



ANALYSIS OF ANTERIOR CERVICAL DISCECTOMIES: EVALUATION OF 338 CASES

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SUMMARY

Objective: The aim of our study is to analyse the cervical discectomy operations performed in our clinic in the last 3 years.

Materials and Method: 338 patients underwent anterior cervical discectomy+fusion or total disc replacement at Adana Numune Training and Research Hospital Neurosurgery Clinic between April 2013 and April 2016 were inspected retrospectively. We evaluated patients' age, gender, level of discopathy, side of the disc herniation, type of surgery, preoperative and postoperative Visual Analog Scale(VAS) scores.

Results: Data from 338 patients were included in the statistical analyses. Mean age of the study population was 46.1 ± 10.3 years, and male/female ratio was 171 / 167. 145 patients(42.9 %) had a localization at C₅-C₆. The symptoms were on the left side of 43,5 % of patients. Total disc replacement implanted on 203 patients (60.1 %) and 135 patients(39.9 %) had been operated with fusion cages with blade. VAS scores decreased significantly during follow-up period. The comparisons of clinical characteristics between males and females were similar. But postoperative 3rd month VAS scores were significantly different between genders, and males had lower VAS scores than females.

Conclusion: Cervical disc disease is a common pathology. Anterior cervical discectomy is a frequently performed procedure in surgical treatment. Anterior cervical discectomy + fusion or total disc replacement can be performed.

Key words: Cervical disc herniation, anterior cervical discectomy, total disc replacement

Level of evidence: Retrospective clinical study, Level III

INTRODUCTION

Anterior cervical discectomy(ACD) is the most commonly used procedure for cervical disc herniation. Many techniques and modalities of fixation are used in ACD. Each one has some advantages and disadvantages against the others.

The first surgical approach to cervical disc disease was performed by Victor Horsley with posterior approach in 1895. Then Smith and Robinson described the anterior cervical discectomy and fusion technique in 1955⁽¹³⁾. Anterior approach is more preferred in recent years. Autograft bone placement is recommended for the fusion^(3,5). Autograft bone fusion has complications like graft collapse, graft removal and loss of cervical lordosis. Cage implantation has been used frequently in recent years

for the fusion. But fusion causes adjacent segment disease (ASD).

Some authors suggest total disc replacement (TDR) to prevent ASD⁽²⁾. The incidence of heterotopic ossification in TDR usage is 1,4-15,2 %⁽¹⁹⁾. Pseudoarthrosis and fusion develop on long-term follow-up. Also the cost is quite high. Treatment options are wide and not clear.

In our retrospective study we try to analyze our 3 years experience of anterior cervical discectomy procedures.

MATERIALS AND METHODS

Three hundred and thirty eight patients whom operated for cervical disc herniation with anterior cervical discectomy procedure between April

2013 and April 2016 at Adana Numune Training and Research Hospital Neurosurgery Clinic were evaluated for the study. Traumatic and spondylotic patients were not included in the study.

Patient information's were accessed from archive files retrospectively. Radiological data were inspected from the PACS system. In this study we evaluated the level of discopathy, side of the disc herniation, type of surgery, preoperative and postoperative Visual Analog Scale (VAS) scores.

Statistical Analysis

Descriptive data were presented as mean and standard deviations, or median and min-max values for numerical variables, and frequencies and percent for categorical variables. Independent group comparisons were analyzed with Mann-Whitney U test between genders. Changes over time in VAS scores were analyzed with Friedman non-parametric analysis of variance test. A Type I error level of 5% was considered as statistical significance in analyses. SPSS 18 (IBM Inc., Armonk, USA) was used for the statistical assessments.

RESULTS

Data from 338 patients were included in the statistical analyses. Mean age of the study population was 46.1±10.3 years, and male/female ratio was 171/167 (50.6% vs. 49.4%). Patient demographics was presented in Table-1.

