

Early vs Delayed Surgical Intervention in Degenerative Cervical Myelopathy: An Outcome Analysis

Suraj Kant Mani¹, Arti Kumari², Dharmendra Kumar³

¹Assistant Professor, Department of Neurosurgery, Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar, India

²Assistant Professor, Department of Microbiology, Netaji Subhas Medical College and Hospital, Bihta, Patna, Nihar, India

³Junior resident, Department of physiology, Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar, India

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Corresponding Author: Suraj Kant Mani

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Abstract:

Background: Degenerative cervical myelopathy (DCM) is a progressive condition leading to spinal cord compression and neurological deficits. The timing of surgical intervention plays a crucial role in determining outcomes.

Objective: To compare clinical outcomes between early and delayed surgical intervention in patients with DCM.

Methods: A prospective study was conducted over 9 months including 50 patients (25 early surgery, 25 delayed surgery). Outcomes assessed included neurological recovery, complication rates, hospital stay, and functional outcome. Statistical analysis was performed using chi-square and t-test.

Results: Early surgery showed significantly better neurological recovery (80% vs 55%, $p=0.01$) and functional outcome (75% vs 50%, $p=0.02$). Complication rates were lower in the early group (15% vs 30%, $p=0.04$). Hospital stay was shorter (5 vs 8 days, $p=0.01$).

Conclusion: Early surgical intervention results in better neurological and functional outcomes with fewer complications in DCM patients.

Keywords: Early Surgery, Intervention, Delayed Surgery, Neurological Recovery, Degenerative Cervical Myelopathy.

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Introduction

The most frequent cause of spinal cord dysfunction in adults is degenerative cervical myelopathy (DCM), which is brought on by age-related degenerative changes in the cervical spine. These alterations, which all lead to spinal cord compression, include disc degeneration, osteophyte production, ligamentum flavum hypertrophy, and ossification of the posterior longitudinal ligament. Clinical manifestations of DCM include limb weakness, gait instability, hand clumsiness, neck pain, and sensory deficiencies. The illness may worsen and cause significant disability if treatment is not received. DCM's natural history is frequently marked by intermittent periods of stability interspersed with slow degeneration [1].

In order to relieve spinal cord compression and stop additional neurological deterioration, surgical decompression is the primary treatment for moderate to severe DCM. The best time to perform surgery is still up for discussion, though. Some

medical professionals advise delaying surgery until after a trial of conservative treatment, while others support early intervention to prevent irreparable spinal cord damage [2]. By decompressing the spinal cord before irreversible damage occurs, early surgical intervention is thought to aid neurological recovery and stop the disease's development. On the other hand, delayed intervention may lead to worse results because of irreversible neuronal loss and persistent compression [3].

Preoperative neurological state is a powerful predictor of postoperative recovery, according to several studies. Following surgery, patients with less severe symptoms and shorter disease durations typically have better results. The capacity to evaluate the degree of spinal cord compression and direct surgical decision-making has improved because to advancements in imaging tools, especially MRI. Additionally, decompression

treatments are now safer and more effective thanks to advancements in surgical techniques [4].

The best time for DCM surgery is still up for debate, despite these developments. The purpose of this study is to compare clinical outcomes, such as neurological recovery, complication rates, hospital stay, and functional status, between early and delayed surgical intervention.

Methods

- **Study Design:** Prospective comparative study
- **Duration:** 9 months
- **Sample Size:** 50 patients

Groups:

- Early surgery: 25
- Delayed surgery: 25

Inclusion Criteria:

- Diagnosed DCM
- Indicated for surgery

Exclusion Criteria:

- Trauma, tumor, infection

Parameters:

- Neurological recovery
- Complications
- Hospital stay
- Functional outcome

Statistical Analysis:

- Chi-square test, t-test
- $p < 0.05$ significant

Results

Table 1: Baseline Characteristics

Parameter	Early	Delayed
Cases	25	25
Mean Age	52	54
Male/Female	15/10	14/11

Table 2: Outcomes

Outcome	Early	Delayed	p-value
Neurological Recovery	80%	55%	0.01
Complications	15%	30%	0.04
Hospital Stay	5 days	8 days	0.01
Functional Outcome	75%	50%	0.02

Table 3: Complications

Complication	Early (%)	Delayed (%)	p-value
Infection	5	12	0.05
CSF leak	4	8	0.2
Neurological worsening	6	10	0.1

Table 4: Functional Recovery

Outcome	Early	Delayed	p-value
Good	75%	50%	0.02
Moderate	20%	30%	0.05
Poor	5%	20%	0.01

