Volume: 27, Issue: 3, July 2016 pp: 143/146 ORIGINAL ARTICLE / ORJINAL MAKALE

ANTERIOR CERVICAL DISCECTOMY: ANALYSIS OF THE RESULTS OF TWO YEARS

ANTERİOR SERVİKAL DİSKEKTOMİ: 2 YILLIK SONUÇLARIN DEĞERLENDİRİLMESİ

Evren AYDOĞMUŞ[1],
Alptekin GÜL[2],
Erdal GÜR[2],
Ercan KAYA[2],
Mehmet TIRYAKI[1],
Hikmet Turan SÜSLÜ[3]

[1] Surgeon of the neurosurgery, Department of the Neurosurgery, Dr.Lütfi Kırdar Kartal Trainig and Research Hospital, İstanbul.

[2] Resident of the neurosurgery, Department of the Neurosurgery, Dr.Lütfi Kırdar Kartal Trainig and Research Hospital, İstanbul.

[3] Assoc. Prof. of the neurosurgery, Department of the Neurosurgery, Dr.Lütfi Kırdar Kartal Trainig and Research Hospital, İstanbul.

Address: Op. Dr. Mehmet Tiryaki, Kartal Dr.Lütfi Kırdar Eğitim ve Araştırma Hastanesi Cevizli-Kartal İstanbul Türkiye
Tel: +90 505 918 47 40
Fax: +90 216 438 00 00
E-mail: mztiryaki@hotmail.com
Received: 22th March, 2016.
Accepted: 12th May, 2016.

SUMMARY:

Objective: The aim of the study is to analyse the cervical discectomy operations in two years.

Materials and Method: We inspected 175 patients who were operated for cervical disc herniation between June 2014 and June 2016 at Dr.Lütfi Kırdar Kartal Training and Research Hospital Neurosurgery Clinic. The parameters that evaluated are the level of discopathy, side of the disc herniation and type of surgery.

Results: This study included a total of 175 patients, of whom 100 were female (57.1 %) and 75 were male (42.9 %). Mean age was 45.1 ± 9.6 years for males, and 43.3 ± 9.9 for females. There was no statistically significant difference between males and females (p=0.111). The most frequent levels of disorder was at C5-6 (n=68; 38,9 %), and C6-7 (n=53; 30.3 %). More than half of the patients had lesions on left side (n=92; 52.6 %). Most frequent type of operation was total disc replacement (TDR) application (n=127; 72.6 %). Comparisons between males and females regarding level (p=0.311) and side (p=0.463) of lesions, and operation type (p=0.466) showed that both genders were similar for these clinical parameters.

Conclusions: ACDF and TDR showed similar results in terms of efficacy and safety, and these procedures with expectation of better results together with the development of surgical techniques and instruments.

Key Words: Cervical disc herniation, anterior cervical discectomy, analysis of anterior cervical discectomies

Level of evidence: Retrospective clinical study, Level III.

ÖZET:

Amaç: Çalışmamızın amacı iki yıl içerisinde yapılan anterior servikal diskektomi ameliyatlarının analizini çıkartmaktır.

Materyal ve Metod: Haziran-2014 ile Haziran-2016 tarihleri arasında Dr.Lütfi Kırdar Kartal Eğitim ve Araştırma Hastanesi Nöroşirurji Kliniğinde anterior servikal diskektomi ameliyatı yapılmış 175 hasta retrospektif olarak incelendi. İncelenen parametreler diskopati seviyesi, disk hernisinin tarafı ve cerrahinin tipi idi.

Sonuçlar: Çalışmaya katılan popülasyonun ortalama yaşı kadınlarda 43.3 ± 9.9, erkeklerde 45.1 ± 9.6 olarak hesaplandı. 100 hasta kadın (% 57.1) ve 75 hasta erkek idi (% 42.9). Cinsiyet yönünden istatistiksel fark saptanmadı(p=0.111). En çok diskektomi yapılan seviyeler C5-6 (n=68; % 38,9) ve C6-7 olarak bulundu(n=53; % 30.3). Hastaların yarısından fazlasının lezyonu sol tarafta idi(n=92; % 52.6). En çok yapılan ameliyat tipi disk protezi implantasyonu olarak saptandı(n=127; % 72.6). Cinsiyetler arasında yapılan karşılaştırmalarda serviye (p=0.311), taraf (p=0.463) ve operasyon tipi (p=0.466) arasında anlamlı istatistiksel fark bulunmadı.

