The efficacy of non-operative conservation treatment compared with surgery treatment for the lumbar disc herniation patients.

1Mohammad Anwar Hossain, 2Mohammad AlamgirChowdhury

Abstract

Background: Conventional therapy and surgical intervention of disc herniation patients are widely used.Objective: To evaluate the effectiveness of conventional therapy in adult lumbar disc herniation patients versussurgery treatment.Data Sources: The source of the data collection from Hinari website; the journal of Spine, New English Journal of Medicine, Physical therapy journal. Study Selection:Randomized controlled trials evaluating conservative therapy or surgery intervention for lumber disc prolapsed (PLID) patients and measuring pain, function, return to work and global improvement outcomes.Data Extraction: The author himself independently selected studies and extracted data on study characteristics, quality, and the measuring the outcomes in different duration that was short evaluation, intermediate evaluation, and long-term which was follow-up evaluation.Data Synthesis:20 randomized controlled trails study were selected for this critical review which had compared with conservative treatment and surgery interventions was given for PLID patients. All of the study has been follow up in specific time intervals. Evidence suggests that conservative treatment approach is effective in PLID relative to comparisons at all follow-up periods. Some studies suggested that surgery patients was improve quickly initially compared with conservative treatment approach, but follow up after time intervals did not find any significant result. A few studies mentioned that functional improvement is superior to conservative treatment. In acute low back pain, exercise therapy and other programs were equally effective.Limitations: Limitations of selection of the relevant literature which was very much difficult, including low-quality studies with mixed outcome measures unpredictable and poor recording, and chance of publication bias.Conclusions:Conservative therapyappears to be slightly effective at declining pain and improving function in adults with PLID, particularly in health care populations., some evidence suggests that a structured physiotherapy/ exercises with activity program improves their devastating problems and was found positive outcomes,. Although, evidence for types of conservative treatment which was applied that is unclear.

1Associate Professor and Head of Physiotherapy Department, CRP, Savar, Dhaka-1343
2Assistant Professor of Physiotherapy, BHPI, CRP, Chapain, Savar, Dhaka-1343
Corresponding :anwar_physiobd@yahoo.com, Mobile: 01753559949

Introduction

Low back pain (LBP) is distinguished by irradiating pain over the area of buttocks or legs served by one or more spinal nerve roots of the lumbar vertebrae sacrum, combined with or without neurological loss associated with nerve root compression (Erdogmus, et al., 2007, andLuijsterbur, et al., 2007). Prevalence of low back pain is 75% to 80% of the population in some time in their life (An, et al., 2003). The incidence of sciatica due to lumbar disc prolapsed is about 5 per 1000 persons a year in the Netherlands (Luijsterbur, et al., 2007).

Radicular leg pain in adult working populations is the most common cause due to sciatica of a lumbar intervertebral disc herniation (Atlas, S.J., et al., 2005). Lumbar disc herniation is defined as the localized displacement or disruption of disc material beyond the margins of the intervertebral disc space, is considered to be the most common cause of lumbosacral radiculopathy (Hahne, 2010).

LBP due to disc herniation is one of the most costly and complex health conditions affecting the developed countries (Rundell, et al.,2009).Albert, and Mannicle, (2012) mentioned in their recent study that most of the patients with herniated discs feel severe pain and experience unpleasant sensory and motor disturbances, health care systems often arbitrate to relieve these symptoms. All of health care professionals felt great challenges to dealing with chronic low back pain (CLBP) in their practice (Mikhail, et al., 2005 and O'Sullivan, et al., 2011). LBP can become a seriously self-limiting problem, gradually contributing to increase pain and disability which lead a significant socioeconomic burden for the nation (Rutten, et al., 2010). It is second leading cause of work days lost and about $ 52 billion were spent yearly for CLBP in over all medical costs in the United States (Mikhail, et al., 2005).

