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Outcome of Multilevel Anterior Cervical Discectomy and Fusion without Plating

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Abstract

Background: Multilevel anterior cervical discectomy and fusion (ACDF) procedure had traditionally been associated with plating, however, the increase in cost and complications associated with plating led us to investigate results of multilevel ACDF with polyether ether ketone (PEEK) cages without plating and study complication and fusion rates.

Objective: To evaluate the clinical and radiological outcome of patients underwent multilevel Anterior Cervical Discectomy and Fusion (ACDF) using polyether ether ketone (PEEK) cage with no plating.

Patients and Methods: Sixty patients underwent multilevel Anterior Cervical Discectomy and Fusion (ACDF), Surgical approach, using Polyether Ether Ketone (PEEK) cages with synthetic bone graft material with no plating. Their mean age was 48 year. All patients were evaluated clinically and radiologically for a mean time of one year. Assessment done comparing early and late post-operative cervical spinal x-rays for cage subsidence and migration. Improvement in axial neck and radicular pain were assessed using the Visual Analogue Score (VAS). Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS), A p value of ≤ 0.05 was considered statistically significant.

Results: Sixty patients underwent Anterior Cervical Discectomy with Fusion (ACDF) through Cloward approach. F:M ratio was 1:1. Two levels were operated in 75% of patients, while in 25% three levels were operated. The majority 85% underwent operation at C5-6 level, least operated levels were C3-C4 and C6-C7 36.7% and 66.7% underwent operation at C4-C5 level. None underwent operation at C2-C3 level. There was significant improvement in axial neck pain with VAS decreasing from 6 to 2, radicular pain improved from 7 to 2. Only one patient (1.7%) showed radiological subsidence of 3 mm after 6 months of operation with no further progression, cage slippage was observed in 2 patients (3.3%) by 1 mm in both cases but no radiological progression. All patients (100%) showed good fusion.

Conclusion: Multilevel ACDF with PEEK cages without plating showed to be safe option and provided good fusion rates and clinical outcome in our patients.

Keywords: Cervical spondylosis, Multilevel ACDF, ACDF without plating, Subsidence, Migrati on.

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Introduction

Neck pain with or without radiculopathy are the most frequent presentation of cervical disk disease, pain of axial neck caused by spondylosis as well as pain triggered from paravertebral myofascial compartments. Incidence rates of persistent neck pain; defined pain present for the period of 6 months or more, wa s nearly 14% in population based study in Norway [1].

Cervical nerve root compression in the exiting cervical neural foramina produces distinct clinical syndromes of radiculopathy that can usually be correlated with radiological evaluation of the cervical spine. radiculopathy could be presented in the form or sensory or motor changes or both [2].

Neck pain and cervical radiculopathy can be managed by conservative measures, which involves, although not limited to, a broad range of analgesics, muscle relaxants, exercises and life style modifications, most individuals who have cervical disc disease; nearly 90% of cervical disc diseases are managed with these conservative measures; however, severe pain that is resistant to conventional treatment, progressive neurological deficit, and myelopathy are surgical indications [3,4].

Surgical intervention was indicated in patients not responding to conservative measures, those initially presented with disabling pain, neurological deficit or myelopathy and thus, Robinson and Smith (1955) developed the surgical approach to remove the Cervical Intervertebral Disks through an anterior approach in parallel with Cloward in the same decade [5,6] . Since then the surgical approach, with the development of surgical optics and instrumentations, had been developed to include multilevel disk removal, addition of pl ating for lordosis preservation, with autologous or various developed synthetic graft materials.

Patients and Methods

Patient enrolment

This single center study was performed at the Neurosurgical Teaching Center in Rozhawa Emergency Hospital and Hawler Teaching Hospital from January 2020 until January. 2023 in Erbil Governorate in Kurdistan Region of Iraq.

A total of 100 patients had undergone single or multilevel anterior cervical discectomy and fusion at the above mentioned centers and we reviewed the medical records and retrospectively reviewed the data of 40 patients and prospectively collected the data of the remaining 20 patients that were eligible for our inclusion criteria.

Inclusion criteria were:

(1) diagnosis of cervical disc herniation

(2) disease resistant to course of conservative treatment consisting of rest in collar, anti-inflammatory medications, neuroleptic medications and physical therapy for 3-6 months

(3) follow-up of 1 year or more.

The exclusion criteria included cases with:

(1) single level cervical disc herniation

(2) posterior cord compression

(3) patients ossified posterior longitudinal ligament

(4) infection

(5) anterior cervical plating and (6) patients with traumatic disc herniation.

