



PREDICTIVE FACTORS FOR FOOT DROP CAUSED BY DEGENERATIVE LUMBAR SPINE DISEASE

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ABSTRACT

Aim: The research aims to study some variables that help surgeons predict the surgical outcomes of foot prolapse caused by degenerative lumbar spine diseases with a focus on the timing of surgical intervention and muscle strength before surgery according to the scale of The manual muscle test (MMT) and radial change. **Methods:** 43 patients participated in the study, 8 patients were excluded, the follow-up period was 4 months. The patients were divided into groups according to each of the studied variables. **Results:** The research sample included 35 patients aged between 20 to 67 years and the average age was 43.5 years . **According to the levels of incidence**, the incidence rate at one level was 65.7% and several levels at 34.3%, the rate of improvement in patients at one level was 77.3%, while several levels were 22.7% with P-value = 0.01, which is statistically significant .**According to the pathogenetic mechanism**, the rate of lumbar disc herniation was 65.7% while the lumbar spinal stenosis was 34.3%, the rate of improvement in patients with lumbar disc herniation was 77.3% while the lumbar spinal stenosis was 22.7% with P-value = 0.01 and is statistically significant. **According to pre-surgical muscle strength**, total decline 37.1% while partial decline 62.9%, the rate of improvement in patients with partial decline was 68.2% while total decline 31.8% with P-value = 0.04 is statistically significant .**According to the timing of the surgical intervention:** during the first week 54.3% while more than a week 45.7%, the improvement rate in patients of the first week was 86.4% while patients undergoing surgery after the first week were 13.6% with P-value = 0.001 and is statistically significant. **Conclusion:** The current study confirmed that the recovery rates are higher if foot drop is diagnosed with partial drop and treated surgically during the first week, while the recovery rate decreased with age and with multiple levels of injury, in contrast, the recovery rates are higher in patients with lumbar disc herniation compared to lumbar spinal stenosis and there was no significant effect of gender, or injury pattern on the recovery rate.

KEYWORDS: foot drop. degenerative lumbar spine disease. The manual muscle test (MMT).

INTRODUCTION

Foot drop by definition is a weakness of the anterior tibial muscle (innervated mainly by the L4 nerve root and partially the L5 Root) often associated with weakness of the long finger extensor and the long thumb extensor innervated (mainly by the L5 nerve root).^[1] Foot drop refers to the inability to lift the forefoot due to a weakness in the dorsiflexion of the foot.^[3] This condition may be due to a muscle or bone problem or a problem with the nervous system.^{[7][6]}

To determine the treatment plan for foot prolapse, a complete assessment must be carried out for each patient, and determine the cause of foot drop, since there are many causes of foot drop, treatment will take several forms.^[12]

Although foot drop is a topic related to neurology and orthopedics, foot drop due to degenerative spinal diseases is not uncommon.^[5]

The Variation of surgical outcomes and the clinical improvement of patients with foot drop caused by degenerative lumbar spine diseases (lumbar disc herniation – lumbar spinal stenosis) was one of the main reasons for the research, to study this discrepancy and try to identify the prognostic factors that help the surgeon decide the best mechanism to deal with the pathological condition.

MATERIALS AND METHODS

The study included 35 patients with foot prolapse caused by degenerative lumbar spine diseases who underwent

surgical intervention at Tishreen University Hospital in the period between the eighth month of 2020 and the eighth month of 2022.

Entry criteria

All patients with foot drop caused by degenerative diseases of the lumbar spine confirmed by clinical and radiographic examination (lumbar disc herniation or lumbar spinal stenosis is established by magnetic resonance imaging and correspond to clinical data) and who underwent surgical treatment.

Written informed consent was obtained by all patients participating in the research (the form adopted at the Faculty of medicine of Tishreen University) and the research was approved by the scientific research ethics committee at the Faculty of medicine of Tishreen University and by the Council of Tishreen University.

Output parameters

- * Patients with foot drop without the presence of degenerative changes in the lumbar column
- * Patients who have had previous interference on the lumbar column
- * Patients who have a foot drop after spinal trauma
- * Patients with foot drop with muscle strength more than 3 on the MMT scale
- * Foot drop patients we could not communicate with

The patients were organized as follows so that all patients before surgery were subjected to

- * Careful neurological examination with MMT assessment before surgery
- * MRI image with sagittal and transverse sections or CT image
- * Careful study of radiographs and their approach to clinical examination of patients
- * Taking informed consent from the patient
- * After surgery: a neurological examination was performed with an MMT assessment four months after surgery

RESULTS

The current study of a sample of 35 patients with foot drop caused by degenerative lumbar spine diseases showed the following:

- * The majority of cases of foot drop were unilateral, and in most cases it was caused by a lumbar disc herniation about 65%, and at one injury level it was also estimated at about 65%
- * Patients with partial prolapse (with muscle strength equal to 3 or 2 out of 5 on the MMT scale) had the largest percentage of the research sample by 62 %
- * Patients who were surgically interfered with during the first week from the onset of symptoms of dorsiflexion impairment of the foot were about 54%
- * Recovery rates were higher if foot prolapse was diagnosed and treatment started during the first week and the prolapse was still partial
- * Recovery rates were reduced with multiple levels of injury and in case they were caused by spinal canal stenosis



Figure (1) the distribution according to the pathogenetic mechanism between the two groups of patients and according to the occurrence of improvement in the Department of neurosurgery at Tishreen University Hospital in Latakia during the time period 2020-2022.

DISCUSSION

Foot drop is an important symptom of some clinical and life-threatening diseases, especially the frequent falls

caused by it while walking, progressive impairment of ankle mobility up to the stage of complete paralysis, and an important impairment in the quality of Life.^{[3][4]}

The current study dealt with the warning factors of foot drop caused by degenerative lumbar spine diseases with a focus on the time of surgical intervention and the muscular strength of the dorsiflexion of the foot before surgery and the pathogenetic mechanism of foot drop and injury levels, and global studies are still dealing with these and other factors that may help patients and doctors predict the therapeutic results of foot prolapse.

- A Japanese study in 2019 indicated the study of some warning factors for foot prolapse caused by degenerative lumbar spine diseases, through which the results showed convergence in terms of improvement of symptoms according to the MMT power scale^{[10][8]}, in the Japanese study the improvement reached 87% for partial prolapse and improvement according to the pathogenetic mechanism reached 70% for lumbar disc herniation the results correspond to our study, while there is a significant difference in the rates of improvement with respect to the timing of surgical intervention the improvement reached 50% in the Japanese study during the first month of foot prolapse while the improvement reached 86.4% of patients who were surgically intervened during the first week in our study.

CONCLUSIONS

The current study confirmed the following:

- * Recovery rates are higher if the foot drop is diagnosed with the stage of partial prolapse and treated surgically during the first week
- * Recovery rates are higher in patients with lumbar disc herniation compared with lumbar spinal stenosis
- * The healing rate decreases with multiple levels of injury.

Declaration of interests: The authors declare that they have no known financial interests or personal relationships that could have appeared

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