

ANTERIOR CERVICAL DISCECTOMY AND ASSESSMENT OF PATIENTS' QUALITY OF LIFE

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Abstract: Background: Anterior cervical discectomy is among the surgeries that are frequently conducted on the cervical area of the vertebral column. **Objective:** Our study aimed to analysis the clinical findings of patients who underwent anterior cervical discectomy and assess the quality of life for patients after surgery. **Patients and methods:** A total of 76 patients who underwent anterior cervical discectomy surgery were included in the study, where their ages ranged between 35 and 75 years, with 76 cases included. The clinical, demographic, and surgical data for these patients were collected from different hospitals in Iraq over a period of time spanning from 6 July 2022 to 18 August 2023. This study aimed to determine the extent of recovery and quality of life of patients using both the Neck Disability Index (NDI) scale, where the scale ranged between 0 and 50 and included mild disability (0-15), moderate disability (16-30), and severe disability (31-50). The patients' quality of life questionnaire ranged from 0 to 100, with 0 indicating poor quality of life and 100 indicating optimal quality of life. **Results:** Our results found patients with ages (56 – 65) years had the most patients who perform anterior cervical discectomy, which include 31 cases; males had 46 cases and females 30 cases; the most symptoms were neck pain with 20 cases and arm pain with 17 cases, smokers had 45 cases, spondylosis included 25 cases, spinal stenosis included 23 cases, operative time was 254.68 ± 57.55 min, general anaesthesia included 57 cases, estimated blood loss was 136.48 ± 77.26 , bleeding rate of cases had 16 cases, ICU admission included 6 cases, length of stay in hospital ranged between 2 - 4 days, the mortality rate was 2 cases, rate of complication was 27.63%, where the most factors had hoarseness had 7 cases and dysphagia with 5 cases. **Conclusions:** In general, the current study shows that anterior cervical discectomy surgery is the most successful and effective procedure in treating patients, resulting in improved quality of life, faster recovery, reduced pain, and comfort for patients after surgery.

Key words: Anterior cervical discectomy; Quality of life scale; Complications; Neck Disability Index (NDI); and Symptoms.

Introduction

Anterior cervical discectomy is a common procedure in neurosurgical services for the treatment, mainly of cervical herniated discs [1]. This technique pursues, on the one hand, the decompression of the nerve structures of the spinal canal (spinal cord and nerve roots) and, on the other hand, the fusion of the operated cervical vertebrae. [2]

Since its description in the 50s by Cloward and Smith and Robinson, in which tricortical autologous bone graft was used, numerous technical variants have been described as new materials and devices were developed to improve the rates of intervertebral fusion and to avoid the morbidity associated with the use of autologous graft (iliac crest usually). [3 – 6]

The advantages and disadvantages of the different available interbody devices, such as carbon boxes, PEEK (polyetheretherketone), titanium, or tantalum, with or without instrumentation with cervical

plates and screws, have been widely discussed in the literature due to the boom in the use of these devices, without being able to demonstrate the superiority of one material or design over others. [7 – 10]

We also find in the literature multiple references on the use of bone growth-promoting substances (hydroxyapatite, demineralized bone matrix, bone morphogenetic protein, etc.) or heterologous bone from cadaver, which demonstrate a similar effectiveness, finding differences in the time needed to achieve bone fusion. [11,4,5,8,12,13]

In addition, after studies that confirmed the increase in biomechanical stress in the levels adjacent to the fused level at both the lumbar and cervical levels, cervical disc prostheses (cervical arthroplasty) have been developed over the past decade, with the intention of preserving the physiological biomechanics of the spine to the maximum to prevent degeneration of adjacent discs. [14 – 17]

Therefore, more variables are added in the decision-making about the treatment of the patient with cervical disc pathology. Given this range of possibilities, the surgeon's decision on the use of one technique or another is based on both clinical, radiological, and biomechanical factors, as well as on the experience of using one device or another, the economic cost, or the availability in his workplace. [18 – 20]

Patients and methods

We conducted a cross-sectional study of patients who underwent anterior cervical discectomy. Their ages ranged between 35 and 75 years, which included 76 cases. Their clinical and demographic data were collected from different hospitals in Iraq for a period ranging between July 6, 2022, and August 18, 2023. This data included both ages. Gender, body mass index, clinical symptoms, comorbidities, ASA, %, smoking status, previous surgery, education level, work level, and monthly income. In this study, patients who were associated with diseases such as high blood pressure, diabetes, cholesterol, heart failure, kidney disease, disease who had undergone previous surgeries, and high obesity were included, while patients who were associated with serious diseases such as cancer or other diseases, patients who were under the age of 35 years, were excluded.