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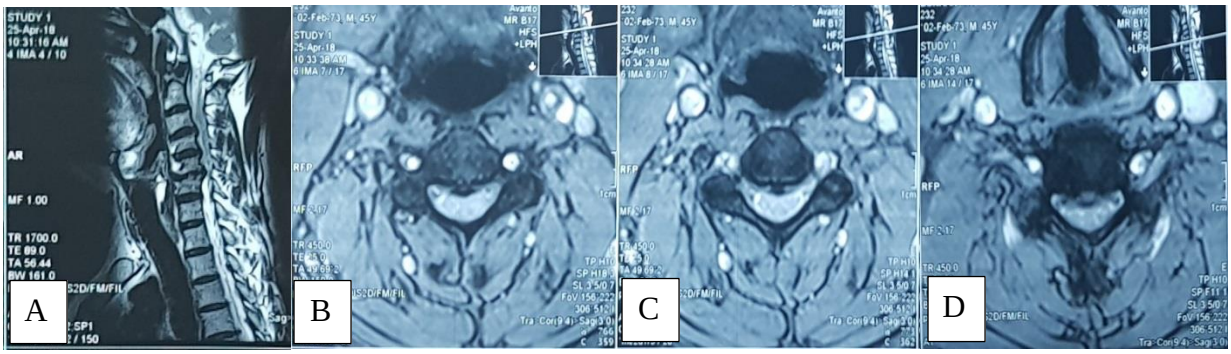
All Patients were diagnosed on the basis of clinical and radiological assessment. Clinical assessment included thorough history and clinical general and neurological bedside examination.

Patient examination and pre-operative preparation

Neurological examination included looking for signs of upper vs. lower motor neuron lesion, through examination of power, sensory level and reflexes. General examination included assessment of the general status of the patient and comorbidities, cardiopulmonary and anesthetic risk assessment. Radiological assessment included cervical spinal X-rays in neutral and dynamic positions; Magnetic Resonance Imaging (MRI) shown in Figure (1) and CT of cervical spine shown in Figure (2) sent in patients were OPLL was suspected.



Figures (1): Figure 1; Shows MR images in, (A) Sagittal, (B) Axial sections at C3-4,(C) C4-5 and (D) C5-6

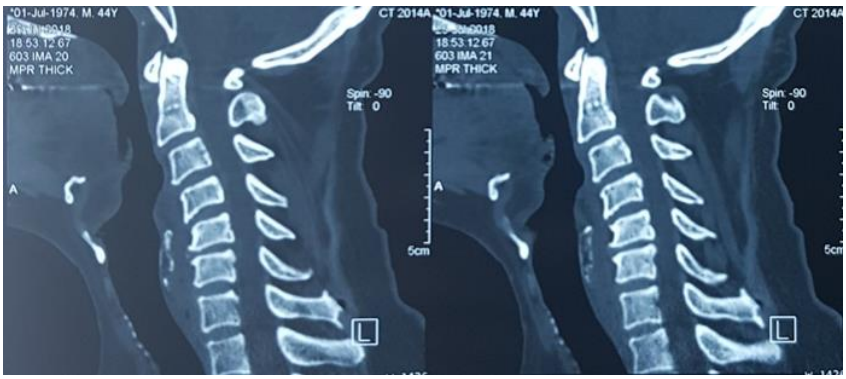


Figure (2): Sagittal sections of the cervical spine of the patient in (Figure 1)

Degree of cervical cord compression, foraminal stenosis and cord signal changes were all assessed. Preoperative investigations that were sent for the patient included hematology panel for complete blood count, coagulation status, renal function test and other comorbidity– specific investigations individualized according to each patient. Along with blood grouping and cross-matching.

Surgical Procedure

The operative procedure, Smith-Robinson approach was performed as follows: Patients were positioned supine, and were tested with neck extension for symptom reproducibility

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before induction of anesthesia; intubation was done with collar for those with worsening of symptoms in extension to limit hyperextension and further cord compression. Shoulders were gently retracted caudally with tape for those involving approaches below C5 vertebra, short-necked and obese patients. Preoperatively level of interest was marked with C-arm radiography Figures (3) and (4) respectively.

Figure (3): Showing per-operative marking with needle

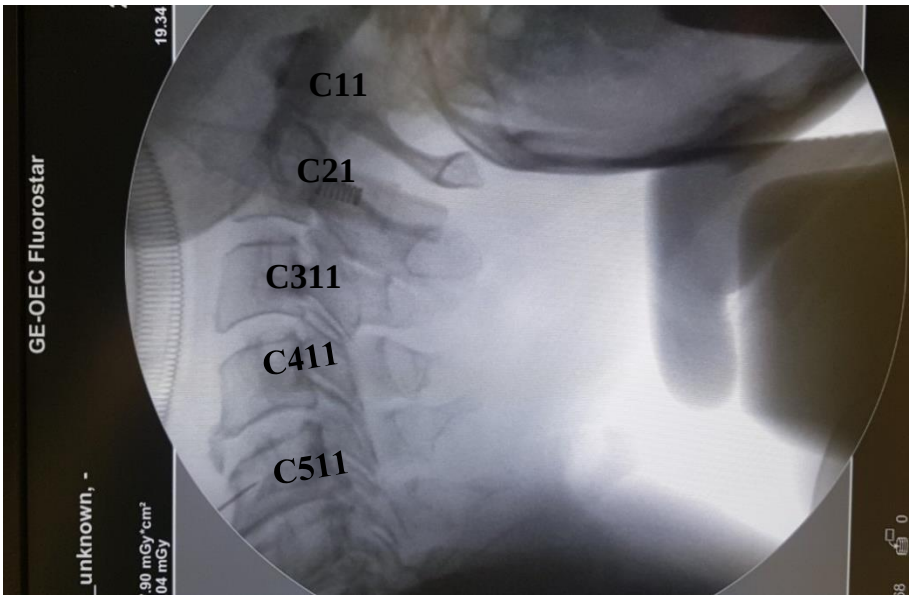

Figure (4): C-arm X-ray image showing the needle at the level of C5 vertebra

Surgical approach started, after disinfection and draping, with an anterior neck skin incision, parallel to an existing skin fold to reduce visibility, or vertical incision according to number of levels and surgeon preference. Side of the approach was mainly on the left side, but also mostly dictated by main side of radiculopathy pain in which the cervical level of interest was approached opposite to the side of the radiculopathy and also surgeon preference. After skin incision and subcutaneous dissection and opening of the platysma, sternocleidomastoid muscle and carotid sheath were found by palpation, and a surgical plane was developed by retracting the sternocleidomastoid and carotid

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sheath laterally and midline structures were medially.

