ORIGINAL STUDY

Comparative Study Between Anterior and Posterior Approaches in the Management of Cervical Spondylotic Myelopathy

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Abstract

Background data: The best surgical approach for managing degenerative cervical myelopathy (DCM) remains debatable. Any surgical intervention for DCM aims to provide decompression of adequate neural elements and preserve mechanical stability with the least morbidity and the best long-term outcome. Due to the heterogeneous nature of DCM, multiple approaches and interventions can be used.

Purpose: This study aims to compare anterior cervical discectomy and fusion (ACDF) and posterior laminectomy with and without lateral mass fixation (LMF) in the treatment of DCM regarding radiological and clinical outcomes.

Study design: This is a retrospective, case series study.

Patients and methods: Twenty patients who underwent ACDF and 20 patients who underwent cervical laminectomy with and without LMF were recruited in this study. Modified Japanese Orthopedic Association (mJOA) score and myelopathy scale (MS) were used for clinical assessment. Postoperative complications, recovery rate, and operative blood loss are recorded. The cervical curve and canal diameter were assessed.

Results: A total of 40 patients were recruited in this study, including 33 males and seven females, with a mean age of 58.8 ± 10.27 years. There was significant improvement in cervical angle in the anterior group (19.38 ± 3.5 vs. 16.5 ± 6.4, P = 0.043) and canal diameter in the posterior group (9.5 ± 0.76 vs. 11.1 ± 1.98, P = 0.01). There were no significant differences between both groups on the mJOA scale (13.5 ± 4.16 vs. 12.1 ± 1.7, P = 0.197), MS (5.1 ± 1.6 vs. 5.5 ± 1.07, P = 0.341), and complication rate (P = 0.14).

Conclusion: Our data suggest that both anterior and posterior approaches were equivalent in treating DCM. Each case should be evaluated carefully to determine the best surgical approach.

Keywords: Cervical, Discectomy, Myelopathy, Spondylosis

Introduction

The pathophysiology of degenerative cervical myelopathy (DCM) is caused by multiple factors. The most important factors are static and dynamic insults on the spinal cord. The static factor is persistent compression on the spinal cord by spondylotic changes (degenerative disk bulge, osteophytes, bulking ligamentum flavum, and hypertrophic facet joints). When mechanical pressure exceeds the stabilization effects of spondylotic changes, the spinal segments become unstable and hypermobile and repetitive trauma to the cord acts as a dynamic factor for symptomatic myelopathy [1].

The aim of any surgical intervention for DCM is to achieve adequate decompression of the cervical
cord and preserve the stability of the cervical spine with the least morbidity and the best long-term outcome. Due to the heterogeneous nature of DCM, multiple approaches and interventions can be used. Anterior approaches include anterior cervical disectomy and fusion (ACDF) and anterior cervical corpectomy and fusion. ACDF technique is used to decompress anterior causes such as multiple degenerative disk bulge, osteophytes, and hypertrophic posterior longitudinal ligament and restore cervical lordosis. However, it may be associated with high rates of pseudarthrosis, graft migration, and spinal cord injury, especially with an increased number of operated cervical levels. Posterior approaches include posterior laminectomy with or without lateral mass fixation (LMF) and laminoplasty. It is commonly indicated in older patients with posterior compression of the cord, such as bulking ligamentum flavum and hypertrophic facet joints. However, they may be associated with progressive kyphosis, C5 nerve root palsy, persistent axial neck pain, late instability, and vertebral artery injury with screw insertion [2–4].

This study aims to compare ACDF and posterior cervical laminectomy with and without LMF for managing DCM regarding radiological and clinical outcomes.

Patients and methods

A retrospective, comparative study was conducted on 40 patients suffering from DCM to compare anterior and posterior approaches for managing DCM. The study was conducted in the Neurosurgical Departments at Ain Shams University Hospital and Kobry Elkobba Armed Forces Hospital from January 2017 to December 2020. Approval for the study was obtained from the Ain Shams University Ethics and Scientific Research Committee.

Inclusion criteria were all adult patients more than or equal to 18 years with DCM caused by multilevel pathology (≥2 segments). All patients have positive evidence of DCM on Magnetic resonance imaging (MRI) and have failed adequate conservative therapy. Exclusion criteria were patients with isolated cervical radiculopathy and single-level intervertebral disk herniation, ossified posterior longitudinal ligament, concurrent neurological conditions, that is, stroke, cerebrovascular accidents, peripheral neuropathy, and motor neuron diseases, previous cervical spine surgery, cervical deformity, any contraindication to general anesthesia, other causes of myelopathy, for example, traumatic, neoplastic, infection, vascular, and congenital causes.