In addition, this study recorded diagnostic data, which was distributed to all patients, as all patients underwent imaging tests, which included X-rays, magnetic resonance imaging, and CT scans, which identified the main causes associated with anterior cervical discectomy surgery, determined the severity of the disease, and measurements of each of the following: Cholesterol and heart rate.

Furthermore, all patients underwent anterior cervical discectomy under both general anesthesia and local anesthesia with sedation. Surgical data included surgical time, estimated blood loss, number of patients with bleeding during surgery, admission to the intensive care unit, and number of cases with high blood pressure, length of stay in the intensive care unit, PONV % follow-up time, mortality rate, and postoperative complication rate.

Regarding the results after the anterior cervical discectomy operation, a questionnaire was conducted for the patients in which the pain scores were measured using the VAS scale, which ranged from 0 to 10, where 0 represents the lowest score for pain, and 10 represents the highest score for pain, as well as the range of motion related to the neck and arm using the scale. Neck Disability Index (NDI), where the scale ranged from 0 to 50, including mild disability (0-15), moderate disability (16-30), and severe disability (31-50), which was conducted on all patients during the pre-and post-operative period. Also, the clinical results of the quality of life of patients after anterior cervical discectomy were evaluated, as the questionnaire scale of the quality of life of patients ranged between 0 - 100, where 0 shows poor quality of life scores for patients and 100 shows optimal quality of life scores. This questionnaire was based on aspects of health, which It included physical function, psychological function, social and emotional aspects, and daily activity aspects. Clinical and demographic data of patients were analysed and enrolled by the SPSS program, version 22.0.

Results

Table 1: Preoperative demographic characteristics of patients.

Characteristics	Number of patients [N =76]	Percentage [%]
Age		
35 – 45	12	15.79%
46 – 55	20	26.32%
56 – 65	31	40.79%
66 - 75	13	17.11%
Sex		
Male	46	60.53%
Female	30	39.47%
BMI, kg/m2		
Underweight	14	18.42%
Normal weight	10	13.16%
Overweight	24	31.58%
Obesity	28	36.84%
Symptoms		
Neck pain	20	26.32%
Arm pain	17	22.37%
Numbness or weakness in the arms or hands	16	21.05%
Difficulty walking	13	17.11%
Difficulty holding objects	10	13.16%
Comorbidities		
Hypertension	62	81.58%
Diabetes	42	55.26%
High cholesterol	67	88.16%
Heart failure	34	44.74%
Kidney disease	21	27.63%
ASA, %		
I	13	17.11%
II	18	23.68%
III	23	30.26%
IV	22	28.95%
Smoking status		
Yes	45	59.21%
No	31	40.79%
Previous surgery		
Yes	37	48.68%
No	39	51.32%
Education status		
Primary	14	18.42
Secondary	23	30.26
College/university	39	51.32%
Working status		
Workers	22	28.95%
Non – workers	54	71.05%
Monthly income, \$		

< 800	34	44.74%
800 – 1000	26	34.21%
> 1000	16	21.05%

Table 2: Diagnoses findings.

Characteristics	Number of patients [N =76]	Percentage [%]
Causes		
Spondylosis	25	32.89%
Spinal stenosis	23	30.26%
Disc herniation	14	18.42%
Degenerative disc disease	4	5.26%
Radiculopathy	2	2.63%
Post-traumatic deformity	2	2.63%
Spondylolisthesis	3	3.95%
Spinal instability	1	1.32%
Infections discitis	1	1.32%
Congenital stenosis	1	1.32%
Severity		
Mild	13	17.11%
Moderate	18	23.68%
Severe	45	59.21%
Cholesterol levels		
Mild	11	14.47
Moderate	15	19.74
Severe	50	65.79
Heart rate		
Mild	26	34.21%
Moderate	32	42.11%
Severe	18	23.68%
Medical history of the disease		
Yes	27	35.53%
No	49	64.47%
Imaging test		
X-rays	41	53.95%
MRI scan	23	30.26%
CT scan	12	15.79%

Table 3: Surgical results related to patients who underwent anterior cervical discectomy.