At this stage the neurosurgical operative microscope was brought to the field when available, or the operation was continued with surgical loupes at times when the microscope was not available. Anterior cervical exposure and anterior vertebral bodies were cleared from muscular attachments by monopolar cauterization, and level was confirmed with c-arm radiography following insertion of a short length of a needle into the first visible disc space.

After confirmation of the intended level, Cloward retractors were fixed in place, during placement of the retractors, anesthesia team is requested to deflate the endotracheal tube cuff inflation to half, and the aim of this maneuver is to decrease the pressure on the tracheal wall. Caspar pins are fixed at this stage with no distraction.

Discectomy was started with removing the any osteophytes situated anterior to the disc space through drilling and Kerrison rongeurs until a flat surface was created and access to the anterior disc space opened. Anterior IVD discectomy started with sharp opening of the annulus as shown in Figure (5) , followed by di straction using Caspar retractors and discectomy continued until space was completely cleared from disc, annulus, cartilaginous endplate and removal of the posterior annulus or osteophyte.

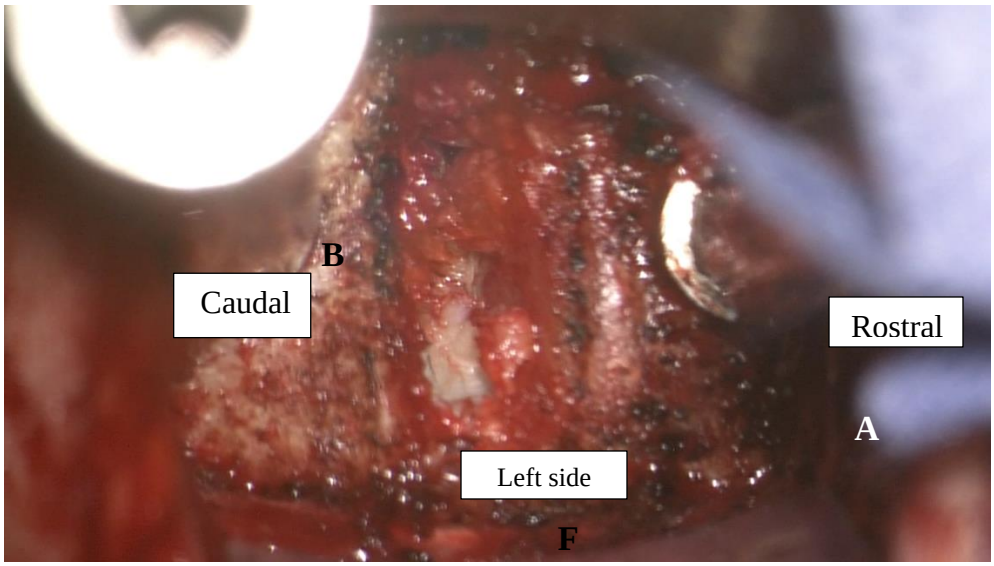

Figure (5): Showing the opening of the annulus after placement of the (A) Cloward retractors and (B) Caspar pins

Then PLL was exposed and opened. Any sub-ligamentous or foraminal fragments can be removed at this stage as shown in Figure (6) which shows a snapshot of an intraoperative maneuver to remove a foraminal disc fragment.

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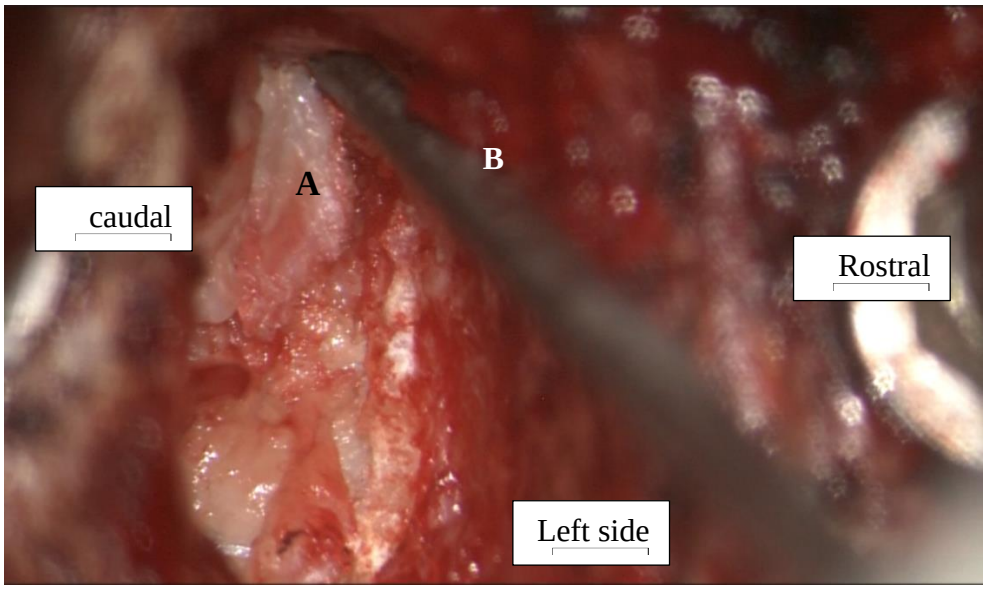

