北京中医医院, 北京 100010)

**【摘要】** 目的: 探讨颈椎前路 Hybrid 手术治疗双节段及 3 节段颈椎病短期临床疗效。方法: 收集 2018 年 1 月至 2019 年 1 月行双节段或 3 节段 Hybrid 手术 108 例颈椎退行性疾病的住院患者, 根据手术节段数目不同将患者分为双节段组 52 例和 3 节段组 56 例, 其中双节段组男 24 例, 女 28 例, 年龄 35~67(45.94±14.67) 岁; 3 节段组男 23 例, 女 33 例, 年龄 32~65(47.54±15.34) 岁。比较两组的结局指标, 其中临床指标采用颈椎功能障碍指数 (neck disability index, NDI) 评价患者日常活动能力, 日本骨科协会 (Japanese Orthopedic Association, JOA) 评分评价神经功能改善情况, 疼痛视觉模拟评分 (visual analogue scale, VAS) 评价疼痛强度, 根据 Odom's 评分对一般临床结果进行分级; 并通过 X 线、CT 及 MRI 测量颈椎活动度、融合情况及并发症等。结果: 所有患者手术顺利完成, 且获得 12 个月以上的随访。双节段组和 3 节段组手术时间分别为 95~180 (152.30±44.74) min 和 110~210 (165.18±45.86) min, 出血量分别为 20~100 (32.88±8.75) ml 和 20~150 (34.64±10.63) ml, 组间比较差异无统计学意义 ( $P>0.05$ )。两组患者术后 12 个月 NDI、JOA、VAS、Odom's 评分较术前有较大改善 ( $P<0.05$ ), NDI、JOA、Odom's 评分组间比较差异均无统计学意义 ( $P>0.05$ ), VAS 3 节段组高于双节段组。两组术后 C<sub>3</sub>-C<sub>7</sub> 颈椎活动度比较差异均无统计学意义 ( $P>0.05$ )。全部患者手术切口顺利愈合, 无脊髓损伤、脑脊液漏等并发症发生, 两组骨融合率分别为 43 例 (82.69%) 和 45 例 (80.35%); 双节段组出现 2 例邻近节段骨质增生, 3 节段组出现 3 例邻近节段骨质增生、1 例邻近节段后纵韧带骨化; 此外, 3 节段组有 1 例融合器松动, 不伴随明显临床症状。结论: 应用前路 Hybrid 术式治疗多节段颈椎病, 既改善了患者的临床症状, 也极大地保留了颈椎的活动度, 同时也证实了 Hybrid 在多节段颈椎间盘疾病中的有效性和安全性。

**【关键词】** 颈椎前路手术; Hybrid 手术; 颈椎病; 手术疗效

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**Short term clinical observation of cervical anterior Hybrid surgery** CHEN Chao, LIU Gen-zhe, YIN Xin-cheng, PENG Ya, ZHENG Hao-yun, ZHU Yong-gang, ZHAO Si-hao, and LI Chun-gen. Beijing Hospital of Traditional Chinese Medicine, Capital Medical University, Beijing 100010, China