The clinical characteristics of the patients were presented in Table-2. Accordingly, 43.5% of the patients had complaints in their shoulders and left arms at admission, 42.9% of the patients had a localization at C₅-C₆, preoperative deficits were present in 29.6% of the patients, 60.1% of patients had cervical disc prosthesis, and 39.9% of cases had blade cages.

The changes in preoperative and postoperative VAS scores were presented in Table-3. Analyses revealed that VAS scores decreased significantly during follow-up period (p<0.001).

The comparisons of clinical characteristics between males and females revealed that complaints at admission (p=0.401), localization of complaints (p=0.169), presence of preoperative deficits (p=0.537), and materials used in operations (p=0.087) were similar between genders (Table-4).

The preoperative and postoperative 1st day VAS scores were not statistically different between males and females. But, postoperative 3rd month VAS scores were significantly different between genders (p=0.014), and males had lower VAS scores than females (Table-5).

Table-1. Patients' demographics

	Mean±SD
Age	46.1±10.3
	n (%)
Gender	
<i>Male</i>	171 (50.6)
<i>Female</i>	167 (49.4)

Table 2. Clinical characteristics of patients

	n (%)
Complaint at admission	
<i>Shoulder & left arm</i>	147 (43.5)
<i>Shoulder & right arm</i>	62 (18.3)
<i>Shoulder</i>	57 (16.9)
<i>Shoulder & both arms</i>	52 (15.4)
<i>Both arms</i>	8 (2.4)
<i>Right arm</i>	6 (1.8)
<i>Left arm</i>	6 (1.8)
Localization	
C ₅ -C ₆	145 (42.9)
C ₆ -C ₇	103 (30.5)
C ₅ -C ₆ , C ₆ -C ₇	29 (8.6)
C ₄ -C ₅	25 (7.4)
C ₄ -C ₅ , C ₅ -C ₆	15 (4.4)
C ₃ -C ₄	8 (2.4)
C ₄ -C ₅ , C ₅ -C ₆ , C ₆ -C ₇	5 (1.5)
C ₄ -C ₅ , C ₆ -C ₇	2 (0.6)
C ₃ -C ₄ , C ₄ -C ₅ , C ₅ -C ₆ , C ₆ -C ₇	2 (0.6)
C ₃ -C ₄ , C ₄ -C ₅ , C ₅ -C ₆	1 (0.3)
C ₄ -C ₅ , C ₅ -C ₆ , C ₇ -T ₁	1 (0.3)
C ₅ -C ₆ , C ₆ -C ₇ , C ₇ -T ₁	1 (0.3)
C ₇ -T ₁	1 (0.3)
Preoperative deficit	
<i>None</i>	238 (70.4)
<i>Present</i>	100 (29.6)
Material	
<i>Cervical disc prosthesis</i>	203 (60.1)
<i>Blade cage</i>	135 (39.9)

Table 3. Pre- and post-operative pain scores

VAS	Median (Min-Max)	p
Preoperative	6 (4-10)	
Postoperative 1 st day	1 (0-5)	<0.001
Postoperative 3 rd month	0 (0-4)	

