doi: 10.13241/j.cnki.pmb.2017.02.021

单节段颈椎人工椎间盘置换术治疗颈椎病的临床研究

彭 帅 刘向阳 向铁城 张 毅 沈雄杰

（湖南省人民医院脊柱外科 湖南 长沙 410005）

摘要 目的:探讨单节段颈椎人工椎间盘置换术(CDA)治疗颈椎病的临床效果。**方法:**选择2013年5月到2015年5月在我院收治的80例颈椎病患者,按手术方式不同分为颈椎人工椎间盘置换组(CDA组)和前路颈椎减压融合组(ACDF组),各40例。两组患者均于术前、术后3个月、术后6个月及术后1年进行末期随访时,采用颈椎功能障碍指数(NDI)评价患者颈部功能,采用颈痛视觉模拟评分(VAS)和上肢痛VAS评价患者颈部疼痛,采用X线片在过伸和过屈位测量患者术前和术后手术节段相邻节段的活动度。**结果:**两组患者术后3个月、6个月及术后1年时的NDI评分、颈痛VAS及上肢痛VAS均明显低于术前,差异具有统计学意义(P<0.05),然而两组间比较差异无统计学意义(P>0.05)。CDA组患者术后3个月、6个月及术后1年时的手术相邻上节段活动度和手术相邻下节段活动度与术前比较差异无统计学意义(P>0.05),而ACDF组患者术后3个月、6个月及术后1年时均明显高于术前及同期CDA组,差异具有统计学意义(P<0.05)。**结论:**单节段CDA治疗颈椎病的临床疗效与ACDF相近,另外其不会引起手术相邻节段活动度的增加,值得在临床上推广应用。

关键词:单节段颈椎人工椎间盘置换术;前路颈椎减压融合术;颈椎病;疗效

中图分类号:R681.53 **文献标识码:**A **文章编号:**1673-6273(2017)02-287-03

The Clinical Study of the Single Level Cervical Disc Arthroplasty for Cervical Spondylosis Myelopathy

PENG Shuai, LIU Xiang-yang, XIANG Tie-cheng, ZHANG Yi, SHEN Xiong-jie

(Department of Spinal Surgery,Hunan Provincial People's Hospital, Changsha, Hunan, 410005, China)

ABSTRACT Objective: To explore the clinical effects of the single level cervical disc arthroplasty for the cervical disease. **Methods:** 80 patients who have cervical spondylosis were selected from May 2013 to May 2015, which were divided two groups randomly according to the surgical approach. 40 patients was in CDA group(experimental group) and 40 patients in ACDF group(controlled group). Before operation 3, 6 and 12 months after operation, the patients were followed up. The neck fuction of patients were evaluated by neck disability index (NDI) preoperative and postoperative, the neck pain of patients were evaluated by visual analogue scale (VAS) preoperative and postoperative, the range of movement (ROM) in operation segement was determined by dynamic X-ray. **Results:** The NDI score, neck pain VAS and upper limb pain VAS after 3, 6 months and the end of the follow-up were significantly lower than the preoperative, the difference was statistically significant (P<0.05), but there was no statistical difference between the two groups(P>0.05). The range of movement of the CDA group after 3, 6 months and the end of the follow-up was no statistical difference with the preoperative(P>0.05). The range of movement of the ACDF group after 3,6 months and the end of the follow-up was statistical difference with the preoperative and the same period CDA group, the difference were statistically significant (P<0.05). **Conclusion:** The clinical efficacy of single segment CDA in treating cervical spondylosis is similar to that of ACDF, In addition, it will not cause the increase of the activity of adjacent segment, so it is worth popularizing in clinic.