**ABSTRACT Objective:** To investigate the short-term clinical effect of the cervical anterior Hybrid surgery in the treatment of two-segment and three-segment cervical spondylosis. **Methods:** From January 2018 to January 2019, 108 patients who were performed anterior Hybrid surgery with cervical degenerative diseases were collected. The patients were divided into a two-segment group with 52 patients and a three-segment group with 56 patients according to surgical segments. In two-segment group, there were 24 males and 28 females, aged from 35 to 67 years old with an average of (45.94±14.67) years old. In three-segment group, there were 23 males and 33 females, aged from 32 to 65 years old with an average of (47.54±15.34) years old. The outcome indicators of the two groups were compared. Clinical indicators; neck disability index (NDI) was used to evaluate daily life ability, Japanese Orthopedic Association (JOA) score was used to evaluate neurological function improvement, visual analogue scale (VAS) was used to evaluate pain intensity, and general clinical results were graded according to Odom's score. Cervical range of motion (ROM), fusion and complications were measured by X-ray, CT and MRI. **Results:** All operations were successfully completed and all patients were followed up for more than 12 months. The operation time of two-segment group and three-segment group were 95 to 180 min with an average of (152.30±44.74) min and 110 to 210 min with an average of (165.18±45.86) mins, the blood loss were 20 to 100 ml with an average of (32.88±8.75) ml and 20 to 150 ml with an average of (34.64±10.63) ml respectively which has no statistical differences between the two groups ( $P>0.05$ ). Compared with those before surgery, NDI, JOA, VAS and Odom's scores between two groups were significantly improved at 12 months after operation ( $P<0.05$ ). However, there was no significant difference in the NDI, JOA and Odom's scores between two groups ( $P>0.05$ ), and VAS in three-segment group was higher than that in two-segment group. There was no significant difference in C<sub>3</sub>-C<sub>7</sub> cervical mobility between two groups. Surgical incisions healed smoothly in all patients without complication such as spinal cord injury

通讯作者: 李春根 E-mail: leechungen1953@163.com

Corresponding author: LI Chun-gen E-mail: leechungen1953@163.com

and cerebrospinal fluid leakage. The bone fusion of the two groups were 43 cases (82.69%) and 45 cases(80.35%) respectively. In two-segment group, there were 2 cases of adjacent segmental hyperosteogeny, and there were 3 cases of adjacent segmental hyperosteogeny and 1 case of adjacent posterior longitudinal ligament ossification in the three-segment group. In addition, in three-segment group, there was 1 case of looseness of implants with no obvious clinical symptoms. **Conclusion:** The anterior Hybrid surgery in treating multi-level cervical spondylosis could not only improve clinical symptoms of patients but also preserve mobility. Meanwhile, the efficacy and safety of Hybrid surgery in different multi-level cervical disc diseases are confirmed, proving its value in clinical practice.

**KEYWORDS** Cervical anterior surgery; Hybrid surgery; Cervical spondylosis; Surgical outcome

颈椎退行性疾病是成年患者的常见诊断，其以退行性病理改变为基础，因骨质增生、椎间盘退变、韧带增厚骨化等引起脊髓、神经根或椎动脉受压，从而出现一系列功能障碍表现，如颈肩疼痛、肩臂发麻、行走困难等症状，严重者可导致残疾和生产丧失<sup>[1]</sup>。目前临床上手术方式的选择众多，包括前路颈椎间盘切除融合术（anterior cervical discectomy and fusion, ACDF），人工椎间盘置换术（artificial cervical disk replacement, ACDR），前路椎体次全切固定融合术（anterior cervical corpectomy and fusion, ACCF）和去除前置钢板的 Stand-alone 椎间融合器等，尽管 ACCF 以及 ACDF 是治疗多节段颈椎病的经典术式，但其所产生的内置物相关并发症、颈椎活动度丧失和邻近节段退变不容忽视，并且多节段手术要求保证减压彻底的同时也要尽量减少手术时间，尽可能保留颈椎生理功能<sup>[2]</sup>，所以对于多节段颈椎病的最佳手术方式存在争议。Hybird 手术结合多种手术方式，综合不同技术在保持椎体稳定性和脊柱活动方面的优势，考虑到在同一个患者的不同节段中，并不是节段水平都符合一种特定方法，所以对特定节段选取特定术式成为一种新的概念及方法。相对于传统术式，椎间融合器合并 ACDR 的 Hybird 手术治疗多节段颈椎病的疗效依然在探索之中。自 2018 年 1 月至 2019 年 1 月，采用 Stand-alone 椎间融合器联合 ACDR 的 Hybrid 手术治疗双节段及 3 节段颈椎病，探讨其短期临床疗效。