Conservative care includes a large variety of treatments such as analgesics, rest, exercises, traction, manipulation; mobilization, epidural injections, and passive conservative treatments for sciatica, which includes epidural steroids, manipulation, traction, and NSAIDs (Albert and Mannicle, 2012 and Atlas, S.J., 2001). Although several recent researches had shown the evidence on conservative treatments for herniated lumbar discs were consistently efficacious (Weinstein, et al., 2008 and Aure, et al., 2003). Osterman, et al. (2006) mentioned that elective discectomy is a good treatment option for lumbar disc herniation, when the severe pain or neurologic deficits persist after 4 to 6 weeks of conservative therapy. Discectomy surgery created rapid reduction in leg pain and good overall treatment satisfaction for 65% to 90% of people with lumbar disc prolapsed (Hahne, et al., 2010 andTrosteson, et al., 2008). Standard open discectomy and microdiscectomy seem to be equally effective (Osterman, et al., 2006).The decompression surgery success rate about functional improvement was 58% to 69% and satisfactory 15% to 81% (McGregor, et al., 2011). So, researchers toevaluate the efficacy of non-operative conservation treatment compared with surgery treatment for the lumbar disc herniation patients.

Critical Review: Discussion and Results

The review of the scientific study is to evaluate the effectiveness of conservativetreatmentor surgical treatment approach for the lumber disc prolapsed or disc herniation patient. The establishment of the scientific validity, and also scientifically and statistically proved the

conservative treatment options in this circumstances and up-to-date appropriate conservative and surgical treatment options are existingworldwide.

Atlas,et al (2001) investigated whether surgery or non operative treatment would be more effective for sciatica patients. In their study, they assessed 5-year outcomes for patients with sciatica those were caused by a lumbar disc herniationtreated surgically which was open discectomy or non-surgically. This study included 507 patients initially enrolled for 220 patients treated surgically and 182 treated non-surgically for observational cohort with inexorable pain, and with positive signs of lumbar disc herniation.The sample size was 402. The surgery group who was underwent open discectomy. The non-operative treatment was included physical therapy, back exercises, bed rest, spinal manipulation, narcotic analgesics, and epidural steroids.Sciatica frequency and bothersome index modified Roland disability scale, SF-36 questionnaire and changes symptoms and functional status was assessed by 7- point scale. In their study found over 5 years 19% of surgical patients had undergone at additional lumbar spine operation and 16% of non-surgical patients had opted for at lumbar spine operation. Low back pain in the past week, leg pain in the past week, sciatica index that were frequency score and bothersome score, and Modified Roland scores, quality life and satisfaction with current state were improved significantly (P<.001) in surgery group compared with non-operative patients. Patients' Global evaluation in Low back pain and leg pain were improved significantly (P<.009, P<.008) and predominant symptom was also improved significantly (P<.005) surgical patients. 19.4% surgery treated patients had at least one reoperation over 5 years. Among patients initially treated non-surgically, (16.2%) underwent a lumbar spine operation between 3 and 60 months of follow-up. Patients who were least symptomatic at entry to the study appeared to benefit less from surgery because the outcomes of those treated non-surgically in this group were generally good. 66% of non-surgically treated patients were satisfied in the least symptomatic group compared with only 30%. Atlas, et al. (2005) in their studyassessed the comparative benefit whether surgery or non operative treatment over 10 year follow up period using extensive range of confirmed patient-reported outcome measures.In their study, they assessed outcomes for patients with sciatica those were caused by a lumbar disc herniation treated surgically which was open discectomy or non-surgically. This study included 507 patients initially registered for 217 patients treated surgically and 183 treated non-surgically for lumbar disc herniation.The sample size was 401. The non-operative treatment was included physical therapy, back exercises, bed rest, spinal manipulation, narcotic analgesics, and epidural steroids.Inthis study also used similar measurement tools except bothersome index and neurological status. They found in their RCT that improvement in symptoms and satisfaction and disability status at 10 year follow-up were not found the significant finding except satisfied the current status (P< .002).There was no change in functional status between 2 and 10 years for patients initially treated surgically, although there was a small amount of improvement for nonsurgical patients for the interaction between time and treatment group.Among patients initially undergoing surgical treatment, the 10-year reoperation rate was 25% receiving nonsurgical treatment also had operation was 25%.