Out of 88 symptomatic patients with clinically and radiographically confirmed DCM reported in our institutions and after applying our exclusion criteria, only 40 patients were allocated for this study.

Clinical evaluation

Once the patient matched our inclusion criteria, the patient was recorded in the study, and informed consent was taken. The selection of the surgical approach, either anterior or posterior, was determined according to the surgeon’s preference. All preoperative data regarding age, sex, complete history, and clinical examination were recorded. We used the modified Japanese Orthopedic Association (mJOA) score for functional assessment, which is an investigator-administered tool and an 18-point scale that addresses upper (five points) and lower extremity (seven points) motor function, sensation (three points), and micturition (three points). A score of 18 reflects no neurological deficits, whereas a lower score indicates a greater degree of disability and functional impairment. In the myelopathy scale (MS) for the assessment of myelopathic signs, there are five functions (gait, hand function, proprioception, paresthesia, and bladder function) based on which myelopathy severity is assessed. The score ranges from 5 to 18. A higher score indicates a greater degree of disability.

Radiographic evaluation

Plain cervical radiography (anteroposterior and lateral views) and computed tomography (CT) scans were performed for all patients for the assessment of sagittal alignment and cervical lordosis angle and detection of any cases of ossified posterior longitudinal ligament and presence of osteophytes and its degree. A cervical spine MRI was done for all patients to assess radiographic details of the spinal cord, nerve roots, intervertebral disk, ligament, and the cerebrospinal fluid (CSF).

Surgical technique

Anterior approach: a multilevel ACDF was performed under general anesthesia with the patient in a supine and neutral position of the head. Before the incision, we get the lateral image on the C-arm for localization of the level. The transverse skin incision was made at the anterior border of the sternomastoid muscle; then, a standard subplatysmal dissection down the adventitial cervical fascia in a plane medial to the carotid sheath and lateral to the...
trachea and the esophagus was made. After that opening of the prevertebral fascia was done with dissection of the right and left longus coli muscle to ensure medial to lateral orientation. Microscopic discectomy was performed with an opening of the posterior longitudinal ligament.

**Posterior approach:** A standard laminectomy with and without lateral mass screw fixation was conducted under general anesthesia with the patient in the prone and flexion position of the head. Before the skin incision, we obtained the lateral image on the C-arm for localization of the intended level. Midline longitudinal skin incision and opening of the posterior neck muscle was made through the white raphe. After dissection of the desired lamina, careful laminectomy was performed. If a lateral mass screw was placed, it was done before laminectomy (Figs. 1–3).

**Outcome parameters**

Clinical outcome parameters included the following: postoperative mJOA, MS, and recovery rate percentage. Recovery rate percentage was measured using the following formula: postoperative mJOA—preoperative mJOA × 100/(17) full score—preoperative JOA score/(17) full score—preoperative JOA score [5].

Radiographic outcome parameters included the following: postoperative canal diameter and postoperative Cobb’s angle of the cervical curve. Postoperative canal diameter was measured through the center of each vertebra and intervertebral disks from C2 to C7 on 10 transverse planes on a midsagittal T2W image [6]. Postoperative Cobb’s angle of the cervical curve is measured by joining perpendiculars to lines drawn parallel to the lower end plates of C2 and C7.

Perioperative complications were recorded within 30 days after the surgical procedure. Postoperative follow-up protocol was performed at 1, 3, and 6 months and then at 6-month intervals and included assessment of clinical outcome (mJOA, MS, and recovery) and radiographic outcome (Cobb’s angle...
of the cervical curve and canal diameter). Radiological follow-up was conducted using a plain radiograph of the cervical spine at each visit, where MRI cervical spine was done after 1 month postoperatively. The minimum period of postoperative follow-up was 12 months.

**Statistical analysis**

Mean, Standard deviation, and range were used to express parametric numerical data, whereas median and interquartile range (IQR) were used to express nonparametric numerical data. We used MedCalc, version 18.11.3 for data entry, processing, and statistical analysis. Paired t test, χ² test, Pearson’s correlation analysis, and receiver operating characteristic curve analysis were used to evaluate significance. Data were presented, and analysis was done according to the type of data (parametric and nonparametric) obtained for each variable. P values less than 0.05 (5%) were statistically significant.