Table 4. Comparisons of clinical characteristics between genders

	Male	Female	P
	n (%)	n (%)	
Complaint at admission			0.401
<i>Shoulder & left arm</i>	74 (43.3)	73 (43.7)	
<i>Shoulder & right arm</i>	29 (17)	33 (19.8)	
<i>Shoulder</i>	32 (18.7)	25 (15)	
<i>Shoulder & both arms</i>	27 (15.8)	25 (15)	
<i>Both arms</i>	2 (1.2)	6 (3.6)	
<i>Right arm</i>	2 (1.2)	4 (2.4)	
<i>Left arm</i>	5 (2.9)	1 (0.6)	
Localization			0.169
<i>C₅-C₆</i>	79 (46.2)	66 (39.5)	
<i>C₆-C₇</i>	42 (24.6)	61 (36.5)	
<i>C₅-C₆, C₆-C₇</i>	19 (11.1)	10 (6)	
<i>C₄-C₅</i>	13 (7.6)	12 (7.2)	
<i>C₄-C₅, C₅-C₆</i>	6 (3.5)	9 (5.4)	
<i>C₃-C₄</i>	4 (2.3)	4 (2.4)	
<i>C₄-C₅, C₅-C₆, C₆-C₇</i>	3 (1.8)	2 (1.2)	
<i>C₄-C₅, C₆-C₇</i>	2 (1.2)	-	
<i>C₃-C₄, C₄-C₅, C₅-C₆, C₆-C₇</i>	1 (0.6)	1 (0.6)	
<i>C₃-C₄, C₄-C₅, C₅-C₆</i>	1 (0.6)	-	
<i>C₄-C₅, C₅-C₆, C₇-T₁</i>	-	1 (0.6)	
<i>C₅-C₆, C₆-C₇, C₇-T₁</i>	-	1 (0.6)	
<i>C₇-T₁</i>	1 (0.6)	-	
Preoperative deficit			0.537
<i>None</i>	123 (71.9)	115 (68.9)	
<i>Present</i>	48 (28.1)	52 (31.1)	
Material			0.087
<i>Cervical disc prosthesis</i>	95 (55.6)	108 (64.7)	
<i>Blade cage</i>	76 (44.4)	59 (35.3)	

Table-5. Comparisons of VAS scores between genders

VAS	Male	Female	P
	Median (Min-Max)	Median (Min-Max)	
Preoperative	6 (4-10)	6 (4-10)	0.370
Postoperative 1 st day	1 (0-5)	1 (0-4)	0.891
Postoperative 3 rd month	0 (0-4)	0 (0-4)	0.014

DISCUSSION

Cervical disc herniation is a common disease with pain and disability. Surgical or conservative treatment options are quite extensive ⁽¹⁵⁾. A variety of surgical methods have been described. Anterior or posterior approaches could be chosen. Radiologic examinations such as Computed Tomography (CT), Magnetic Resonance Image (MRI), X ray and neurological examination findings are guiding our treatment modality choice. MRI could demonstrate degenerative disc disease in patients who older than 40 years even if they are asymptomatic ^(7,9). Therefore, patient complaints and physical examination findings are important.

Many implants can be used for anterior discectomy and fusion ^(14,18). Simple cage can be used for fusion. The use of cage has disadvantages such as loss of lordosis, cage extrusion, pseudoarthrosis and disc height loss. Although fusion rate is good it can cause adjacent segment disease ^(10,16-17). Disc prosthesis is recommended to avoid this. Even if some authors believe that the prosthesis protects the moving segment, some do not ^(2,4,6,8,11-12). Also there have been no clear evidence that the increased stress or strain of adjacent segment from the fusion which is indicated as the cause of ASD increases the incidence of reoperation. Prosthesis replacement is also introduced for reducing ASD, but from the med-long term follow-up of ACD+fusion and prosthesis replacement, it have failed to identify any significant difference in the prevalence of ASD between them. Eventually the focus on prosthesis replacement to overcome the limitation of fusion surgery could not show superiority in comparison to ACD+fusion, hence it can be an alternative to fusion surgery, but it will be hard to substitute ACD+fusion.

There are many clinical series about cervical disc herniations. Statistical results could be different because of genetic variations and enviromental factors. We search similar studies from our territory and we found that Aydoğmuş et al. had a similar clinical series ⁽¹⁾. When we compare with our study similar results found at the level of disc herniation, side of symptoms and type of surgery.

We try to analyse our anterior cervical discectomy operations with demographic and clinical datas. Results of these kind of clinical series demand on genetic variations, weather conditions, social and economic factors of the territories. Surgical methods can vary on surgeons experience and supportment of implant technologies.

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