In this two studies,the surgery was done open discectomy both studies and nonsurgical treatment including back exercises, physical therapy, bed rest, spinal manipulation, narcotic analgesics, and epidural steroids were most frequently used both studies. Actually non-operative various treatment options were not specified. The methodological used Modified Roland disability questionnaire and SF-36 questionnaire in both study that was the big question because both questionnaires were quite similar indicators were mentioned both studies.The result of two studies was shown the significant improvement in the short duration and long time follow up surgery group was not significantly improvement compared with non-surgery group. Big question was both studies at least one re-operation of surgically treated patients was 19.4% in five year follow up study and 25% in 10 year follow up study.In non-operative group patients had done operation 16.2% in five year follow up study and 25% in the ten year follow up study.

Osterman, et al. (2006) evaluated whether surgery or continued conservative treatment would be more effective for lumbar disc herniation patients who had not improved after initial conservative treatment. They found that there were no clinically significant differences between the two groups in leg or back pain intensity, subjective disability, or health-related quality of life over the 2-year follow-up, although discectomy seemed to be associated with a more rapid initial recovery. Surgical treatment was also associated with statistically significantly improved leg and back pain, Oswestry disability, generic health-related quality of life, and subjective work ability when the disc herniation was at L4-L5.Another study by Peul, et al (2007)investigated whether surgery or continued conservative treatment would be more effective for people who had not improved after initial conservative treatment. They used similar measurement tools. They also found that the surgical group had less activity limitation and leg pain at 2 and 3 months' follow ups, these differences were not present at previous or later time points. One year, the scores on the Roland Disability Questionnaire, the Likert scale, and the visual-analogue scale for leg pain had nearly equal recovery rates between the two groups.

In this two randomized control studies, the surgery was done open discectomy both studies. Nonsurgical treatment including isometrics exercises and also received active physiotherapeutic instructions, including stretching, bending, and muscle strengthening exercises at follow-up visits both group of Osterman study, but Peul study used standardized exercise protocol for rehabilitation of the patients at home only.Both study did not blinding. Randomization and sample allocation of sample, baseline characteristics were well defined. Actually nonoperative conservative treatment options were not specified in general way to treat. The age of the sample was not similar both study. The methodological used standard questionnaire, not same questionnaire similar both studiesaccept 100 VAS scale and follow up questionnaire. The result of two studies was shown the significant improvement in the short duration and long time follow up surgery group was improvement compared with non surgery group.

Weinstein,et al., (2008) in their study, investigated to assess the 4-year outcomes of surgery versusnon operative care whether surgery or non operative treatment would be more effective for lumbar disc herniation patients. This multicenter study included 501 patients for prospective randomized cohort and 743 patients for observational cohort (total 1244) with 6 weeks and with optimistic signs of lumbar disc herniation. Patients were either the randomized trial or the observational cohort. The surgery was done a standard open discectomy. The non-operative treatment was usual care including active physical therapy, education/counseling with home exercise instruction, and non-steroidal anti-inflammatory drugs. Main outcome measures were SF-36, Bodily Pain (BP) and Physical Function (PF) was measured by modified Oswestry Disability Index (ODI - AAOS/Modems version), and satisfactory questionnaire assessed at 6 weeks, 3 months, 6 months, and annually thereafter.In result both cohorts combined, 805 (65%) patients received surgery at some point during the first 4 years; 439 (35%) remained non-operative. Non-operative treatments within 4

years of enrollment were similar between the 2 cohorts. Overall surgical treatment and complications were similar between the 2 cohorts. The rates of reoperation were not significantly different between the randomized and observational cohorts. Approximately 50% listed as recurrent herniation at the same level. Results from the intent-to-treat and as-treated analyses of the 2 cohorts are compared. The as-treated treatment effects significantly favored surgery in both cohorts. In the combined analysis, treatment effects were statistically significant in favor of surgery for all primary and secondary outcome measures at each time point. The treatment effects for the secondary measures of sciatica bothersomeness, satisfaction, and self-rated improvement significant at all periods. Work status was significantly worse in the surgery group at 3 months due to surgery patients recovering from surgery.