**Results**

A total of 40 patients met the inclusion criteria for the study and completed a minimum 12-month follow-up with a mean follow-up of 21 ± 10.12 months (range, 12–27 months). Patients were classified according to the surgical approach into two groups: the anterior group (n = 20) submitted for ACDF and the posterior group (n = 20) submitted for laminectomy with (n = 15) and without (n = 5) LMF.

**Epidemiological data**

The mean age was 58.8 ± 10.27 years (range, 40–70 years). Thirty-three patients were males and seven were females. There were no significant differences regarding age and sex (P > 0.05). The duration of symptoms was longer in the posterior group (32.35 ± 11.3; range, 5–80) than that in the anterior group (19.3 ± 11.29; range, 7–42; P = 0.00).

**Preoperative parameters**

The preoperative mJOA scale in the anterior group was 10.1 ± 2.8 (range, 4–14) versus 9.8 ± 2.6 in the posterior group (range, 5–14), with no statistical significance (P = 0.14). The preoperative MS in the anterior approach group was 6.9 ± 1.4 (range, 4–10) versus 7.1 ± 1.5 in the posterior group (range, 4–10), with no statistical significance (P = 0.19).

There were no significant differences in preoperative Cobb’s angle of the cervical curve between both groups, 18.4 ± 3.2° (range, 12–23°) in the anterior group versus 16.61 ± 7.5° (range, 3–29°) the posterior group (P = 0.334). The preoperative canal diameter in the anterior group was 9.17 ± 0.75 (range, 7.40–10.21) versus 8.03 ± 1.7 in the posterior group (range, 3.88–11.36) (P = 0.388).

**Operative data**

The number of operated cervical levels in the posterior group was 3.55 ± 0.74 (range, 2–4) versus 3.65 ± 0.65 in the anterior group (range, 2–4), with no statistical significance (P = 0.24). The operative blood loss was fewer in the anterior approach versus the posterior approach (102.45 ± 35.3 vs. 328 ± 86.8, P < 0.05). Operative time was shorter in the anterior approach versus the posterior approach (179 ± 12.17 vs. 194 ± 17.24, P = 0.377) (Table 1).

**Outcome parameters**

At 12-month postoperative follow-up, there were no significant differences between both groups of patients regarding the mJOA scale (13.5 ± 4.16 vs. 12.1 ± 1.7, P = 0.197) and no significant difference in the MS (5.1 ± 1.6 vs. 5.5 ± 1.07, in the anterior and posterior groups, respectively, P = 0.341). There

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**Table 1. Perioperative data in both groups of patients.**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Anterior group (N = 20)</th>
<th>Posterior group (N = 20)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>57.2 ± 9.08 (40–70)</td>
<td>59.3 ± 12.37 (30–79)</td>
<td>0.539</td>
</tr>
<tr>
<td>Duration of symptoms (months)</td>
<td>19.3 ± 11.3 (7–42)</td>
<td>32.35 ± 11.29 (8–50)</td>
<td>0.00096</td>
</tr>
<tr>
<td>Males [n (%)]</td>
<td>16 (80)</td>
<td>17 (85)</td>
<td>0.677</td>
</tr>
<tr>
<td>Preoperative mJOA scale [n (%)]</td>
<td>10.1 ± 2.8 (4–14)</td>
<td>9.8 ± 2.6 (5–14)</td>
<td>0.14</td>
</tr>
<tr>
<td>Preoperative MS</td>
<td>6.9 ± 1.4 (4–10)</td>
<td>7.1 ± 1.5 (4–10)</td>
<td>0.19</td>
</tr>
<tr>
<td>Preoperative cervical angle</td>
<td>18.4 ± 3.2° (12–23°)</td>
<td>16.61 ± 7.5° (3–29°)</td>
<td>0.334</td>
</tr>
<tr>
<td>Preoperative canal diameter (mm)</td>
<td>9.17 ± 0.75 (7.40–10.21)</td>
<td>8.03 ± 1.7 (3.88–11.36)</td>
<td>0.388</td>
</tr>
<tr>
<td>Operated cervical levels</td>
<td>3.55 ± 0.74 (2–4)</td>
<td>3.65 ± 0.65 (2–4)</td>
<td>0.24</td>
</tr>
<tr>
<td>Operative blood loss (ml)</td>
<td>102.45 ± 35.3 (50–180)</td>
<td>328 ± 86.8 (160–550)</td>
<td>0.000</td>
</tr>
<tr>
<td>Operative time (min)</td>
<td>179 ± 12.17 (54, 156–190)</td>
<td>194 ± 17.24 (70, 180–250)</td>
<td>0.377</td>
</tr>
</tbody>
</table>