Figure (6): showing;(A) The removal of a foraminal disc fragment, (B) with aid of nerve hook, under the microscope

After completion of discectomy and end palate preparation as shown in Figure (7), size of a PEEK cages were checked first with different testers and the correct size cage, which was resistant to pulling forces after compression, was fixed Figure (8).

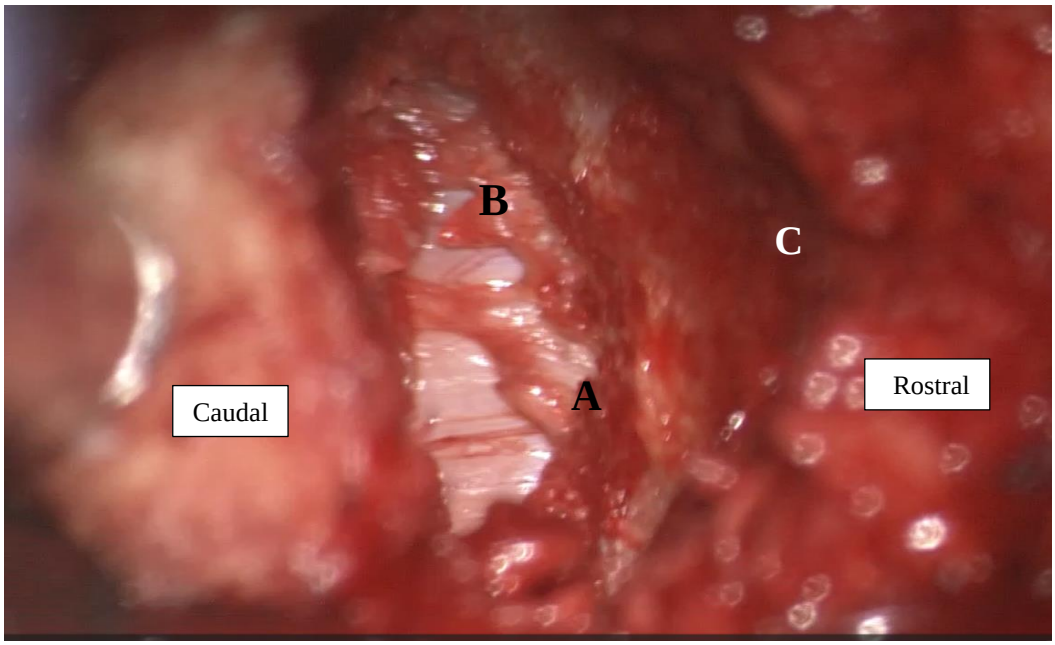

Figure (7): Showing the completion of discectomy; (A) Exposure of the anterior thecal sac. (B) Opening of the PLL. (C) and removal of cartilaginous end-plates

Position of the cage was confirmed with C-arm radiography Figure (8). In Figure (9) we shows example of the cages that were used in some of the patients.

ORIGINAL RESEARCH
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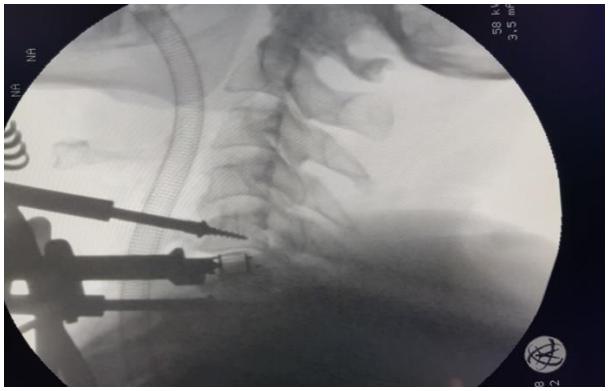