The only strong evidence to appear from this review was obtained by collating the results of several clinically and statistically that compared advice or conservative treatment with microdiscectomy or open standard dscectomy in people with lumbar disc herniation with associated raiculopathy. In these studies analysis indicated that advice is less effective than surgery for producing short-term improvements in back pain intensity, leg pain intensity, function, and global improvement. These differences were maintained at intermediate-term follow-up for leg pain intensity, but not for back pain intensity, function, or global change. There was strong evidence that no difference existed on any of these outcome measures at long-term follow-up. This was noted that leg pain scores at 12-month follow-up were quite low in both groups indicating that the long term prognosis was good regardless of the intervention received. In these studies, the advice group was a control intervention that was compared with the primary intervention of microdiscectomy or open standard discectomy. These studies found no trials that compared advice with other conservative interventions; thus, the relative efficacy of advice compared with other conservative interventions remains unclear. Other reviews of advice for the management of nonspecific low back pain (NSLBP) suggest that advice may be more effective than several other conservative treatments. Although few studies were shown the statistically significant of their study result in favor of surgery treatment options.

Albert and Mannicle, (2012) in their study monitored 181 severe sciatica patients, who were randomized into groups of either symptom guided exercise or sham exercise to find out active conservation treatment programs were effective for severe sciatica patients. In their study main outcome measures wereDanish version of RMDQ (23 questions) to assess activity limitation, Low back pain rating scale used to measure current leg pain, Global improvement and number of neurological signs were measured by 5-point Liker Scale, Generic function (QUALY) was measured by Euro QOL (EQ-5D), Used Patients' self reported follow up questionnaire for sick leave and Patients' satisfaction, Patients' expectations of outcome were measured by patients' self report.In result both active treatment programs had improved but global improvement (most variables),activity limitations were significantly improvedatend of treatment and after one year follow up. Root compression signs (Neurological sign) were statistically significant (P< .001) at one year after follow up. Fewer sick leaves taken symptoms guided active exercise group (23.9%) compared sham exercise group (43%). Both groups were satisfaction.Nerve root neurological signs were measured specifically, not mentioned after the treatment the session and also one year follow up, only overall measured. Age range was large and all participants were consecutively enlisted using standardized, pretested procedure and examined that it may selection bias. Other Randomized study, Engbert and Weber (2011) monitored that the efficacy whether therapeutic climbing exercise or standard exercise to find out therapeutic climbing exercises to increase muscular strengthening and, perceived physical and mental well-being and abilities in activities of daily living (ADL) of chronic low back pain patients compared with the standard exercise therapy. They found the conservative treatment was efficacy for chronic low back pain and PLID patients.

On the research protocol, permitted to take medicine (mild analgesics and NSAIDs), not analyzed how many patients were taken this medicine in steps of the study in both groups. Only Root compression, sick leave, vocational status and little discuss about activity limitation were supported in the discussion, others like current leg pain, Global improvement did not support clearly.The process of sample allocation, randomization and group in the study and age range and women which might be influenced results. Evidence provided the clear each variable way to testing and purpose of testing. Clearly mentioned the reason of the participants and dropouts in the result and every variable's finding also describes properly. Engbert and Weber (2011) in their study scientificallyproved that conservative active treatment process is beneficial for severe sciatica patient. Therapeutic treatment is beneficial in such a type of patients. This treatment is cheap, uses low technology, and has no side effects, easy to perform and good patients' satisfaction that is very suitable for sciatica patients.In this study sample size was the small which was difficult inference the result in the population. Participants were not allowed to participate in the sports and dropped out was high in climbing group which also might be influences the result.

Luijsterburg, et al (2007) in their study investigated an economic evaluation alongside a randomized clinical trial in primary care. A total of 135 patients were randomly allocated to physical therapy and general practitioners' care (n= 67) or general practitioners'(GP) care alone (n = 68) to evaluate the cost-effectiveness of physical therapy and general practitioner care for patients with an acute lumbosacral radicular syndrome (LRS or sciatica). Global perceived effect (GPE) was measured by 7-point scale, generic preference-based measured of health using by EQ-5D. The costs for paid work were calculated by using the friction cost approach. The outcome measures and costs were assessed at baseline and cumulative at 3, 6, 12, and 52 weeks after randomization using questionnaires. At 1-year follow-up, there was a significant difference on perceived recovery in favor of the patients that received physical therapy. Weber, et al. (1993)monitored 208 LBP patients with radiating pain and clear clinical signs of nerve root compression (L5 and S1 level), who were randomized into groups of either non-steroidal anti-inflammatory drug (NSAID) treatment (piroxicam) or placebo medicine. The purpose of this was to provide insight into natural history of acute sciatica with nerve root symptoms within 14 days after onset and find out the efficacy of non-steroid anti-inflammatory drug (Piroxicam). The visual analog scale (VAS 100mm) was used for measure back and leg pain, modified Roland disability questionnaire (17 questions) was used for measuring functional ability and satisfactory questionnaire was used for follow up (4 point likert scale).Both groups improved significantly within 4 weeks. At 4-week, 3-month, and 1-year follow-up, there were no differences between the groups in any of the outcome measures.