Çıkarım: Anterior servikal diskektomi füzyon ve disk protezi uygulaması benzer şekilde etkili ve güvenli teknikler olarak bilinirler ve bu prosedürlerden beklentiler cerrahi tekniklerin ve enstrumanların gelişimi ile beraber daha da artmaktadır.

Anahtar kelimeler: Servikal disk hernisi, anterior servikal diskektomi, anterior servikal diskektomilerin analizi

Kanıt Düzeyi: Retrospektif klinik çalışma, Düzey III

INTRODUCTION:

Anterior cervical discectomy and fusion (ACDF) has been suggested as an effective and safe treatment for spinal cervical abnormalities such as spondylosis, disc herniations, fractures and neoplastic lesions. Many trials have been carried out to get better results from the procedures, and it was essential to develop new graft materials and implants but these changes could not always guarantee better results[17].

Anterior cervical approach was initially described by Lahey and Warren to expose esophageal diverticula[9]. Smith and Robinson first applied this approach to cervical spine and reported the result of anterior cervical interbody fusion by using a horseshoe-shaped graft harvested from iliac crest but there was no attempt to remove the structure compressing neural structure and simply disc was removed and autologous bone graft was filled in the hollow space to conduct the fusion[16]. Cloward reported interbody arthrodesis by using dowel type graft[2]. It is applied Wiltberger's lumbar interbody dowel fusion technique on cervical spine, and unlike Smith-Robinson technique, it removed not only discs but also all lesions that compressing the neural structure anteriorly under direct visualization, and used a large drill to prepare the area for bone graft[2].

In our study we try to analyse our experience of anterior cervical discectomy procedures for 2 years rethrospectively.

MATERIALS AND METHODS:

We inspected 175 patients who were operated for cervical disc herniation with the anterior cervical discectomy technique between June-2014 and June-2016 at Dr. Lütfi Kırdar Kartal Training and Research Hospital Neurosurgery Clinic (Figure-1).

Cervical stenosis, fractures and spondylopaties excluded from the study.

The informations were collected from the patients file archieves rethrospectively. Radiological data were inspected from the PACS system. The parameters that evaluated are the level of discopathy, side of the disc herniation and type of surgery.

STATISTICAL ANALYSIS:

Descriptive data were presented by using mean and standard deviation, and frequencies and percent. Chi-square and Mann-Whitney U tests were used for comparisons between the independent groups of the study, and statistical significance was evaluated according to a two-sided Type-I error level of 5%. Statistical Package for the Social Sciences (SPSS) 21 software (IBM Corp. in Armonk, NY) was used for all statistical analyses of this research.

Figure-1. Sagittal plain radiography of postoperative C5-6 total disc replacement and C6-7 cage implantation

RESULTS:

This study included a total of 175 patients, of whom 100 were female (57.1 %) and 75 were male (42.9 %). Mean age was 45.1 ± 9.6 years for males, and 43.3 ± 9.9 for females. There was no statistically significant difference between males and females (p=0.111).

The most frequent levels of disorder was at C5-6 (n=68; 38,9 %), and C6-7 (n=53; 30.3 %). More than half of the patients had lesions on left side (n=92; 52.6 %). And, most frequent type of operation was total disc replacement (TDR) application (n=127; 72.6 %). The general characteristics of study population were presented in Table-1.

Comparisons between males and females regarding level (p=0.311) and side (p=0.463) of lesions, and operation type (p=0.466) showed that both genders were similar for these clinical parameters. Between-gender comparisons showed in Table-2.