Key words: Single segment cervical disc arthroplasty; Anterior cervical decompression and fusion; Cervical spondylosis; Clinical effects

Chinese Library Classification(CLC): R681.53 Document code: A

Article ID: 1673-6273(2017)02-287-03

前言

前路颈椎减压融合术（anterior cervical decompression and fusion,ACDF)是目前临床治疗颈椎病、颈椎创伤及颈椎肿瘤的首选方法[1]。ACDF能够彻底清除突向椎管内的椎间盘、骨折碎片、增生骨赘等,解除对脊髓的压迫,同时植骨融合,重建颈椎的稳定性[2,3]。但是临床结果显示[4],ACDF会引起手术邻近节段应力的增加、邻近节段代偿性活动度变大,导致手术邻近节段发生退行性病变。有研究表明[5],有3%接受过ACDF治疗的患者需要再次接受手术治疗。因此,在切除椎间盘的同时,不会引起手术相邻节段活动度的增加,使手术节段锥间关节的运动得到保存,逐渐成为医学界研究的热点。单节段颈椎人工椎间盘置换术(cervical disc arthroplasty,CDA)是一种新型的颈椎病治疗方法，能够在切除椎间盘从而恢复患者脊柱功能的同时,限制手术相邻节段活动度的增加,阻止手术相邻节段发生退行性

作者简介:彭帅(1985-),男,硕士,主治医师,从事脊柱外科方面的研究,E-mail:pendshuai@163.com

(收稿日期:2016-06-29 接受日期:2016-07-25)

病变[6,7]。本研究探讨单节段 CDA 治疗颈椎病的临床效果，研究结果如下。

1 资料与方法

1.1 一般资料

选择 2013 年 5 月到 2015 年 5 月在我院收治的 80 例颈椎病患者作为研究对象。病例纳入标准：⑴经 X 线、CT 或 MRI 检查确认为颈椎病；⑵神经根型或脊髓型颈椎病患者；⑶C3-C7 单节段颈椎间盘病变患者；⑷非手术治疗 6 周以上，病情无改善患者。病例排除标准：⑴先天性颈椎畸形患者；⑵严重创伤后颈椎畸形患者；⑶肝、肾功能不全患者；⑷有颈椎融合手术史患者；⑸伴发有恶性肿瘤患者。将 80 例颈椎病患者按照随机数字表法随机分为颈椎人工椎间盘置换组（CDA 组）和前路颈椎减压融合组（ACDF 组），各 40 例。CDA 组男 25 例，女 15 例；年龄 30-58 岁，平均年龄（45.31± 12.07）岁；疾病分型：神经根型颈椎病 19 例，脊髓型颈椎病 21 例；手术节段：C3/4 颈椎间盘 6 例，C4/5 颈椎间盘 9 例，C5/6 颈椎间盘 13 例，C6/7 颈椎间盘 12 例。ACDF 组患者，男 24 例，女 16 例；年龄 32-57 岁，平均年龄（44.03± 10.96）岁；疾病分型：神经根型颈椎病 22 例，脊髓型颈椎病 18 例； 手术节段：C3/4 颈椎间盘 5 例，C4/5 颈椎间盘 8 例，C5/6 颈椎间盘 15 例，C6/7 颈椎间盘 12 例。两组患者性别、年龄、疾病分型、手术节段等一般资料比较差异均无统计学意义（P>0.05），具有可比性。所有患者均知情同意且自愿加入本研究，并经医院伦理委员会批准。

1.2 实验方法

CDA 组患者应用 Bryan 颈椎人工椎间盘假体（购自美敦力公司）置换术，具体措施为：切开右侧颈部，彻底清除椎间盘病变组织，打开后纵韧带，清除增生在钩椎关节处骨赘。采用水平仪、角度测量器等仪器综合定位椎间隙基准线，安放和固定双规通道。给予患者非甾体类抗炎药以防止异位骨化。佩戴颈托保护 1 周。ACDF 组患者常规切除病变椎间盘，清除致压物，取同种异体骨于减压间隙植入，颈椎前路采用钢板固定。佩戴颈托保护 3 个月。两组患者均常规给与小剂量糖皮质激素 5d，于术后平卧休息 6h，术后 2d 可佩戴颈托活动。

两组患者均于术前、术后 3 个月、术后 6 个月以及术后 1 年进行末期随访，随访时行颈椎正侧位、动力位 X 线片。采用颈椎功能障碍指数（neck disability index，NDI）评价患者术前和术后颈部功能情况[8]；采用颈痛视觉模拟评分（visual analogue scale，VAS）和上肢痛 VAS 评价患者术前和术后颈部疼痛情况[9]；采用 X 线片在过伸和过屈位测量患者术前和术后手术节段相邻节段的活动度。