Figure (8): Showing an intraoperative C-arm X-ray of cage placement confirmation

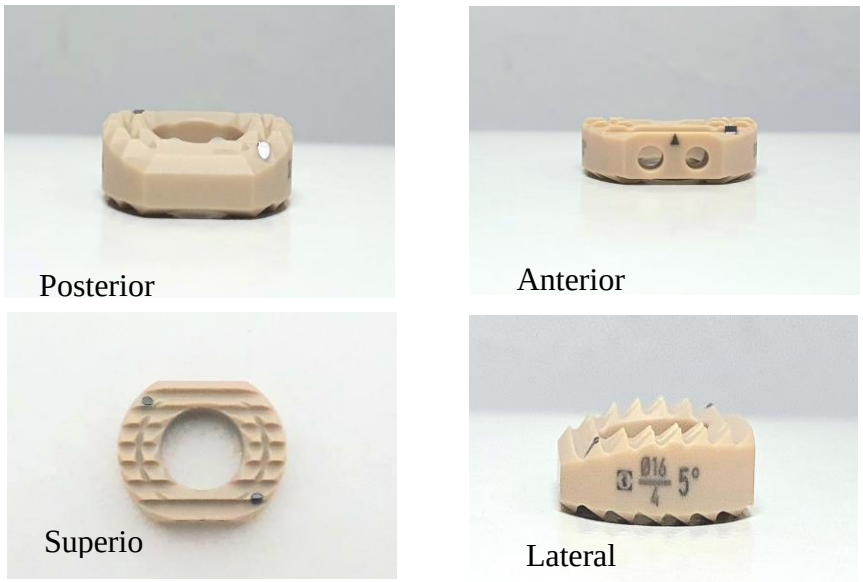

Figure (9): PEEK cages with different views

Sample of the PEEK cages that were used in some of the patients can be seen in Figrue (9). Following finishing of the first level, other level discectomies were done the same way. Wound was thoroughly irrigated at the end of the operation with antibiotic-containing saline solutions, a drain was left in place and field and instruments were covered with 1 g. of Vancomycin powder. Wound closed in 3 layers after ensuring excellent hemostasis. Drain was removed the next day. And patients were mobilized the next day after initial post-operative cervical spine x-ray.

Post-operative management and Follow-up

Post-operatively patients were put in a rigid cervical collar (Philadelphia collar). They were mobilized by physiotherapist the next morning after performing confirmatory cervical spine X-ray in AP and Lateral views. Drains were removed the next day after mobilization.Patients were mostly discharged

ORIGINAL RESEARCH
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on post-operative day 1 or day 2. Rigid cervical collar was kept a duration of 6 weeks, followed by further 6 weeks in a soft collar. After 3 months of collar patients were sent for physiotherapy rehabilitation for the purpose of strengthening of neck muscles.

Data collection

Clinical data collected for the purpose of this study included Age and gender of the patient, comparison of Pre and Post-operative axial neck pain and radicular pain through the Visual Analogue Score (VAS), number of levels operated, exact levels also follow up imaging with Cervical spinal X-rays, which included AP and lateral views on regular basis; first post-operative day followed by 3 months, 6 months and 1 year intervals to evaluate cage slippage, subsidence and fusion and were assessed for rate of fusion, cage slippage and cage subsidence.

Cage slippage was defined as protrusion of the anterior borer of the cage by 1 mm compared to the immediate post-operative imaging. Subsidence was defined as significant if cage migration was more than 2 mm into the adjacent vertebral body.

Statistical Analysis

Statistical analysis was done and data were analyzed using the Statistical Package for Social Sciences (SPSS, version 26). Wilcoxon signed ranks test was used to compare the medians of the same sample but at two different time periods (before and after the operation). A p value of ≤ 0.05 was considered as statistically significant.

Results

Data were analyzed using the Statistical Package for Social Sciences (SPSS, version 26). Wilcoxon signed ranks test was used to compare the medians of the same sample but at two different time periods (before and after the operation). A p value of ≤ 0.05 was considered as statistically significant.

Sixty patients underwent surgery. Their mean age (SD) was 47.8 (8.3) years, and the age range was 31 to 66 years. The largest proportion (45%) of the sample were aged 40-49 years. Half of the patients were males and the male: female ratio was 1: 1. Table (1).

Table (1): Age and gender distribution

	No.	(%)
Age (years)		
< 40	9	(15.0)
40-49	27	(45.0)
50-59	18	(30.0)
≥ 60	6	(10.0)
Gender		
Female	30	(50.0)
Male	30	(50.0)
Total	60	(100.0)

It is evident in Table (2) that there was a significant decrease in the median of neck pain VAS scores from 6.5 before the operation, to 2 after the operation ($p < 0.001$). There was also, a significant decrease in the median of VAS of radicular pain from 7 before the operation to 2 after the operation ($p < 0.001$) Table (2).

ORIGINAL RESEARCH
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Table (2): VAS scores of neck pain and radiculopathy, before and after surgery

	Pre-operative VAS scores			Post-operative VAS scores			
VAS scores	**Mean**	**SD**	**Median**	**Mean**	**SD**	**Median**	**p**
Neck pain	5.97	2.56	6.50	2.07	1.16	2.00	< 0.001
Radicular pain	6.90	1.81	7.00	1.90	1.20	2.00	< 0.001

Two levels were operated on in 75% of the patients, while three levels were involved in 25% of patients. The majority (85%) of the patients underwent an operation on level C5-C6, 66.7% underwent an operation on level C4-C5. The levels C3-C4 and C6-C7 were involved in 36.7% of patients, while none of the patients underwent an operation on C2-C3 Table (3).

Table(3): Operation details (levels)

	No. of total	**% (n = 60)**
Number of levels		
Two	45	(75.0)
Three	15	(25.0)
Levels operated on		
C2-C3	0	(0.0)
C3-C4	22	(36.7)
C4-C5	40	(66.7)
C5-C6	51	(85.0)
C6-C7	22	(36.7)

Our results showed only a total of two patients (3.3%) with cage slippage, each with slippage only in one operated level.