mJOA, modified Japanese Orthopedic Association; MS, myelopathy scale.
Table 2. Postoperative outcomes in both groups at 12-month follow-up.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Anterior group (N = 20)</th>
<th>Posterior group (N = 20)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postoperative mJOA scale</td>
<td>13.5 ± 4.16 (2–17)</td>
<td>12.1 ± 1.7 (8–14)</td>
<td>0.197</td>
</tr>
<tr>
<td>Postoperative MS</td>
<td>5.1 ± 1.6 (4–10)</td>
<td>5.5 ± 1.07 (4–8)</td>
<td>0.341</td>
</tr>
<tr>
<td>Postoperative cervical angle (deg.)</td>
<td>19.38 ± 3.5 (13–24.7)</td>
<td>16.5 ± 6.4 (5.38–29.4)</td>
<td>0.043</td>
</tr>
<tr>
<td>Postoperative canal diameter (mm)</td>
<td>9.5 ± 0.76 (7.93–10.51)</td>
<td>11.1 ± 1.98 (7.74–16.13)</td>
<td>0.01</td>
</tr>
<tr>
<td>Recovery rate %</td>
<td>49.5 ± 27.2 (−15.38–87.50)</td>
<td>39.51 ± 11.30 (20–63.64)</td>
<td>0.154</td>
</tr>
<tr>
<td>Complications [n (%)]</td>
<td>6 (30)</td>
<td>4 (26.7)</td>
<td>0.04</td>
</tr>
</tbody>
</table>

mJOA, modified Japanese Orthopedic Association; MS, myelopathy scale.

Table 3. Summary of reported complications in our series.

<table>
<thead>
<tr>
<th>Complications</th>
<th>Anterior group (N = 20) [n (%)]</th>
<th>Posterior group (N = 20) [n (%)]</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number</td>
<td>5 (25)</td>
<td>5 (25)</td>
<td></td>
</tr>
<tr>
<td>New neurological symptoms</td>
<td>1 (5)</td>
<td>1 (5)</td>
<td></td>
</tr>
<tr>
<td>Dural tear with CSF leak</td>
<td>1 (5)</td>
<td>1 (5)</td>
<td></td>
</tr>
<tr>
<td>Postoperative C5 palsy</td>
<td>1 (5)</td>
<td>1 (5)</td>
<td></td>
</tr>
<tr>
<td>Adjacent disk prolapse</td>
<td>2 (10)</td>
<td>1 (5)</td>
<td></td>
</tr>
<tr>
<td>Wound infection</td>
<td>1 (5)</td>
<td>1 (5)</td>
<td></td>
</tr>
<tr>
<td>Postoperative kyphosis</td>
<td>1 (5)</td>
<td>1 (5)</td>
<td></td>
</tr>
<tr>
<td>Persistent neck pain</td>
<td>3 (15)</td>
<td>1 (5)</td>
<td></td>
</tr>
<tr>
<td>Vertebral artery injury</td>
<td>1 (5)</td>
<td>1 (5)</td>
<td></td>
</tr>
<tr>
<td>P value</td>
<td>0.14</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

were no significant differences regarding the postoperative recovery rate (P = 0.154).

There was a significant decrease in postoperative cervical angle in the posterior group versus the anterior group (19.38 ± 3.5 vs. 16.5 ± 6.4, P = 0.043). Postoperative canal diameter significantly improved in the posterior group versus the anterior group (9.5 ± 0.76 vs.11.1 ± 1.98, P = 0.01) (Table 2).