1.3 数据处理

使用 SPSS19.0 软件包处理数据，计量资料以均数± 标准差（$\bar{x}$± s）表示，采用 t 检验，以 P<0.05 为有统计学意义。

2 结果

2.1 两组患者临床指标比较

两组患者术前 NDI 评分、颈痛 VAS 及上肢痛 VAS 比较差异无统计学意义（P>0.05）。两组患者术后 3 个月、6 个月及术后 1 年时的 NDI 评分、颈痛 VAS 及上肢痛 VAS 均明显低于术前，差异具有统计学意义（P<0.05），然而两组间比较差异无统计学意义（P>0.05）。见表 1。

表 1 两组患者临床指标比较（分）

Table 1 Comparison of the clinical index of the two groups（point）

Indexes	CDA group(n=40)			ACDF group(n=40)		
	NDI score	Neck VAS score	Upper limb VAS score	NDI score	Neck VAS score	Upper limb VAS score
Preoperative	42.17± 10.69	7.59± 2.43	8.47± 3.05	41.38± 12.45	7.83± 2.68	8.38± 2.95
After 3 months	18.93± 6.42#	2.38± 0.93#	3.22± 1.36#	19.52± 8.47#	2.47± 1.21#	3.16± 1.73#
After 6 months	17.65± 6.33#	2.14± 1.04#	3.10± 1.45#	18.15± 7.34#	2.16± 0.98#	3.02± 1.63#
After 1 years	16.99± 5.35#	1.92± 0.88#	2.69± 1.50#	17.05± 6.71#	2.01± 0.78#	2.78± 1.47#

Note: Compared with ACDF group, *P<0.05; Compared with preoperative, #P<0.05.

2.2 两组患者形态学指标比较

两组患者术前手术相邻上节段活动度和手术相邻下节段活动度比较差异无统计学意义（P>0.05）。CDA 组患者术后 3 个月、6 个月及术后 1 年时的手术相邻上节段活动度和手术相邻下节段活动度与术前比较差异无统计学意义（P>0.05）；ACDF 组患者术后 3 个月、6 个月及术后 1 年时的手术相邻上节段活动度和手术相邻下节段活动度均明显高于术前及同期 CDA 组，差异具有统计学意义（P<0.05），见表 2。

3 讨论

ACDF 是目前治疗颈椎病的金标准，但其将患者具有活动性、力学稳定的颈椎功能改变成了固定、无运动生物功能的节段，导致手术相邻节段应力增加，易引发节段退行性病变[10,11]。另外融合节段运动生物功能丧失、手术颈椎生物力学不稳定等会导致患者需要长时间卧床休息，术后恢复较慢，使患者的依从性下降[12]。CDA 采用颈椎人工椎间盘假体，使得手术节段更加接近生理性稳定，保持了颈椎手术相邻节段的活动度，从而减少了手术邻近节段应力，降低了邻近节段退行性病变的发生率[13,14]。另外有研究表明[15]，CDA 还避免了 ACDF 后植骨块脱落、塌陷、不融合等并发症的发生。本研究对比研究 CDA 与 ACDF 对颈椎病的治疗效果，以期为临床选用合理的治疗措施提供一定的临床依据。

本研究结果显示，两组患者术前 NDI 评分、颈痛 VAS 及上肢痛 VAS 比较差异无统计学意义（P>0.05）。两组患者术后 3

表 2 两组患者形态学指标比较

Table 2 Comparison of the morphology index of the two groups

Indexes	CDA group(n=40)		ACDF group(n=40)	
	The mobility of the upper adjacent level(0)	The mobility of the lower adjacent level(0)	The mobility of the upper adjacent level(0)	The mobility of the lower adjacent level(0)
Preoperative	7.27± 1.71	7.32± 1.83	7.08± 0.65	7.14± 1.72
After 3 months	7.35± 1.42*	8.14± 1.35*	10.05± 1.02#	11.14± 1.20#
After 6 months	7.69± 1.50*	7.98± 1.42*	13.16± 1.13#	14.08± 1.36#
After 1 years	8.04± 1.11*	8.03± 1.31*	15.67± 1.25#	16.18± 1.43#

Note: Compared with ACDF group, *P<0.05; Compared with preoperative, #P<0.05.