Table(4): Rate of cage slippage

	No.	%
Slippage/migration		
Negative slippage	58	96.7
Positive slippage	2	3.3
Total	60	100.0

In Figure (10) we can see the immediate postoperative X-ray showing good alignment of the cage with the anterior and posterior edges of the rostral and caudal vertebrae.

ORIGINAL RESEARCH
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Figure (10):lateral cervical X-ray

However, after 7 Months routine follow up X-ray showed 1.5 mm anterior slippage of the cage relative to the anterior border of the adjacent vertebrae as shown in Figure (11).

Figure (11): Lateral cervical X-ray showing cage slippage

There was fortunately no further increase in the slippage and no clinical sequelae after 1 year and 2 years or follow-up. Cage subsidence of 3 mms occurred in only 1 patient after 6 months of follow-up rate of (1.7%), as shown in lateral cervical X-ray in Figure (12) and CT scan in Figure (13).

Table (5): Rate of subsidence

Subsidence	No.	%
Negative subsidence	59	98.3
Positive subsidence	1	1.7

There were no clinical symptoms or signs, with excellent fusion and no further progression after 2 years of follow-up.

ORIGINAL RESEARCH
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Figure (12): X-ray of patient with subsidence

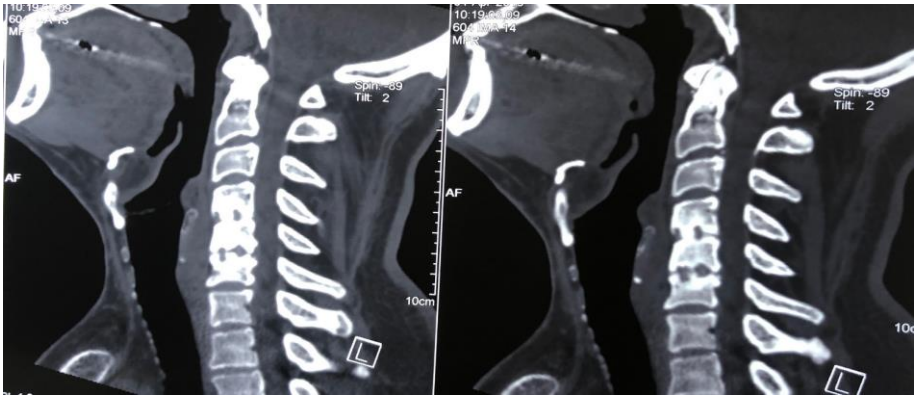

Figure (13): Sagittal cervical CT scan of patient with subsidence

All patients (100%) showed excellent fusion after 12 months of follow-up.

Discussion

Anterior cervical discectomy and fusion (ACDF) has been the most common surgical approach during the past decades, performed for the relief of symptomatic cervical disc herniation with satisfactory results in developing the quality of function and pain relief [7].

Cage-assisted ACDF has so far been shown to be a secure and successful method for treating degenerative disc degeneration [8,9,10,11,12,13].

Although maintaining cervical stability and regaining cervical lordosis might be difficult, the surgical treatment of ACDF is highly safe and successful in terms of treating symptoms. When a spinal segment is fused, the motion of that level is sacrificed, which may raise intradiscal pressure, cause surrounding segments to be more mobile, and cause nearby segments to acquire degenerative conditions [13,14].

Many studies have recommended that ACDF should be performed with plating to avoid pseudoarthrosis, subsidence, and local kyphosis14. In an investigation of 251 individuals who underwent one- or two-level ACDF, Kaiser et al showed that anterior fixation using a plate in one-level and two-level ACDF showed a fusion rate of 96 and 91%, respectively, in comparison with cases without plate fixation (90 and 72%) that was significantly higher [15]. However, none of

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the above studies have been conducted using PEEK cages.

Plating had traditionally been added to ACDF operations involving 2 or more cervical levels with disc replacement. Plating multilevel ACDF had been mentioned to enhance the rate of fusion, decrease rates of cage protrusion and maintain cervical lordosis due to decrease in cervical micro movements [16].

However due to its related complications involving screw problems such as pullout and breakage and esophageal injury though not high, also increased time and cost [17,18,19] during the recent years, we have observed a local and international trend toward less use of plating. A number of publications had studied and compared the results of this operation with and with no plating.

PEEK is a polymer that provides stiffness and compressive strength according to biomechanical studies and has been used for multilevel ACDF due to its lower complication rate compared to other methods [8]. In addition, PEEK cages have more elastic properties than other cages made of metal and reduce the amount of subsidence in the surrounding vertebrae. PEEK cages can exert a stimulating impact on fibroblast proliferation, osteocalcin synthesis, and osteoblasts due to its biocompatibility [20]. In radiography, it is also radiolucent, which makes the assessment of bone fusion easier, and its artifacts can be overlooked in a CT scan and an MRI [21, 22]. Before the PEEK cage, a titanium cage was used in ACDF. Niu *et al*. evaluated 53 patients undergoing level one or two ACDF with a titanium cage or PEEK and showed that cases using the PEEK cage reported a fusion rate of 100%, while the fusion rate in recipients of the titanium cage was 86.5% [23].