**1 资料与方法**

**1.1 病例选择**

纳入标准：(1)CT 及 MRI 诊断为 C<sub>3</sub>-C<sub>7</sub> 双节段

或 3 节段颈椎间盘退变性疾病。(2)合并根性症状或脊髓症状。(3)保守治疗 6 周无效者。(4)患者知情并签署知情同意书。排除标准：(1)既往脊柱手术史。(2)3 个节段以上的颈椎病以及骨折、颈椎畸形、感染、强直性脊柱炎、类风湿性关节炎、肿瘤等。(3)病史资料不全者。

**1.2 一般资料**

2018 年 1 月至 2019 年 1 月，符合病例选择标准 108 例行 Hybrid 手术的双节段或 3 节段的颈椎退行性疾病患者被纳入研究，根据手术节段数目不同将患者分为双节段组和 3 节段组，其中双节段组 52 例，男 24 例，女 28 例，年龄 35~67(45.94±14.67)岁；3 节段组 56 例，男 23 例，女 33 例，年龄 32~65(47.54±15.34)岁。两组患者术前一般资料比较差异无统计学意义(P>0.05)，见表 1。本研究通过首都医科大学附属北京中医医院伦理委员会审查批准（批准文号：2021BL02-028-02）。患者均知情同意，并签署知情同意书。

**1.3 治疗方法**

所有手术由同一术者完成。节段选择：间盘置换节段选择相对较轻和生理颈椎活动度较大的节段(C<sub>5,6</sub>>C<sub>4,5</sub>>C<sub>6,7</sub>>C<sub>3,4</sub>)。融合节段选择退变相对较重和有颈椎不稳的节段。退变相对较重为严重椎关节强硬（桥状骨化，椎间高度丢失>50%，活动度丢失<2%）；颈椎不稳：与相邻节段比较，椎体位移>3 mm 和(或)>11°旋转改变。患者绝对卧床观察 24 h，拔出引流管，下地活动，活动时佩戴颈托 1~2 周。术后常规采用地塞米松 1 d、甘露醇 3 d、非甾体抗炎药 5 d，根据个体情况控制止痛药服用时间。

表 1 两组颈椎退行性疾病患者术前一般资料比较

Tab.1 Comparison of general data between two groups of patients with cervical degenerative diseases

组别	例数	性别(例)		年龄 (x±s, 岁)	临床症状(例)		
		男	女		脊髓	根性	脊髓加根性
双节段组	52	24	28	45.94±14.67	28	34	10
3 节段组	56	23	33	47.54±15.34	36	31	11
检验值		χ <sup>2</sup> =0.283		t=0.553	χ <sup>2</sup> =1.217	χ <sup>2</sup> =1.131	χ <sup>2</sup> =0.003
P 值		0.595		0.581	0.270	0.287	0.957

1.4 观察项目与方法

1.4.1 临床效果评定方法 通过门诊或电话进行随访,采集 3、6、12 个月患者的临床信息。采用颈椎功能障碍指数(neck disability index, NDI)<sup>[3]</sup>评价患者日常活动能力;采用日本骨科协会(Japanese Orthopedic Association, JOA)评分<sup>[4]</sup>评价神经功能改善情况;采用视觉模拟评分(visual analogue scale, VAS)<sup>[5]</sup>评价疼痛强度;根据 Odom's 评分<sup>[6]</sup>对一般临床结果进行分级。

1.4.2 影像学评价方法 术前、术后 3 d 和末次随访分别行 X 线、CT 及 MRI 检查,应用颈椎动力位 X 线片测量颈椎活动度(range of motion, ROM), ROM 定义为过伸位与过屈位 X 线的 Cobb 角<sup>[7]</sup>(C<sub>2</sub>与 C<sub>7</sub>椎板下缘连线的夹角)差值。邻近节段退变(adjacent segment degeneration, ASD)由影像学上的椎间盘间隙缩小>50%,新增或增大的骨赘,终板硬化或前后纵韧带钙化增加诊断。骨融合定义如下:(1)屈伸运动<2°。(2)椎体前方或后方有骨小梁形成。(3)融合节段无透亮带。假体下沉为术后节段高度减小>3 mm。