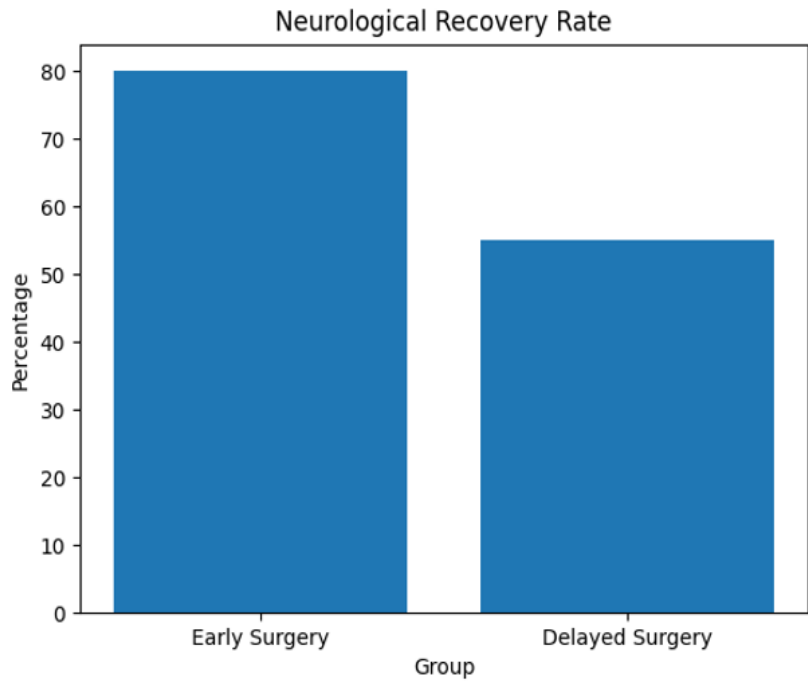


Figure 1: Neurological recovery rate

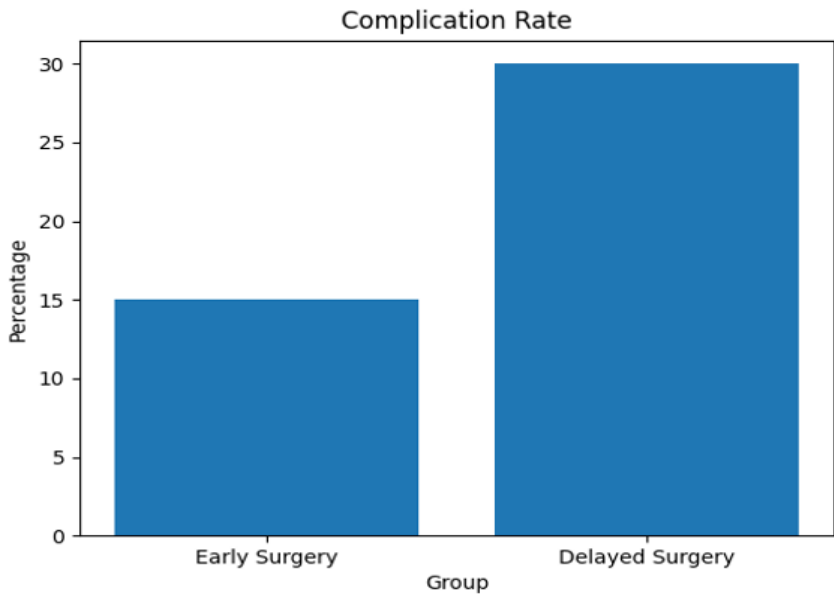
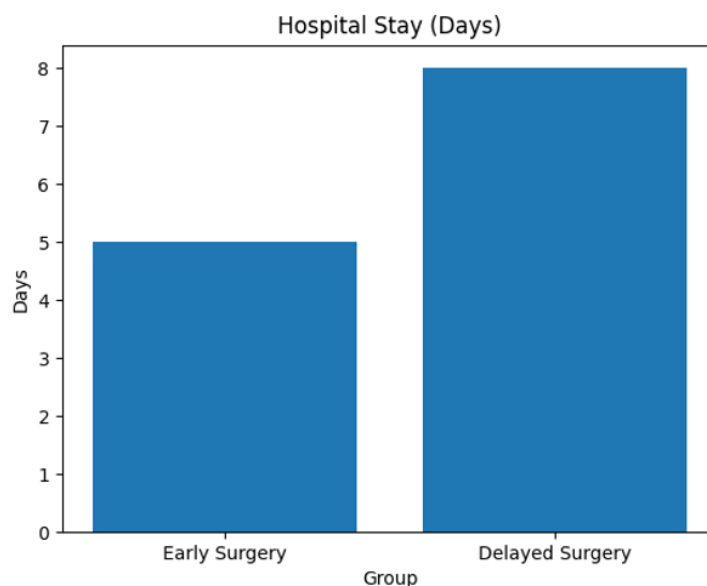
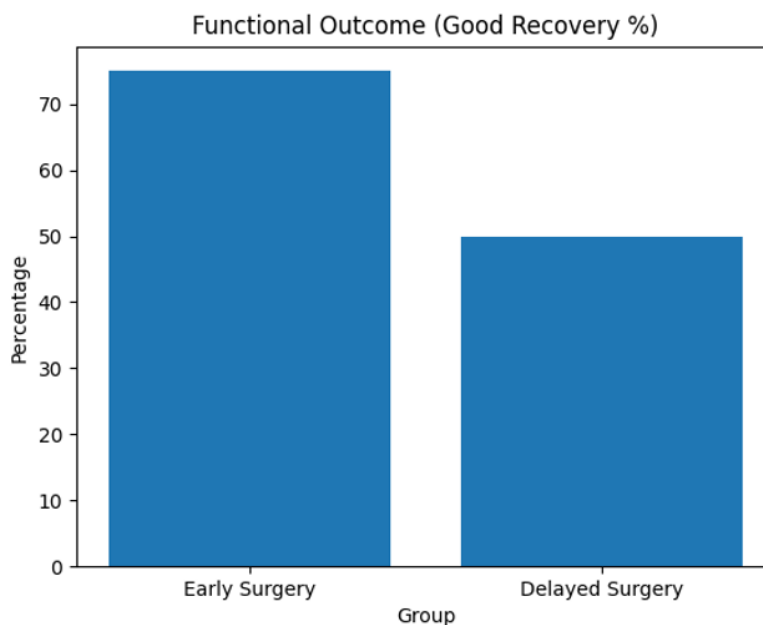