个月、6 个月及术后一年时的 NDI 评分、颈痛 VAS 及上肢痛 VAS 均明显低于术前，差异具有统计学意义（P<0.05），然而两组间比较差异无统计学意义（P>0.05）。提示 CDA 与 ACDF 对颈椎病均具有较好的疗效，且临床疗效相近。ACDF 能够形成开放的减压术野，完全解除对脊髓的压迫，使患者疼痛感降低，疗效明显[16]。CDA 则使用撑开器扩张病变颈椎间隙，降低对脊髓的压迫，植入颈椎人工椎间盘假体，保持了目标间隙的活动度，降低邻近节段产生应力，保护邻近节段，具有较好的疗效[17-19]。另外，本研究结果显示，两组患者术前手术相邻上节段活动度和手术相邻下节段活动度比较差异无统计学意义（P>0.05）。CDA 组患者术后 3 个月、6 个月及术后一年时的手术相邻上节段活动度和手术相邻下节段活动度与术前比较差异无统计学意义（P>0.05）；ACDF 组患者术后 3 个月、6 个月及术后一年时的手术相邻上节段活动度和手术相邻下节段活动度均明显高于术前，差异具有统计学意义（P<0.05），同时 CDA 组患者的手术相邻上节段活动度和手术相邻下节段活动度均明显低于 ACDF 组，差异具有统计学意义（P<0.05）。提示 CDA 相比于 ACDF 能够保持手术相邻节段活动度。ACDF 引起患者术后融合节段运动生理功能的丧失，从而导致上下相邻节段应力增加，活动度增大，引起颈椎活动性并发症或相近节段退行性病变[20]。CDA 是使用撑开器扩开病变颈椎间隙，不但间接降低对脊髓的压迫，还保留了病变关节左右、前后的屈伸活动，但不会引起手术相邻上下邻近节段活动度的明显增加，从而降低了手术相邻节段退行性病变的发生率[21,22]。

综上所述，CDA 治疗颈椎病的临床疗效与 ACDF 相近，另外其不会引起手术相邻节段活动度的增加，值得在临床上推广应用。

参考文献（References）

[1] Wang C, Tian F, Zhou Y, et al. The incidence of cervical spondylosis decreases with aging in the elderly, and increases with aging in the young and adult population:a hospital-based clinical analysis[J]. Clin Interv Aging, 2016, 12(11): 47-53

[2] 孙涛,张弘来,丁惠强,等.颈椎前路减压椎间融合术对已退变椎间盘邻近间盘退变的影响[J].宁夏医科大学学报, 2013, 35(8): 897-899
Sun Tao, Zhang Hong-lai, Ding Hui-qiang, et al. Effect of anterior cervical decompression and interbody fusion on degenerative intervertebral disc degeneration [J]. Journal of Ningxia Medical University, 2013, 35(8): 897-899

[3] Lou J, Li H, Rong X, et al. Location change of center of rotation after single-level cervical total disc replacement with ProDisc-C [J]. Acta Orthop Traumatol Turc, 2016, 50(3): 339-345

[4] Qizhi S, Lei S, Peijia L, et al. A Comparison of Zero-Profile Devices and Artificial Cervical Disks in Patients With 2 Noncontiguous Levels of Cervical Spondylosis[J]. Clin Spine Surg, 2016, 29(2): 61-66

[5] Lebl DR, Bono CM. Update on the Diagnosis and Management of Cervical Spondylotic Myelopathy [J]. J Am Acad Orthop Surg,2015, 23(11): 648-660

[6] Zhang HX, Shao YD, Chen Y, et al. Clinical and radiographic evaluation of cervical disk replacement:a retrospective study [J]. Int Orthop, 2014, 38(12): 2533-2541