Regarding the decrease in pain, Liu et al, Assessed VAS of neck pain and arm pain preoperatively for patients planned to undergo three-level ACDF, follow up at 3 months and the final follow up showed decreased scores from 8.2±1.23 preoperatively to 1.9±1.03 on final follow-up [24].

The above results were similar to our results which showed that all patients experienced marked improvement in both axial and radicular pain after operation. Mean decrease in axial neck pain was from 6.5 to 2 ,while at the same time mean reduction in radicular pain was from 7 to 2 in all patients, which showed to be statistically significant (P value <0.001).

In another study, Ashour et al. studied the efficacy and safety of using PEEK cages in four-level ACDF without plate fixation on 66 patients. They used the Japanese Orthopedic Association (JOA) scoring system for clinical evaluation. The results indicated a substantial development in the JOA score after surgery, which showed the efficiency of this surgical approach [25]. The results of the aforementioned study were consistent with the present study as well that reviewed ACDF without plating for two, three and four level disc disease.

Wang *et al.* conducted a study with the aim of investigating the efficiency of stand-alone PEEK cages in ACDF with two non-continuous levels (skip-level). By evaluating 16 patients who were candidates for ACDF surgery for 2 non-contiguous levels, they showed that the average JOA score in patients increased significantly after a follow-

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up of more than 2 years compared to before surgery [26].

These findings indicate that the clinical efficacy of plate -free ACDF is acceptable in single-level, multi-level, and skip-level cases. In addition, the use of a PEEK cage without plate fixation can reduce the surgical time, which in turn reduces the invasiveness of the procedure [26]. This can be due to the reduction of surgical steps, which eliminates plate and screw installation from the process.

Incidence of cage subsidence after ACDF with no plating varied in the literature. According to Kim et al, subsidence can result in significant poor outcome that could result if marked decrease in the intervertebral disc height and sagittal malalignment occurs, in their study, found out that half of the caged segments/levels (63 out of 144 levels) developed radiological subsidence, resulting in a rate of 43% out of the total of their operated segment. However, according to their study no patients had significant clinical implications [27].

Joo et al, retrospectively reviewed a sample of 42 patients who underwent two-level ACDF, of which twenty-two patients underwent ACDF with cage alone and compared them to another twenty patients who underwent ACDF with plate fixation, th ey found no statistically significant difference in the rate of subsidence between the groups of patients with and without plate augmentation 30% (7/22 patients) and 31.81% (6/20 patients) respectively [28].

Our results showed only 1 patient (1.6%) who experienced radiological subsidence after 6 months of follow up, he was a 52 years old patient who underwent 2 level ACDF, one level developed 3 mm of subsidence, with no clinical implication or subsidence progression after 1 and 2 years of follow-up Figure (3).

In the study of Ashour et al., cage subsidence was reported in only three cases (4.5%) after four-level ACDF without the use of plate fixation during a 2-year follow-up [25]. These findings were consistent with the present results and showed that applying PEEK cages in ACDF without plate fixation rarely causes cage subsidence.

Another study done by Dai et al., which prospectively studied outcome of ACDF in sixty-two patients using interbody cages with and without plating, showed that ACDF performed with a plate had a lower incidence of subsidence than ACDF performed without a palte [29]. This difference can be due to the type of interbody cage used; in the above study, interbody cages containing β-tricalcium phosphate (β-TCP) were used, while in the present study, only one case of subsidence was reported using a PEEK cage in ACDF without plate fixation. It seems that the low incidence of subsidence in ACDF cases using PEEK cages is mostly due to the elasticity of these cages, which is similar to the elasticity of bone.

Igarashi et al., in a study on 78 patients undergoing single-level and 2-level ACDF without plate fixation, showed that PEEK cage cases had much lower subsidence rates than titanium cage cases, it is widely recognized that the incidence of cage subsidence may be connected to a number of variables, including bone density and human error during surgery. These parameters include size, location, and ratio of the cage's contact area [30].

ORIGINAL RESEARCH
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As a result, more research utilizing a large sample with longer follow-up should be done to obtain a definitive result.

Regarding pseudo-arthrosis there had been wide variation in results in literature. In 35 multilevel (three- and four-level), Geisler et al found out 100 % fusion rate ACDFs with plating [31].

Wang et al., observed no difference in the rate of fusion in patients underwent plating vs. those not plated, as their results showed 18 % (7 of 40) of the patients after three levels ACDF with plating had pseudo-arthrosis [32].

In our study all patients (100%) showed good fusion rates with no pseudo-arthrosis observed during follow up.

According to previous reports, such as Sharma et al., who compared patients undergoing ACDF with autograft harvested from iliac bone and those with stand-alone PEEK cages, and Ng et al., who assessed outcome of patients who underwent 2-level ACDF with stand-alone PEEK cages, showed excellent rates of fusion and improvement in pain scores [33,34].

Das et al., pseudarthrosis was reported to be between 6-8% for single-level ACDF and 25% for multi-level treatment [35].

In a four-level ACDF evaluation without the use of plate fixation, pseudarthrosis developed in 7.6% of patients at 24 months of follow-up33. In another evaluation with single-level ACDF, the rate of fusion in subjects receiving PEEK cage with plate fixation was slightly better than PEEK cage without plate fixation (96% vs. 92%), but this difference was not significant [26].