Morbidity

A new neurological deficit was reported in one case of the anterior group with loss in motor power from grade 4 to grade 3. An MRI cervical spine showed cord contusion and edema where the patient underwent further posterior laminectomy with improving motor power to grade 4 after 2 months postoperatively. CSF leak occurred only in one case of the anterior approach, which was managed by the insertion of a lumbar drain for 4 days. Postoperative C5 palsy occurs only in one case of the posterior approach, with gradual improvement over 3 months with conservative management. Reoperation surgery was reported in four (20%) cases in the anterior group: two cases with adjacent level prolapsed cervical disk in the first year postoperatively, one case with wound infection that needed surgical debridement, and one case with loss of motor power as mentioned above. There was one case of postoperative kyphosis and three cases complaining of persistent postoperative neck pain for a 12-month follow-up in the posterior approach group. Also, only one case of dural tear occurs in the posterior approach group managed by primary repair and one case of intraoperative hemorrhage from vertebral artery injury during lateral mass screw insertion. Postoperative angiography was accepted, and the patient needed no intervention. Persistent axial pain was present in the posterior group in three cases. There was no significant difference between the two groups in terms of complications (P = 0.14). There was no significant dysphagia, pseudarthrosis, deep venous thrombosis, or pulmonary embolism (Table 3).

Discussion

In this comparative, retrospective study, we performed clinical and radiological evaluation after anterior and posterior intervention to manage DCM on 40 patients using the mJOA and MS as clinical outcome parameters and C2–C7 Cobb’s angle and cervical canal diameter measurement as a radiological outcome parameter for comparison between both groups. Our results reported that there was a nonsignificant difference regarding the postoperative mJOA scale and MS between the anterior and posterior groups. Although the recovery rate was higher in the anterior group than the posterior group, there was no significant difference as regards postoperative recovery and complication rates. Postoperative canal diameter change was greater in the posterior surgery than the anterior group. The reoperation rate was higher in the anterior group. Postoperative C5 palsy and axial neck pain were higher in the posterior group.

Epidemiologic findings

In the Piazza et al. [7] study, the mean age for the anterior group was 55.3 years, while the mean age for the posterior group was 65.5 years. In the Asher et al. [4] study, the median age for the anterior group was 61 years and the median age for the
posterior group was 66 years. In our study, the mean age for the anterior and posterior groups was 57.3 and 63.6 years, respectively. In our study, male sex in the anterior and posterior groups were 80 versus 90%, respectively. Asher et al. [4] observed no differences in male sex between both anterior and posterior groups (47 vs. 52%). Piazza et al. [7] reported no differences in male sex between both anterior and posterior groups (54.5 vs. 50%).

**Preoperative clinical data**

In our study, the preoperative mJOA score was 9.2 ± 2.5, and also the preoperative mJOA score was more severe in the posterior group (8.4 ± 2.6). Kato et al. [8] mentioned in their study that the preoperative mJOA score had a mean of 12.7 ± 2.5, and the preoperative mJOA score was significantly more severe in the posterior group (11.8 ± 2.8). Asher et al. [4] reported in their study a significantly low preoperative mJOA score in the posterior group versus the anterior group (13 vs. 12, \( P = 0.02 \)). In our study, the number of operated cervical segments in the anterior approach and posterior approach were 3.55 and 3.65, respectively, to allow to compare between more homogeneous populations. Fehlings et al. [9] conducted their study on both single-level and multilevel cervical myelopathic patients. Asher et al. [4] studied cervical myelopathic patients with three cervical levels of affection or more. Ghogawala et al. [11] reported that the number of operated cervical segments in the anterior and posterior approaches were 2.1 and 3.1, respectively. Piazza et al. [7] mentioned that the number of operated cervical segments in the anterior and posterior approaches were 1.64 and 3.31, respectively.

**Operative data**

In our study, there was no significant dysphagia, pseudarthrosis surgical site infection, deep venous thrombosis, or pulmonary embolism. A new neurological deficit (2.5%) was present only in the anterior approach group. CSF leak (2.5%) occurred only in one case of the anterior approach, which was managed by the insertion of a lumbar drain for 4 days. Postoperative C5 palsy (5%) occurs only in the posterior approach, but the reoperation rate was present in four cases only in the anterior approach group. There was one case of postoperative kyphosis and three cases complaining of persistent postoperative neck pain for a 12-month follow-up in the posterior approach group. Only one dural tear was reported in the posterior approach group, managed by primary repair. Persistent axial pain was present only in the posterior approach group in two (5%) cases. However, no significant difference was present in the overall complication rate between both groups.