The strong evidence of the efficacy of Conservative treatment of chronic LBP (PLID) patients mentioned Aure, et al. (2003) in their randomized controlled trail with one year follow up study. 49 patients with CLBP patients allocated in this study, manual therapy (MT) group was 22 and exercise therapy (ET) group was 27. Manual therapy consisted of spinal manipulation, mobilization and stretching, and five general exercises like spine, abdomen, and lower limbs regions. Exercise therapy consisted of worm up, strengthening, mobilization, coordination, and stabilizing exercises

for the abdominal, back, pelvic and lower limbs muscles. outcomes measures by modified Schober test used for measuring spinal range of motion, 100 Visual Analog Scale (VAS) used for measuring pain intensity, Oswestry LBP disability Questionnaire used for measuring functional disability, Dartmouth COOP Function Charts used for general health and self reported used for return to work. They found that both treatment group significantly improvement, the manual therapy group showed significantly larger than the exercise group.

The strong evidence to emerge from this review was obtained by collating the results of several clinically and statistically studies that compared active conservative treatment or therapeutic intervention with others conservative treatment options in people with lumbar disc herniation with associated raiculopathy. In these studies analysis indicated that others conservative interventions is less effective than active conservative treatments or therapeutic interventions for producing improvements in back pain intensity, leg pain intensity, function, and global improvement. Both group of treatment options were improvement statistically significant, but therapeutic interventions superior to others conservative treatment options. There was strong evidence that difference existed still on any of these outcome measures in one year follow up. In these studies, the other conservative treatment group was a control intervention that was compared with the active conservative treatment or therapeutic intervention group. These studies found no trials that compared advice with other conservative interventions; thus, the relative efficacy of advice compared with other conservative interventions remains unclear. Other reviews of other conservative treatment options or advice for the management of nonspecific low back pain (NSLBP) suggest that advice may be more effective than several other conservative treatments.

Conclusion and Recommendations:There is no strong evidence found in this review surgery effective for lumbar disc herniation patients compare with the conservative treatment options. Most of the studies were shown their study effective in short term effect, no long term effectiveness in favor of surgery of the herniation patients. The most study mentioned reoperation and rate of reoperation was not justified and acceptable. In nonsurgical clinical trials shown the strong evidence conservative treatment (physiotherapy interventions) is effective Treatment options for lumbar disc herniation patients. Few study recommended for wait for natural healing process with active conservative treatment. So it can be included that lumbar disc herniation patients should be stay in active conservative treatment options for their recovery.

References

Albert, H.B. and Mannicle, C.(2012). The Efficacy of Systematic Active Conservation Treatment for Patients with Severe Sciatica. Spine, 37(7), pp. 531-542.

An, H.S., Eugene, T.J.M.A. and Masuda, K. (2003).Biological Repair of Intervertebral Disc. Spine, 28 (15), pp. 86-92.

Atlas, S.J., Keller, R.B., Chang, Y.C, Deyo, R.A. and Singer, D. E. (2001).Surgical and Nonsurgical Management of Sciatica Secondary to a Lumbar Disc Herniation.Spine, 26 (10), pp. 1179-1187.

Atlas, S.J., Keller, R.B., Wu, Y.A., Deyo, R.A. and Singer,D.E. (2005). Long-Term Outcomes of Surgical and Nonsurgical Management of Sciatica Secondary to a Lumbar Disc Herniation: 10 Year Results from the Maine Lumbar Spine Study. Spine, 30 (8), pp. 927-935.