1.5 统计学处理

使用 SPSS 20.0 软件进行统计学分析。定量资料采用均数±标准差( $\bar{x}\pm s$ )表示,符合正态分布、方差齐性的定量资料组间比较采用成组设计定量资料 *t* 检验,组内治疗前后采用配对设计定量资料 *t* 检验,方差不齐的定量资料采用  $\chi^2$  检验或 Mann-Whitney 检

验;计数或率的比较采用  $\chi^2$  检验。双侧检验,以 *P*<0.05 为差异有统计学意义。

2 结果

所有手术切口顺利愈合,随访时间双节段组为 13~24(15.50±5.45)个月,3 节段组为 13~26(16.84±5.72)个月。双节段组和 3 节段组手术时间分别为 95~180(152.30±44.74)min 和 110~210(165.18±45.86)min,出血量分别为 20~100(32.88±8.75)ml 和 20~150(34.64±10.63)ml,住院时间分别为 4~21(7.17±1.44)d 和 4~28(7.55±1.46)d,组间比较差异均无统计学意义(*P*>0.05)。见表 2。

2.1 两组患者临床疗效评价结果

两组患者术后 NDI、JOA、VAS、Odom's 评分较术前有较大改善(*P*<0.05)。NDI、JOA、Odom's 评分组间比较差异均无统计学意义(*P*>0.05);术后 12 个月 3 节段组 VAS 高于双节段组(*P*<0.05),未发生脊髓损伤、脑脊液漏等相关等并发症,见表 3。

2.2 两组患者影像学观察结果

两组患者影像学资料见图 1-2。两组术后 C<sub>3</sub>-C<sub>7</sub>颈椎活动度比较差异均无统计学意义(*P*>0.05)。两组融合率分别为 82.69%(43 例)和 80.35%(45 例);双节段组出现 2 例邻近节段骨质增生,3 节段组出现 3 例邻近节段骨质增生、1 例邻近节段后纵韧带骨化;此外,3 节段组有 1 例融合器松动,随后行颈胸支具治疗,随访期不伴随明显临床症状;未发现假体下沉事件。见表 4。

表 2 两组颈椎退行性疾病患者一般情况比较( $\bar{x}\pm s$ )

Tab.2 Comparison of general data between two groups of patients with cervical degenerative diseases( $\bar{x}\pm s$ )

组别	例数	手术时间(min)	出血量(ml)	引流量(ml)	住院时间(d)	随访时间(月)
双节段组	52	152.30±44.74	32.88±8.75	5.48±2.37	7.17±1.44	15.50±5.45
3 节段组	56	165.18±45.86	34.64±10.63	6.34±3.56	7.55±1.46	16.84±5.72
<i>t</i> 值		1.476	0.935	1.487	1.360	1.244
<i>P</i> 值		0.143	0.352	0.140	0.177	0.216

表 3 两组颈椎退行性疾病患者术前和术后 12 个月临床指标比较( $\bar{x}\pm s$ , 分)

Tab.3 Comparison of clinical indexes of patients with cervical degenerative diseases between two groups before and 12 months after surgery( $\bar{x}\pm s$ , score)

组别	例数	NDI				VAS				JOA 评分			
		术前	术后 12 个月	<i>t</i> 值	<i>P</i> 值	术前	术后 12 个月	<i>t</i> 值	<i>P</i> 值	术前	术后 12 个月	<i>t</i> 值	<i>P</i> 值
双节段组	52	31.43±	15.94±	8.954	0.000	7.15±	2.85±	22.355	0.000	13.54±	15.67±	5.945	0.000
		11.65	4.46			1.38	0.14			2.46	0.79		
3 节段组	56	34.27±	17.58±	9.295	0.000	7.52±	3.04±	23.223	0.000	13.76±	15.36±	4.072	0.000
		12.58	4.72			1.42	0.26			2.75	1.04		
<i>t</i> 值		1.215	1.853			1.371	4.774			0.437	1.734		
<i>P</i> 值		0.227	0.067			0.173	<0.001			0.663	0.086		