[7] Zhang X, Zhang X, Chen C, et al. Randomized,controlled,multicenter, clinical trial comparing Bryan cervical disc arthroplasty with anterior cervical decompression and fusion in China [J]. Spine, 2012, 37(6): 433-438

[8] Chen J, Fan SW, Wang XW, et al. Motion analysis of single-level cervical total disc arthroplasty:a meta-analysis[J]. Orthop Surg, 2012, 4(2): 94-100

[9] Mehdi SK, Alentado VJ, Lee BS, et al. Comparison of clinical outcomes in decompression and fusion versus decompression only in patients with ossification of the posterior longitudinal ligament:a meta-analysis[J]. Neurosurg Focus, 2016, 40(6): E9

[10] Sala V, Lisi C, Di Natali G, et al. Functional and quality of life evaluation after single level cervical discectomy and fusion or cervical artificial disc replacement [J]. G Ital Med Lav Ergon, 2015, 37(4): 239-244

[11] Zhang Z, Jiao L, Zhu W, et al. Comparison of Bryan versus ProDisc-C total disk replacement as treatment for single-level cervical symptomatic degenerative disk disease[J]. Arch Orthop Trauma Surg, 2015, 135(3): 305-311

[12] Tracey RW, Kang DG, Cody JP, et al. Outcomes of single-level cervical disc arthroplasty versus anterior cervical discectomy and fusion[J]. J Clin Neurosci, 2014, 21(11): 1905-1908

[13] Shi R, Li J, Liu H, et al. Clinical comparison of 2 implantation systems for single-level cervical disk replacement [J]. Orthopedics, 2014, 37(2): 161-168

[14] Qureshi SA, McAnany S, Goz V, et al. Cost-effectiveness analysis: comparing single-level cervical disc replacement and single-level anterior cervical discectomy and fusion:clinical article[J]. J Neurosurg Spine, 2013, 19(5): 546-554

（下转第 316 页）

[4] Lu X, Li J, Li T, et al. Clinical study of midazolam sequential with dexmedetomidine for agitated patients undergoing weaning to implement light sedation in intensive care unit [J]. Chin J Traumatol, 2016, 19(2): 94-96

[5] 朱娟,朱明慧,何帆,等.右美托咪定对腰椎手术中体感诱发电位及运动诱发电位的影响[J].辽宁医学院学报, 2014, 35(6): 12-14
Zhu Juan, Zhu Ming-hui, He Fan, et al. The Effects of Dexmedetomidine on Intraoperative SSEP and MEP in Spinal Surgery [J]. Journal of Liaoning Medical University, 2014, 35(6): 12-14

[6] Nagge J, Bauer J. Different perspective on ASA use [J]. Can Fam Physician, 2016, 62(1): 30-31

[7] Giannini SP, Latorre MD, Ferreira LP. Condition of Vocal Production-Teacher questionnaire: comparison of responses on Likert scale and visual analog scale[J]. Codas, 2016, 28(1): 53-58

[8] Lawton M, Kasten M, May MT, et al. Validation of conversion between mini-mental state examination and montreal cognitive assessment[J]. Mov Disord, 2016, 31(4): 593-596

[9] Li Y, He R, Chen S, et al. Effect of dexmedetomidine on early postoperative cognitive dysfunction and peri-operative inflammation in elderly patients undergoing laparoscopic cholecystectomy [J]. Exp Ther Med, 2015, 10(5): 1635-1642

[10] Azimi P, Benzel EC, Shahzadi S, et al. The prediction of successful surgery outcome in lumbar disc herniation based on artificial neural networks[J]. J Neurosurg Sci, 2016, 60(2): 173-177

[11] Dagistan Y, Okmen K, Dagistan E, et al. Lumbar Microdiscectomy Under Spinal and General Anesthesia: A Comparative Study[J]. Turk Neurosurg, 2015, 25(5): 685-689

[12] Benitez PR, Nogueira CS, Holanda AC, et al. Lumbar spinal anesthesia with cervical nociceptive blockade. Critical review of a series of 1,330procedures[J]. Rev Bras Anestesiol, 2016, 66(1): 86-93