Table-1. General characteristics

	Mean±SD
Age (years)	44.3±9.8
	n (%)
Sex	
Female	100 (57.1)
Male	75 (42.9)
Level	
C3-4	2 (1.1)
C3-4 and C4-5	1 (0.6)
C3-4 and C5-6	1 (0.6)
C4-5	13 (7.4)
C4-5 and C5-6	8 (4.6)
C5-6	68 (38.9)
C5-6 and C6-7	28 (16)
C6-7	53 (30.3)
C6-7 and C7-T1	1 (0.6)
Side	
Left	92 (52.6)
Right	80 (45.7)
Bilateral	3 (1.7)
Operation	
Total disc replacement (TDR)	127 (72.6)
Cage and TDR	39 (22.3)
Cage	8 (4.6)
Discectomy	1 (0.6)

Table-2. Between gender comparisons

	Female	Male	
	Mean±SD	**Mean±SD**	**p**
Age	45.1±9.6	43.3±9.9	0.111
	n (%)	**n (%)**	**p**
Level			0.311
C3-4	-	2 (2.7)	
C3-4 and C4-5	-	1 (1.3)	
C3-4 and C5-6	-	1 (1.3)	
C4-5	10 (10)	3 (4)	
C4-5 and C5-6	4 (4)	4 (5.3)	
C5-6	36 (36)	32 (42.7)	
C5-6 and C6-7	16 (16)	12 (16)	
C6-7	33 (33)	20 (26.7)	
C6-7 and C7-T1	1 (1)	-	
Side			0.463
Left	50 (50)	42 (56)	
Right	49 (49)	31 (41.3)	
Bilateral	1 (1)	2 (2.7)	
Operation			0.466
Total disc replacement (TDR)	73 (73)	54 (72)	
Cage and TDR	21 (21)	18 (24)	
Cage	6 (6)	2 (2.7)	
Discectomy	-	1 (1.3)	

DISCUSSION:

Cervical degenerative disc disease is a common cause of pain and disability.

Most symptomatic cases present between the ages of 40-60, although many individuals never develop symptoms[7]. Many conservative treatment modalities like physical therapy and injection were described[18]. MRI studies have documented the presence of cervical degenerative disc disease in 60 % of asymptomatic individuals aged greater than 40 years and 80 % of patients over the age of 80 years[10-11].

ACDF surgery has become a standard treatment for cervical disc disease, and it is a proven intervention for patients with myelopathy and radiculopathy as it affords the surgeon the ability to provide direct (from the discectomy) and indirect (through restoration of disc height) decompression and stabilization[5,6]. Various implant and graft devices have been developed for use with ACDF(19). The anatomy of cervical spine must be well known for the better results of the operations[3,8,14].

Complications of ACDF could be exampled as disection injuries (vascular, eosofagial, tracheal), nerve injuries, hyperosteosis, CSF fistula and bone graft site injuries[4,13]. The donor site complication due to the use of host bone led to the morbidity rate of 20 % or higher, and it is presented as pain in the donor site, seroma, hematoma, infection, hip fracture, and meralgia paresthetica[15]. Allogenic bone graft and synthetic devices were suggested to resolve those problems.

TDR has been proposed as an alternative treatment to ACDF. Cervical arthroplasty maintains motion and believed to decrease the adjacent segment disease and reduce the rate of reoperations[1]. Literature have shown similar outcomes for ACDF and TDR[12]. TDR is not indicated for cervical disease at more than 2 levels. These devices are indicated for

skeletally mature patients for reconstruction of disc following discectomy at a single level or adjacent levels for radiculopathy or myelopathy. In our series the most used device was TDR for anterior cervical disc pathologies

ACDF and TDR showed similar results in terms of efficacy and safety, and these procedures with expectation of better results together with the development of surgical techniques and instruments.