表 4 两组颈椎退行性疾病患者术前和术后 12 个月影像学指标比较

Tab.4 Comparison of imaging data of patients with cervical degenerative diseases between two groups before and 12 months after surgery

组别	例数	C <sub>3</sub> -C <sub>7</sub> 活动度( $\bar{x}\pm s, ^\circ$ )		邻近节段退变[(例)%]	骨融合[(例)%]	并发症(例)
		术前	术后 12 个月			
双节段组	52	43.28±6.98	41.72±5.67*	2(3.85)	43(82.69)	0
3 节段组	56	42.36±7.39	40.34±7.01*	4(7.14)	45(80.35)	1 <sup>▲</sup>
<i>t</i> 值		0.664	1.120	0.559	0.097	0.937
<i>P</i> 值		0.508	0.265	0.455	0.755	0.333

注: \*与术前比较,  $P < 0.05$ 。▲并发症为融合器松动

Note: \*Compared with preoperative data,  $P < 0.05$ . ▲Complication is loosening of the fusion cage

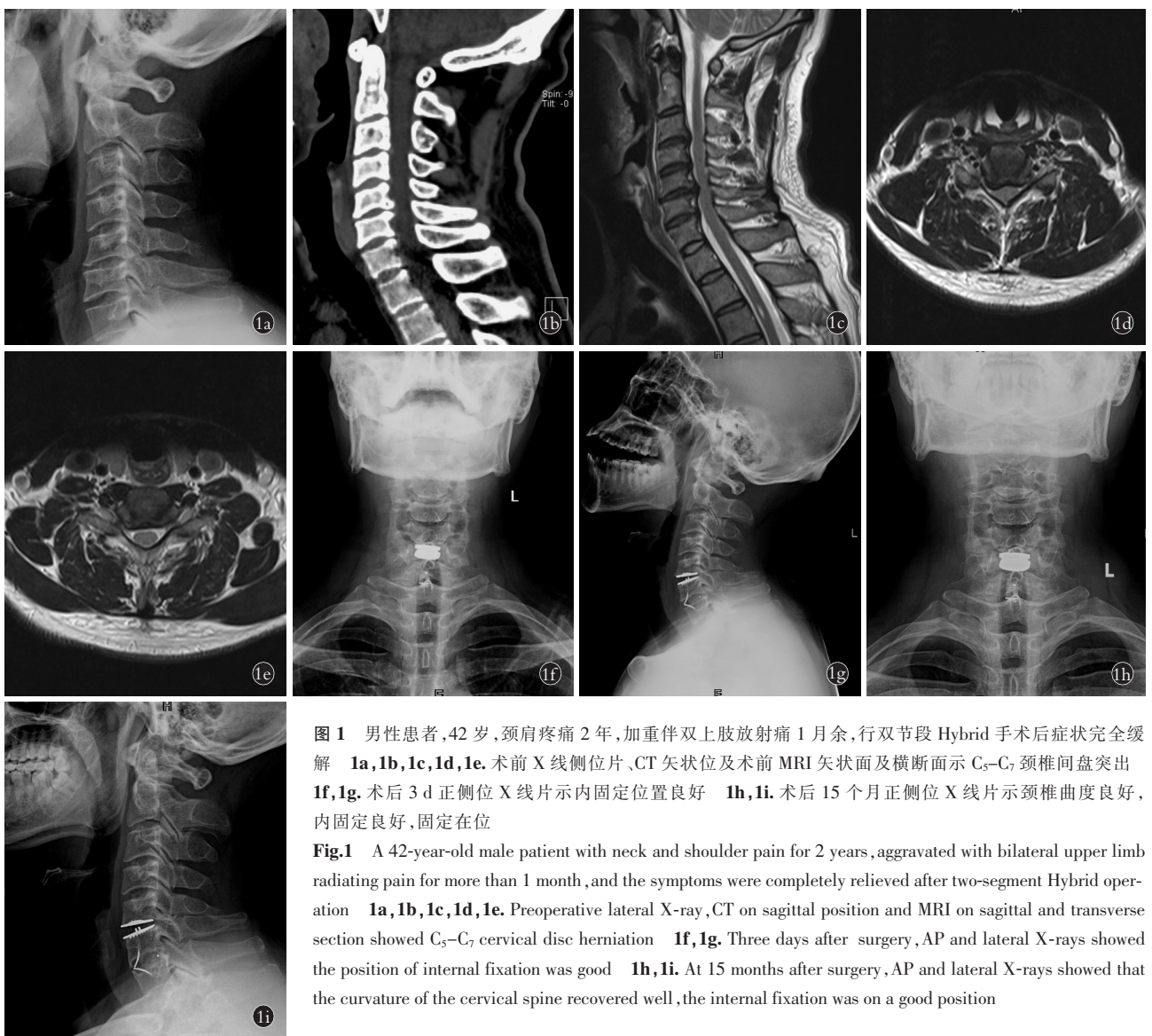


图 1 男性患者, 42 岁, 颈肩疼痛 2 年, 加重伴双上肢放射痛 1 月余, 行双节段 Hybrid 手术后症状完全缓解 1a, 1b, 1c, 1d, 1e. 术前 X 线侧位片、CT 矢状位及术前 MRI 矢状面及横断面示 C<sub>5</sub>-C<sub>7</sub> 颈椎间盘突出 1f, 1g. 术后 3 d 正侧位 X 线片示内固定位置良好 1h, 1i. 术后 15 个月正侧位 X 线片示颈椎曲度良好, 内固定良好, 固定在位