Aure, O.F., Nilsen, J.H. and Vasseljen, O. (2003). Manual therapy and exercise therapy in patients with chronic low back pain. Spine, 28 (6), pp. 525-532.

Engbert, K. and Weber, M.(2011).The Effects of Therapeutic Climbing in Patients with Chronic Low Back Pain. Spine, 36 (11), pp. 842 - 849.

Erdogmus, C.B., Resch, K.L., Sabitzer, R., Muller, H., Nuhr, M., Schoggl, A., Posch, M., Osterode, W., Ungersbock, K. and Ebenbichler,G.R.(2007).Physiotherapy-Based Rehabilitation Following Disc Herniation Operation.Spine, 32(19), pp. 2041-2049.

Hahne, A. J., Ford, J. J. and McMeeken, J.M.(2010). Conservative Management of Lumbar Disc Herniation With Associated Radiculopathy. Spine, 35(11), pp. E488-E504.

Luijsterburg, P.A.J., Lamers, L.M., Verhagen, A.P., Ostelo, R.W.J.G., ven den Hoogen, H.J. M. M., Peul, W., Avezaat, C.J.J. and. Koes, B.W. (2007). Cost-effectiveness of physical therapy and general practitioner care for sciatica.Spine, 32(18), pp. 1942-1948.

McGregor, A.H., Dore, C.J., Morris, T.P., Morris, S. and Jamrozik, K. (2011). Function after spinal treatment, exercise, and rehabilitation (FASTER). Spine, 36 (21), pp. 1711-1720.

Mikhail, C., Korner-Bitensky, N., Rossignol, M., Dumas, J.P. (2005).Physical therapists' use of interventions with high evidence of effectiveness in the management of a hypothetical typical patient with acute low back pain.Physical Therapy, 85(11), pp.1151-1167.

Osterman, H., Seitsalo, S., Karppinen, J. and Malmivaara, A. (2006). Effectiveness of Microdiscectomy for Lumbar Disc Herniation.Spine, 31(21), pp. 2409-2414.

O'Sullivan, P.B., Smith, A.J., Beales, D.J., Straker; L.M. (2011).Association of biopsychosocial factors with degree of slump in sitting posture and self-report of backpain in adolescents: A Cross-Sectional Study. Physical therapy, 91(4), pp.470-483.

Peul, W.C., van Houwelingen, H.C., van den Hout, W.B., Brand, R., Eekhof,J.A.H., Tans, J.T., Ralph Thomeer, T.W.M. and Koes B.W. (2007). Surgery versus prolonged conservative treatment for sciatica.New English Journal of Medicine, 356(22), pp. 2245 - 2256.

Rundell, S.D., Davenport, T.E., Wagner,T. (2009). Physical therapist management of acute and chronic low back pain using the World Health Organization'sInternational Classificationof Functioning, Disabilityand Health. Physical Therapy, 89 (1), pp. 82-90.

Rutten, G.M., Degen S., Hendriks, E.J., Braspenning, J.C., Harting J., Oostendorp, R.A. (2010). Adherence to clinical practice guidelines for low back pain in physical therapy: do patients benefit? Physical Therapy, 90 (8), pp.1111-1122.

Saal, A.J. (1996). Natural history and non operative treatment of lumbar disc herniation.Spine, 21(24S), pp. 2S- 9S.

Trosteson, A.N.A., Skinner, J.S., Tosteson, T.D., Lurie, J.D., Anderson, G.B., Berven, S., Grove, M.R., Hanscom, B., Blood, E.A. and Weinstein, J.N. (2008). The cost effectiveness of surgical versus nonoperative treatment for lubar disc herniation over two years.Spine, 33(19), pp. 2108-2115.

Weber, H.I. and Amlie, E. (2993). The natural course of acute sciatica with nerve root symptoms in a double blind placebo controlled trail evaluating the effect of piroxicam. Spine, 18(11), pp. 1433-1438.

Weinstein, J.N., Lurie, J. D., Tosteson, T. D., Tosteson, A. N., Blood, E. A., Abdu, W. A., Herkowitz, H., Hilibrand, A., Albert, T. and Fischgrund, J. (2008).Surgical versusnonoperative treatment for lumbar disc herniation.Spine, 33(25), pp. 2789-2800.