REFERENCES:

1. Blumenthal SL, Ohnmeiss DD, Guyer RD, Zigler JE. Reoperations in cervical total disc replacement compared with anterior cervical fusion: results compiled from multiple prospective food and drug administration investigational device exemption trials conducted at a single site. *Spine* 2013; 38(14): 1177–1182.
2. Cloward RB. The anterior approach for removal of ruptured cervical disks. *J Neurosurg* 1958; 15: 602-617.
3. Demirel N, Gül A, Gergin S, Düzkalır HG, Başaran R, Düzkalır AH, Yaltırık CK, Özdoğan S. Craniovertebral junction Morphometric Evaluation with Reconstructive Computed Tomography. *JTSS* 2016; 27(1):13-17.
4. Düzkalır AH, Özdoğan S, Demirel N, Yaltırık CK. Complications of Anterior Cervical Spine Surgery: Review of the Literature. *JTSS* 2015; 26(4): 307-314.
5. Gao Y, Liu M, Li T, F Huang, T Tang, Z Xiang. A meta-analysis comparing the results of cervical disc arthroplasty with anterior cervical discectomy and fusion (ACDF) for the treatment of symptomatic cervical disc disease. *J Bone Joint Surg* 2013; 95-A(6):555–561.
6. Istemen I, Ozdogan S, Duzkalir AH, Senturk S, Yildirim T, Okutan MO. Clinical Results of Median Corpectomy in Cervical Spondylotic Patients with Myelopathy. *Turk Neurosurg* 2016; 26(1): 90-96.
7. Kelly JC, Groarke PJ, Butler JS, Poynton AR, O'Byrne JM. The natural history and clinical syndromes of degenerative cervical spondylosis. *Adv Orthop* 2012; 2012: 393642.
8. Köken M, Özdoğan S, Gergin YE, Aydın SO, Yüce E, Tiryaki M, Tatarlı N, Süslü HT, Hiçdönmez T. Alt servikal bölge disk mesafelerinin yüksekliklerinin ölçümü ve klinikte kullanımı. *JTSS* 2014; 25(3): 189-192.
9. Lehto IJ, Tertti MO, Komu ME, Paajanen HEK, Tuominen J, Kormano MJ. Age-related MRI changes at 0.1 T in cervical discs in asymptomatic subjects. *Neuroradiology* 1994; 36(1): 49–53.
10. Lehto IJ, Tertti MO, Komu ME, Toyama Y, Shiga H. Age-related MRI changes at 0.1 T in cervical discs in asymptomatic subjects. *Neuroradiology 1994; 36(1): 49–53.*
11. Matsumoto M, Fujimura Y, Suzuki N, Traynelis VC, Zdeblick TA. MRI of cervical intervertebral discs in asymptomatic subjects. *J Bone Joint Surg* 1998; 80-B (1): 19–24.
12. Mummaneni PV, Burkus JK, Haid RW, et al. Clinical and radiographic analysis of cervical disc arthroplasty compared with allograft fusion: a randomized controlled clinical trial. *J Neurosurg Spine* 2007; 6(3): 198–209.
13. Özdoğan S, Sabuncuoğlu H, Beriat GK, Tiryaki M, Düzkalır AH. Dysphagia Caused by Anterior Cervical Hyperostosis: Case Report. *JTSS* 2015; 26(3): 237-240.
14. Özdoğan S, Köken M, Gergin YE, Aydın SO, Yüce E, Tiryaki M, Tatarlı N, Süslü HT, Hiçdönmez T. Erişkinlerde ön atlantodental mesafenin bilgisayarlı tomografi ile ölçümü. *JTSS* 2014; 25(3): 193-197.
15. Silber JS, Anderson DG, Daffner SD, et al. Donor site morbidity after anterior iliac crest bone harvest for single-level anterior cervical discectomy and fusion. *Spine* 2003; 28:134-139.
16. Smith GW, Robinson RA. The treatment of certain cervical-spine disorders by anterior removal of the intervertebral disc and interbody fusion. *J Bone Joint Surg* 1958; 40-A: 607-624.
17. Song KJ, Choi BY. Current concepts of anterior cervical discectomy and fusion: a review of literature. *Asian Spine J* 2014; 8(4): 531-539.
18. Süslü H, Düzkalır HG, Özdoğan S, Şenol Ö, Tatarlı N, Düzkalır AH, Yaltırık CK. Fluoroscopy guided transforaminal steroid injection on cervical radicular pain. *JTSS* 2015; 26(2): 127-133.
19. Xie JC, Hurlbert RJ. Discectomy versus discectomy with fusion versus discectomy with fusion and instrumentation: a prospective randomized study. *Neurosurgery* 2007; 61(1): 107–116.