Fig.1 A 42-year-old male patient with neck and shoulder pain for 2 years, aggravated with bilateral upper limb radiating pain for more than 1 month, and the symptoms were completely relieved after two-segment Hybrid operation 1a, 1b, 1c, 1d, 1e. Preoperative lateral X-ray, CT on sagittal position and MRI on sagittal and transverse section showed C<sub>5</sub>-C<sub>7</sub> cervical disc herniation 1f, 1g. Three days after surgery, AP and lateral X-rays showed the position of internal fixation was good 1h, 1i. At 15 months after surgery, AP and lateral X-rays showed that the curvature of the cervical spine recovered well, the internal fixation was on a good position

### 3 讨论

#### 3.1 颈椎前路 Hybrid 手术治疗多节段颈椎退行性疾病的临床疗效

颈椎间盘退行性疾病的发病率随着年龄增长而

增加, 据统计, 超过 85% 的 60 岁以上人群有至少一个节段颈椎间盘的严重退变<sup>[8]</sup>, 多节段颈椎间盘退变更常见, 可伴随神经功能缺陷并极大影响生活质量, 若保守治疗无效且伴有神经症状, 手术介入是必



图 2 男性患者,60 岁,颈肩痛伴右上肢麻木 8 年余,行 3 节段 Hybrid 手术后患者症状完全缓解 2a,2b,2c,2d,2e.术前侧位 X 线片及 MRI 矢状面及横断面示 C<sub>3</sub>-C<sub>6</sub> 颈椎间盘突出 2f,2g.术后 12 个月正侧位 X 线示生理曲度存在,内固定良好,固定在位