In our analysis of more than 40 patients, anterior approach and posterior approach complications were 30 and 35%, respectively, and there was only one case of intraoperative hemorrhage from vertebral artery injury during lateral mass screw insertion. Only pulmonary affection (2.5%) occurs in one case of the anterior approach group due to postoperative cord compromise. No postoperative hematoma was present in our study. In terms of postoperative complications in the management of DCM, Luo et al. [10] reported that the reoperation rate was superior in the anterior group. In our study, we also found that the main complication in the anterior group was the need for a second posterior intervention because of incomplete decompression of the cervical canal due to buckling of the ligamentum flavum.

Ghogawala et al. [11] confirmed in their study of 50 patients that anterior approach and posterior approach complications were 17.9 and 13.6%, respectively. Boakye et al. [12] confirmed in their study a complication rate of 11.9% for anterior and 16.4% for posterior procedures, and they reported pulmonary complications (3.6%) and postoperative hemorrhage or hematoma (2.3%), thromboembolic complications (0.73%), dysphagia (2.7%), and infection (0.4%). Asher et al. [4], in their study of 245 patients, reported that complications include significant dysphagia (1%), postoperative hematoma (1%), postoperative neurological deficit (4%), thromboembolic complications (2%), and CSF leak (1%). The reoperation rate was present in four cases in both approaches. Zhai et al. [13] mentioned in their study that axial neck pain (16%) was one of the two significant complications after posterior cervical surgery, and they observed that some patients suffered from constant postoperative neck pain, which may be due to muscle atrophy and detaching of the muscles from C2 or C7 [11,14].

**Clinical and functional outcomes**

In this comparative study, canal diameter change was better in the posterior group. mJOA score for recovery rate was superior in the anterior approach postoperatively, and that may be due to direct decompression of the cord and correction of cervical lordosis angle in anterior intervention, but in the late follow-up, there were no significant differences in terms of postoperative recovery, improvement, and complications rates. In a multicenter study, Fehlings et al. [9] reported the same clinical outcomes and complication results between anterior
and posterior interventions. Hirai et al. [15] reported more improvement in mJOA scores and even recovery rate after 2 years in the anterior group when compared with the posterior one.

In their meta-analysis, Luo et al. [10] found that postoperative mJOA score reported more improvement in the anterior approach; however, at the last follow-up, both had the same recovery rate between both approaches. Liu et al. [16] also reported similar results. In their comparative study, Kristof et al. [17] reported no significant difference in postoperative mJOA score between anterior and posterior approaches after 1 year of follow-up. Lawrence et al. [20] reported that improvements in mJOA scores were similar between the two approaches, with more improvement in canal diameter in the posterior approach. El-Zuway et al. [3] made a new scale for the evaluation of myelopathic signs in accordance with clinical outcomes after surgical intervention for myelopathic patients. In our study, we used the MS with the mJOA scale, and there was significant conjunction between improvement in the degree of myelopathy and both scales.

Regarding cervical lordosis angle assessment for DCM patients, Elsebeck et al. [19] reported increased postoperative kyphosis after posterior decompression. Our study recorded that there was an improvement in cervical lordosis angle in both groups postoperatively and at the last follow-up. Abou-Zeid and Hamada [18] reported in their series the advantage of ACDF in getting a better curve in comparison to the posterior approach. This can be achieved in the posterior group by avoiding detachment of deep muscles from C2 and C7 and avoiding extension of muscle splitting to the facet joint and preoperative patient selection with normal lordosis or mild degree of kyphosis.

Both Liu et al. [16] and Lawrence et al. [20] selected laminoplasty only as a posterior surgical intervention in their study and reported that canal diameter change was greater after posterior surgery. In their comparative study, Piazza et al. [7] also used laminectomy only as a posterior decompression and detected more increase in canal diameter in the posterior surgery group. In our study, we used laminectomy with and without fusion for posterior intervention to prevent postoperative kyphosis in the late follow-up, especially in patients with a preoperative decrease in cervical lordosis angle.

There were some limitations, including the retrospective nature of the study with small numbers of selected patients and a short period of follow-up. Randomized large sample size studies with long-term follow-up prospective studies are recommended.

Conclusion

Our data suggest that both anterior and posterior approaches were equivalent in the treatment of DCM. Each case should be evaluated carefully to determine the best surgical approach.

Conflict of Interest

There are no conflicts of interest.