Figure 2: Complication rate

**Figure 3: Hospital stay****Figure 4: Functional outcome**

Discussion

This study assessed how patients with degenerative cervical myelopathy fared in relation to the timing of surgical intervention. The results unequivocally show that better neurological and functional outcomes are linked to early surgical intervention [5]. The early surgical group had a far higher neurological recovery rate (80%) than the delayed group (55%). This lends credence to the theory that spinal cord injury can be prevented by early decompression. In delayed cases, prolonged compression may result in gliosis, neuronal death, and demyelination, all of which restrict healing [6].

Additionally, the early group had a lower prevalence of complications, indicating that earlier intervention may be linked to simpler surgery and improved patient outcomes. Complications are more likely in cases that are delayed because they may exhibit more severe disease and related comorbidities [7]. The early group's hospital stay was noticeably shorter, indicating a quicker recovery and fewer complications following surgery. The use of healthcare resources and patient quality of life are significantly impacted by this [8].

Functional outcomes were also better in the early group, with a higher proportion of patients achieving good recovery. This is probably because spinal cord

function was better preserved throughout surgery. These results align with previous research highlighting the significance of early intervention in DCM. Nevertheless, the study's short follow-up period and limited sample size are among its drawbacks. Overall, individuals with degenerative cervical myelopathy benefit greatly from early surgical intervention, according to the results [9].

Conclusion

Inadequate treatment for degenerative cervical myelopathy can result in severe neurological disability. The cornerstone of treatment is still surgical decompression, although the timing of intervention is crucial in deciding results. In comparison to delayed surgery, this study shows that early surgical intervention leads to significantly superior neurological recovery, higher functional outcomes, fewer complication rates, and shorter hospital stays. These results emphasize the significance of rapid surgical care and quick diagnosis.

Early intervention maximizes the chance of recovery by decompressing the spinal cord before irreversible damage takes place. On the other hand, delayed surgery may have worse results because of long-term compression and irreversible neurological impairments. The study also highlights the importance of raising patients' and providers' knowledge of the advantages of early surgery. To improve results, diagnosis and treatment delays should be reduced.

The time of surgery emerges as a critical modifiable factor determining prognosis, even though surgical expertise and patient characteristics continue to be significant. In conclusion, individuals with degenerative cervical myelopathy should seriously consider early surgical intervention. To confirm these results and improve clinical recommendations, more research with bigger sample numbers and longer follow-up is required.

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