Fig.2 A 60-year-old male patient with neck pain and numbness of the right upper limb for more than 8 years. After 3-segment Hybrid surgery, the patient's symptoms were completely relieved 2a,2b,2c,2d,2e. Preoperative lateral X-ray and MRI on sagittal and transverse section view showed C<sub>3</sub>-C<sub>6</sub> cervical disc herniation 2f,2g. AP and lateral X-rays at 12 months after surgery showed physiological curvature was present, the internal fixation was on good position

要的<sup>[9]</sup>。ACDF 曾是治疗多节段颈椎间盘突出疾病的标准术式,其固定性能优越,能够恢复颈椎生理曲度和有效的减压,然而对于术后颈椎活动度有较大侵蚀,并且可能改变脊柱本身的力学结构导致邻近节段的退变,增加再次手术的风险,这些弊端不容忽视<sup>[10]</sup>。此后,保留颈椎活动度的替代术式 ACDR<sup>[11]</sup>和具有较高融合率的 ACCF<sup>[12]</sup>相继出现,而当 ACDF、ACCF 或 ACDR 同时出现时,可以考虑为混合术式,即 Hybrid 手术,其被认为是治疗多节段颈椎间盘突出疾病的一种新选择,考虑到在同一患者的不同节段中,并不是节段水平都符合一种特定方法<sup>[13]</sup>,所以对特定节段选取特定术式成为一种新的概念及方法。Kang 等<sup>[14]</sup>采用 1 节段 ACDF+2 节段 ACDR 完成 3 节段手术,疗效优于双节段 ACCF;Ding 等<sup>[15]</sup>报道 ACCF+ACDR 和 ACCF+ACDF 治疗 3 节段颈椎间盘突出退行性疾病,临床效果相当。然而前置钢板相关的并发症多有报道<sup>[16]</sup>,如断裂、螺钉松动、螺钉穿透终板、邻近血管和组织结构损伤等,并且由于手术暴露过程中对软组织的医源性刺激,接受 3 节段融合的患者术后吞咽

困难的发生率明显高于接受单节段或双节段融合的患者<sup>[17]</sup>,这可能与术后软组织水肿、食管损伤、血肿和植入物周围粘连有关。此外,3 节段 ACDF 不愈合率可高达 54%<sup>[18]</sup>,这可能是由于移植物与宿主界面的增加以及由此引起的活动<sup>[19]</sup>。ACCF 较 ACDF 的融合率更高,能切除椎体后缘压迫物,减压充分,但其需要切除部分椎体造成骨丢失,双节段 ACCF 固定失败率为 6%,而 3 节段则高达 71%,翻修风险过高<sup>[20]</sup>。对于长节段造成更大应力、邻近节段活动代偿后稳定性缺失易导致邻近节段病变<sup>[21]</sup>。另外,多节段人工间盘置换术的临床和生物力学结果尚不明确,因为它可能导致过度运动、植入物相关并发症和较高医疗费用<sup>[11,13]</sup>。

综上所述,对于前路手术仍需改进,由于不同节段的发病类型和程度不尽相同,因此可以根据不同节段的情况,制定出最适合的处理方案<sup>[15]</sup>。近年来,Stand-alone 椎间融合器更多被使用,此种方法不需要前置钢板,通过减小内置物轮廓,可最大限度地减少颈部软组织的破坏<sup>[22]</sup>,手术时间更短,出血量更

小,术中步骤简化,临床疗效更佳<sup>[23]</sup>。有学者曾质疑 Stand-alone 椎间融合器在颈椎下沉、cage 松动、颈椎生理前凸丧失和相对较低的融合率等方面的问题,然而 De Leo-Vargas 等<sup>[24]</sup>通过对比单节段与 3 节段使用独立颈椎融合器,发现两者在各项临床指标上无差异,且避免了 ACDF 可能带来的钢板周围骨化及食道气管损伤等并发症;齐英娜等<sup>[25]</sup>初步研究了结合 ACDF 和 ACDR 的混合手术并获得了满意近期临床疗效,以上均证明了其在多节段手术中的良好性能。