Abbreviation list

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>ACDF</td>
<td>Anterior cervical discectomy and fusion</td>
</tr>
<tr>
<td>CSF</td>
<td>Cerebrospinal fluid</td>
</tr>
<tr>
<td>CT</td>
<td>Computed tomography</td>
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<tr>
<td>DCM</td>
<td>Degenerative cervical myelopathy</td>
</tr>
<tr>
<td>LMF</td>
<td>Lateral mass fixation</td>
</tr>
<tr>
<td>MRI</td>
<td>Magnetic resonance imaging</td>
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<tr>
<td>MS</td>
<td>Myelopathy scale</td>
</tr>
<tr>
<td>mJOA</td>
<td>modified Japanese Orthopedic Association</td>
</tr>
<tr>
<td>IQR</td>
<td>Interquartile range</td>
</tr>
<tr>
<td>SD</td>
<td>Standard deviation</td>
</tr>
</tbody>
</table>

References

study of anterior decompression with fusion and posterior decompression with laminoplasty for the treatment of cervical spondylotic myelopathy. Spine J 2011;36:


المصطلح العربي

دراسة مقاورة بين الدخول الأمامي والخلفي في علاج حالات انتقال الشوكي

البيانات الكاملة

لا تزال أفضل طريقة للتدخل الجراحي لحالات انتقال الشوكي الفقري جاملا للتفتيش. تمثل حالة أخذ أي تدخل جراحي لحالات انتقال الشوكي الفقري في توفير ضغط مناسب للشرايين الدموية والحفاظ على الأنسجة التمثيلية. تم استخدام الطرق المحيطة في أوقات معالجات انتقال وافراً للتقنية على مدى العقود. نظرًا لتوسع العروض الملونة، تحدث انتقال الشوكي الفقري، يمكن استخدام آليات مختلفة للتدخلات الجراحية

المعرض من الدراسة

المقارنة بين النهج الأمامي (استنتاج القصص الفقري الأمامي مع المدمج) والنهج الخلفي (استنتاج البقع الخلفية) لعلاج انتقال الشوكي الفقري مع مقاومة للتناسب السريري والإشعاعي ومعدلات الشفاء والمضاعفات.

تصميم الدراسة

دراسة سلسلة حالات ذات رجوع

المريض والطريقة

تم إجراء 20 مريضاً عن طريق استنتاج القصص الفقري الأمامي والدمج. وتم إجراء 20 مريضاً عن طريق استنتاج القصص الفقري الخلفي. تم استخدام الطرق المحيطة في أوقات معالجات انتقال والشفاء. تم استخدام الأدوات مثل الاستنتاجات الشفوية والخلايا الخفيفة والمعدات والمواد والطرق. تم استخدام الطرق المحيطة في أوقات معالجات انتقال والشفاء. وتم استخدام الأدوات مثل الاستنتاجات الشفوية والخلايا الخفيفة والمعدات والمواد والطرق. وتم استخدام الطرق المحيطة في أوقات معالجات انتقال والشفاء.

النتائج: تم تضمين 80 مريضاً عن طريق استنتاج القصص الفقري الأمامي والدمج. وتم إجراء 80 مريضاً عن طريق استنتاج القصص الفقري الخلفي. تم استخدام الطرق المحيطة في أوقات معالجات انتقال والشفاء. وتم استخدام الأدوات مثل الاستنتاجات الشفوية والخلايا الخفيفة والمعدات والمواد والطرق. وتم استخدام الطرق المحيطة في أوقات معالجات انتقال والشفاء.

أعراض التصوير: 80 مريضاً عن طريق استنتاج القصص الفقري الأمامي والدمج. وتم إجراء 80 مريضاً عن طريق استنتاج القصص الفقري الخلفي. تم استخدام الطرق المحيطة في أوقات معالجات انتقال والشفاء. وتم استخدام الأدوات مثل الاستنتاجات الشفوية والخلايا الخفيفة والمعدات والمواد والطرق. وتم استخدام الطرق المحيطة في أوقات معالجات انتقال والشفاء.

ب) في المجموعة الأمامية والخلفية على التوالى، 0.341 (P=0.14).

الخلاصة

الباحثون يشيرون إلى أن كل من النهج الأمامي والخلفي كانا مكافئين في علاج انتقال الشوكي الفقري. يجب قيام كل حالة بعناية تحديد أفضل نهج جراحي.