[13] Zywiel MG, Prabhu A, Perruccio AV, et al. The influence of anesthesia and pain management on cognitive dysfunction after joint arthroplasty:a systematic review[J]. Clin Orthop Relat Res, 2014, 472 (5): 1453-1466

[14] Kim HJ, Park JH, Kim JW, et al. Prediction of postoperative pain intensity after lumbar spinal surgery using pain sensitivity and preoperative back pain severity[J]. Pain Med, 2014, 15(12): 2037-2045

[15] Kuang Y, Xiang YX, Guo CX, et al. Population pharmacokinetics study of dexmedetomidine in Chinese adult patients during spinal anesthesia[J]. nt J Clin Pharmacol Ther, 2016, 54(3): 200-207

[16] Patro SS, Deshmukh H, Ramani YR, et al. Evaluation of Dexmedetomidine as an Adjuvant to Intrathecal Bupivacaine in Infraumbilical Surgeries[J]. J Clin Diagn Res, 2016, 10(3): UC13-16

[17] Hoffman J, Hamner C. Effectiveness of dexmedetomidine use in general anesthesia to prevent postoperative shivering:a systematic review [J]. JBI Database System Rev Implement Rep, 2016, 13(12): 287-313

[18] Ko KH, Jun IJ, Lee S, et al. Effective dose of dexmedetomidine to induce adequate sedation in elderly patients under spinal anesthesia [J]. Korean J Anesthesiol, 2015, 68(6): 575-580

[19] Tan WF, Miao EY, Jin F, et al. Changes in First Postoperative Night Bispectral Index After Daytime Sedation Induced by Dexmedetomidine or Midazolam Under Regional Anesthesia: A Randomized Controlled Trial[J]. Reg Anesth Pain Med, 2016, 41(3): 380-386

[20] Vora KS, Baranda U, Shah VR, et al. The effects of dexmedetomidine on attenuation of hemodynamic changes and there effects as adjuvant in anesthesia during laparoscopic surgeries[J]. Saudi J Anaesth, 2015, 9(4): 386-392

(上接第 289 页)

[15] Xing D, Ma XL, Ma JX, et al. A meta-analysis of cervical arthroplasty compared to anterior cervical discectomy and fusion for single-level cervical disc disease [J]. J Clin Neurosci, 2013, 20(7): 970-978

[16] Shao H, Chen J, Ru B, et al. Zero-profile implant versus conventional cage-plate implant in anterior cervical discectomy and fusion for the treatment of degenerative cervical spondylosis:a meta-analysis [J].J Orthop Surg Res, 2015, 17(10): 148

[17] Radcliff K, Coric D, Albert T. Five-year clinical results of cervical total disc replacement compared with anterior discectomy and fusion for treatment of 2-level symptomatic degenerative disc disease:a prospective,randomized, controlled, multicenter investiga tional device exemption clinical trial[J]. J Neurosurg Spine, 2016, (25): 1-12

[18] Kang J, Shi C, Gu Y, et al. Factors that may affect outcome in cervical artificial disc replacement:a systematic review [J]. Eur Spine J, 2015, 24(9): 2023-2032

[19] Zigler JE, Delamarter R, Murrey D, et al. ProDisc-C and anterior cervical discectomy and fusion as surgical treatment for single-level cervical symptomatic degenerative disc disease: five-year results of a Food and Drug Administration study[J]. Spine(Phila Pa 1976),2013, 38(3): 203-209

[20] Nandyala SV, Marquez-Lara A, Fineberg SJ, et al. Comparison of revision surgeries for one- to two-level cervical TDR and ACDF from 2002 to 2011[J]. Spine J, 2014, 14(12): 2841-2846

[21] Zang L, Ma M, Hu J, et al. Comparison of Hybrid Surgery Incorporating Anterior Cervical Discectomy and Fusion and Artificial Arthroplasty versus Multilevel Fusion for Multilevel Cervical Spondylosis: A Meta-Analysis [J]. Med Sci Monit, 2015, 27(21): 4057-4067