### 3.2 采用 Stand-alone 椎间融合器加 ACDR 的 Hybrid 手术治疗多节段颈椎退行性疾病

本研究针对双节段和 3 节段手术采用 Stand-alone 椎间融合器和人工间盘置换术的 Hybrid 手术,全部患者顺利完成手术,术后 NDI、JOA、VAS、Odom's 评分较术前有较大改善,NDI、JOA、Odom's 评分组间比较差异无统计学意义,这表明就 Hybrid 手术而言,节段数量与临床结果之间无明显相关性,即对于多节段应用 Hybrid 术式达到良好临床效果。有文献曾指出 Hybrid 相比 ACDF 有更长的手术时间,更少的术中出血量和更短的康复时间<sup>[26]</sup>,本研究双节段和 3 节段手术出血量分别为(32.88±8.75) ml 和(34.64±10.63) ml,出血量较少源于有限的切除范围,不触及椎体,避免骨损伤;通常更长的手术时间由于较新的手术方法有一定学习期限,鉴于较早开展椎间融合器加人工椎间盘植入的混合术式,术中佩戴目镜辅助手术,相较于其他 Hybrid 手术暴露范围更小,与以往研究对比手术时间更短,且两组间各项指标差异均无统计学意义,在双节段和 3 节段手术中均达到了良好的临床效果。

### 3.3 Hybrid 手术在双节段及 3 节段颈椎病的疗效比较

Hybrid 手术在保证临床疗效的基础上尽量保留活动功能与骨性融合,也能够降低邻近节段退变及吞咽不适的风险<sup>[27]</sup>。其在颈椎活动度的恢复中具有优势,这可能带来更多长期的临床收益<sup>[26]</sup>。本研究中双节段和 3 节段两组术后颈椎活动度对比:较术前差异无统计学意义,C<sub>3</sub>-C<sub>7</sub> 颈椎活动度双节段组大于 3 节段组,在双节段或 3 节段手术中 Hybrid 术均良好的保留了颈椎活动度。值得注意的是,本系列中有 6 例产生邻近节段退变,两组发生率分别为 3.85% 和 7.14%,差异无统计学意义,有学者指出,颈椎各结构退变的自然过程不能避免,对于医源性因素的影响缺乏客观的比较<sup>[28]</sup>。稳定的骨融合可防止延迟的后凸性椎间孔狭窄并减缓根部受压症状、缓解颈部疼痛,本研究中双节段和 3 节段组融合率分别为

82.69% 和 80.35%,两组差异无统计学意义,与先前研究的结果一致<sup>[24]</sup>。3 节段组出现 1 例融合器松动,进行支具保守治疗,随访期未发现相关临床症状;本组病例均未发现假体下沉,有研究表明过大的假体可能是产生下沉的重要原因<sup>[9]</sup>,故选择合适的内置物至关重要。术后 3 节段组 VAS 高于双节段组,可能与颈椎本身的自然退变和患者恢复正常工作后的劳累程度相关,余指标未出现组间差异。此外,本组患者采取术后综合镇痛方案,进行术后宣教、药物镇痛及冷敷等物理疗法,其中口服药物符合个体差异,用药时间不尽相同,此举可增加患者依从性,配合早期进行下地活动,避免止痛药过度使用。

综上,本组病例应用 Hybrid 术式,在保留颈椎的活动度的同时,改善了患者的临床症状,证实了 Hybrid 在多节段颈椎间盘疾病中的有效性和安全性,是可靠的临床方法。

### 3.4 本研究不足及展望

本研究仍存在以下缺点及局限性,回顾性分析缺乏前瞻性对照,结果可能存在偏倚;病例数目依然较少,随访时间较短;且目前采用的假体均是针对初次手术设计,在 Hybrid 术式的应用仍有挑战<sup>[29]</sup>,未来需要大量的临床随访研究,对 Stand-alone 椎间融合器加人工间盘置换术 Hybrid 手术的长期临床效果加以证实。

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