Characteristics	Number of patients [N =76]	Percentage [%]
Operative time, min (mean ± SD)	254.68 ± 57.55	
Anaesthesia used, n (%)		
General anaesthesia	57	75.0%
Local anaesthesia with sedation	19	25.0%
Estimated blood loss, ml, (mean ± SD)	136.48 ± 77.26	

Bleeding rate of cases, n (%)		
Yes	16	21.05%
No	60	78.95%
ICU admission, n (%)		
Yes	6	7.89%
No	70	92.11%
Intraoperative high blood pressure, n (%)		
Yes	10	13.16%
No	66	86.84%
Length of stay in hospital, days, median	3 (2 – 4) days	
PONV %		
Yes	7	9.21%
No	69	90.79%
Follow-up time, months	Nine months	
Mortality rate, n (%)		
Yes	2	2.63%
No	74	97.37%

Table 4: Postoperative complications.

Complications	Number of patients [N =76]	Percentage [%]
Nerve root injury	1	1.32%
Palsy	1	1.32%
Hoarseness	7	9.21%
Dysphagia	5	6.58%
Postoperative neck pain	4	5.26%
Other	3	3.95%
Total	21	27.63%

Table 5: A questionnaire measured scores of pains and range of motion related to neck and arm in preoperative and postoperative.

Variables	Pre-operative		Postoperative		P – value
	VAS scale				
Neck pain	5.2 ± 3.3		3.1 ± 2.6		0.013
Arm pain	3.7 ± 3.1		2.9 ± 3.1		0.14
	Neck Disability Index (NDI) scale				
Mild disability, (0-15)	13	17.11%	50	65.79%	< 0.01
Moderate disability, (16-30)	18	23.68%	22	28.95%	0.045
Severe disability, (31-50)	45	59.21%	4	5.26%	< 0.01

Table 6: Assessment of clinical findings of quality life for patients after anterior cervical discectomy.

Items	QoL score
Physical function	67.82 ± 12.54
Psychological function	72.79 ± 7.82
Social and emotional aspects	69.88 ± 8.50
Daily activity	74.92 ± 4.68

Discussion

A recent study found that, after anterior cervical discectomy, clinical outcomes increase. Wang (2007) reported good results in a retrospective study of 32 patients who had undergone ACDF for at least five years: NDI scores improved significantly; neck/arm pain decreased markedly, and Japanese Orthopedic Association (JOA) scores rose substantially. [21]

After two years, the increase in neck pain, arm pain, and NDI were noted in significant amounts on 46 patients whose symptomatic spondylosis were analyzed in retrospect by Laratta et al. [22]

Tetrault et al. [23]. has demonstrated that greater symptom duration corresponds with outcomes in cervical myelopathy patients. Longer symptom duration has also been shown to have an influence on clinical outcomes in the case of predominant cervical radiculopathy.

Burneikiene [24] found that patients with cervical radiculopathy who had 1-2 level anterior cervical discectomy operation in the setting of symptoms onset less than six months ago showed a significantly greater decrease on VAS arm pain scores as compared with patients whose symptoms were more than 6-months old.

Likewise, Tarazona et al. found that in a retrospective review of 216 patients who had ACDF for radiculopathy, symptom duration at more than two years were associated with higher neck as well as arm pain than symptom durations at less than six months. [25]

After the anterior cervical procedure, hoarseness and dysphagia are common during the early times. It can be experienced by as low as 1% of patients or as high as 79%. This is because if more anterior cervical discectomy procedures are done, then their frequency increases due to the increase of soft tissue exposure and edema rising. [26 – 28]

It has been demonstrated that doing things like reducing the endotracheal cuff pressure, using dynamic retraction in surgery, applying local steroids within the retropharyngeal space, and ensuring appropriate surgical dissection can reduce their incidence. [29]

While most symptoms go away after six months post-surgery, dysphagia can remain for 6-24 months in 6-9% of cases. The study showed that the majority of patients had postoperative dysphagia and hoarseness as primary conditions, with rates of 9.21% and 6.58%, respectively. [30,31]

Conclusion

Our study discovered that the procedure is effective within relieving pre-operative symptoms, in a high rate of symptomatic improvement as well as satisfactory outcomes at the majority for patients, at which anterior cervical discectomy demonstrated high improved outcomes in terms of decreased risk for medical and surgical complications, resulting to improved clinical results despite potential mortality rate as well as complications, as well as other clinical advantages in terms of low pain and high recovery.

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