Only two of our patients (3.3%) had cage slippage or protrusion of 1 mm or less; both were female patients, 40 and 49 years old and developed 7 months and 1 year after surgery, respectively. Both were radiologically evident but had no clinical significance or progression on further follow-up and did not need surgical intervention.

Joo *et al*, in their series comparing two groups of patients that underwent 1 level cervical discectomy and fusion with and without plating, and had no cage migration or anterior displacement [28] .

These findings were consistent with the results of the present study and show that cage migration is not high in cases of ACDF without plating independent of the number of surfaces.

Implant slippage/migration, may be caused by improper surgical techniques, including inadequate preparation of adjacent endplates and segmental over distraction during surgery, or may originate from improper cage selection with improper biomechanical position [36].

In a recent study by Ashour *et al.*, evaluating 66 patients undergoing four-level ACDF with stand-alone cervical PEEK cages, they did not show any case of cage migration during a 24-month follow-up period [25]. Therefore, according to the results of the present study, cage migration is rare in people undergoing multilevel ACDF surgery with PEEK cages without plate fixation. Therefore, in general, the results of this surgery are completely acceptable and safe.

Conclusions

Two- or three-level ACDF with PEEK cages without plate fixation can also effectively reduce axial pain or radiculopathy. The incidence rate of cage

ORIGINAL RESEARCH
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migration and subsidence was very low, and no cases of pseudo-arthrosis occurred in the patients. Therefore, considering the less complexity of the ACDF process without plate fixation, as well as avoiding complications related to plating, this approach can also be used to treat patients who are indicated for such intervention.

Recommendations

It is also better to conduct comparative studies on the results after multilevel ACDF with and without plate fixation.

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Conflict of interest: Nil

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نتائج عملية تثبيت الفقرات العنقية المتعددة من الامام بدون تثبيت بالصفيحة

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الملخص

خلفية الدراسة: لقد ارتبط إجراء عملية تثبيت الفقرات العنقية المتعددة من الامامACDF بالصفيحة، و الزيادة في التكلفة والمضاعفات المرتبطة بالصفيحة قادتنا إلى البحث في نتائج ACDF متعدد المستويات باستخدام القرص بولي إيثر إيثر كيتون (PEEK) بدون الصحيفة ودراسة المضاعفات و نتائج التثبيت.

اهداف الدراسة: لتقييم النتائج السريرية والإشعاعية للمرضى الذين خضعوا لاستئصال القرص العنقي الأمامي متعدد المستويات والانصهار (ACDF) باستخدام قفص بولي إيثر كيتون (PEEK) بدون طلاء.

المرضى والطرائق: اخضع (60) مريضًا لاستئصال القرص العنقي من الأمام متعدد المستويات والمتصل Anterior Cervical Discectomy with Fusion (ACDF) ، ونهج كلوارد ، باستخدام أقفاص بولي إيثر كيتون (نظرة خاطفة) مع مادة تطعيم عظمي اصطناعية بدون طلاء. كان متوسط أعمارهم 48 سنة. تم تقييم جميع المرضى سريريًا وشعاعيًا لمدة عام واحد. تم التقييم بمقارنة الأشعة السينية للعمود الفقري العنقي المبكرة والمتأخرة بعد الجراحة من أجل دراسة مدى هبوط القفص وتغير موضعه . تم تقييم التحسن في الرقبة المحورية والألم الجذري باستخدام Visual Analogue Score النتيجة التناظرية المرئية (VAS).

النتائج: خضع ستون مريضًا لعملية استئصال القرص العنقي الأمامي باستخدام طريقة (ACDF) من خلال نهج كلوارد.كانت نسبة F: M هي 1: 1. تم إجراء مستويين في 75٪ من المرضى ، بينما تمت ثلاثة مستويات في 25٪ من المرضى. خضع 85٪ من المرضى للعملية عند مستوى C5-6 ، بينما بقية المرضى تمت العمليات في مستوى C3-C4, و C6-c7 بنسبة 36.7٪ ،، وخضع 66.7٪ من المرضى للعملية عند بمستوى C4-C5. لم يتم إجراء أي عملية على مستوى C2-C3. كان هناك تحسن كبير في آلام الرقبة المحورية مع انخفاض VAS من 6 إلى 2 ، وتحسن الألم الجذري من 7 إلى 2. أظهر مريض واحد فقط (1.6 ٪) انخفاضًا إشعاعيًا قدره 3 ملم بعد 6 أشهر من العملية دون مزيد من التقدم ، وكان انزلاق القفص لوحظ في مريضين (3.2٪) بمقدار 1 ملم في كلتا الحالتين ولكن لم يحدث تقدم إشعاعي. أظهر جميع المرضى (100٪) اندماجًا جيدًا.

الاستنتاجات: أظهر ACDF في مستويات متعددة من الرقبة باستخدام أقفاص PEEK بدون طلاء وتبين أنه خيار آمن وقدم معدلات اندماج جيدة ونتائج سريرية لمرضانا المصابين في مفاصل الرقبة.

الكلمات المفتاحية: انزلاق الفقرات العنقية, عملية ازالة الغضروف بين الفقرات العنقية و التثبيت الامام المتعددة , التثبيت بدون استخدام الصفيحة, انخساف انزلاق الديسك الاصطناعي

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