Original Article ISSN (O):2395-2822; ISSN (P):2395-2814

Percutaneus Discectmy; An Innovative Alternative to Surgical Discectomy: Our Initial Experience.

Sunil Dutt[1], Ravinder Thakur[2], Girish Sharma[3], S. Singh Sodhi[4], Saloni Sood[5]

[1]Senior Resident, Department of Anaesthesia, Pt. Jlngmch Chamba (H.P) 176310.
[2]Medical officer (specialist) Zonal Hospital Mandi, (H.P.) 175001.
[3]Professor & Head, Department of Anaesthesia, Dr. Y.S. Parmar GMCH Nahan (H.P) 173001.
[4]Professor & Head, Department of Anesthesia and Critical Care, IGMC Shimla (H.P.) 171001.
[5]Assisant Professor, Department of Anesthesia, Pt.JLNGMCH Chamba (H.P.) 176310.

Received: April 2020
Accepted: April 2020

ABSTRACT

Background: The percutaneous discectomy is emerging as an innovative alternate to surgical discectomy. **Methods:** The study included percutaneous discectomy in ten patients with MRI proven disc prolapse who presented with low backache, neurogenic claudication radiculopathy, paresthesia, affecting quality of their life. Percutaneous Discectomy was done at affected disc level under C-arm guidance and 1-1.5ml of nucleus pulposus was removed under all aseptic precautions. The patients were discharged after 3 hours of procedure. **Results:** The mean pre-op VAS back was 6.5, pre-op VAS leg was 7.9, post-op VAS back was 3.5, post-op VAS leg was 2, follow up VAS back was 1.5 and follow up VAS leg was 1. There was significant difference in pre-operative and post-operative VAS value of back and leg (P< 0.05). All cases were followed up and they all are now symptom free and satisfied. **Conclusion:** Percutaneous discectomy is a safe, very innovative, minimally invasive, less traumatic and effective treatment for herniation of intervertebral disc patients.

Keywords: Percutaneous discectomy, herniation, intervertebral disc.

INTRODUCTION

Herniation of intervertebral disc is an important and common cause of low back pain which affects mobility, physical function, quality of life and costs high to society. It is estimated that 70-90% of normal population will experience at least one episode of sciatica or lumbago during there lifetime.[1] Intervertebral disc and discogenic pain have been identified as causative agents in 26-39% of patients with sciatica or lumbago. The long-term outcomes, complications and occasionally suboptimal results which accompany an open disc surgery in herniated disc have lead to development of other treatment techniques that avoid an open surgery, through the spinal canal.[2]

Low back pain and neuralgia due to spinalpathology are very common symptoms debilitating numerous patients with peak prevalence at ages between 45 and 60 years. Intervertebral discs and facet joints act as pain sources in the vast majority of the cases. Diagnosis is based on the combination of clinical examination and imaging studies.[3] Therapeutic armamentarium for low back pain and neuralgia due to intervertebral discs and/or facet joints includes conservative therapy, injections, percutaneous therapeutic techniques and surgical options.

Name & Address of Corresponding Author
Dr. Girish Sharma
Professor & Head,
Department of Anaesthesia,
Dr. Y.S. Parmar GMC Nahan
(H.P) 173001.

Percutaneous therapeutic techniques are imaging-guided minimally invasive treatments which can be performed as outpatient procedures.

Percutaneous treatments are used in the therapy for small to medium sized herniations of intervertebral discs in order to reduce the intradiscal pressure in the nucleus.[4] Theoretically, it creates space for the herniated fragment to implode inwards, reducing pain and improving mobility and quality of life. These techniques involve the percutaneous removal of the nucleus pulposus by using a variety of chemical, thermal or mechanical, laser and coagulative techniques.[5] The present study was conducted to assess cases of percutaneous discectomy.

MATERIALS AND METHODS

The present study was conducted in the department of Anesthesia and critical care IGMC Shimla (2013-2014). It comprised of 10 patients of disc prolapse. All patients were informed regarding the study and written consent was obtained.

Inclusion Criteria's:

1. Small to medium sized contained protruded intervertebral disc herniations confirmed by MRI.
2. Back pain of discogenic origin, with or without pain to specific dermatomal distribution that limits the activity for at least 6 weeks not relieved by conservative treatments.
3. Neurogenic claudication.
4. Neurogenic findings referring to a single nerve root involvement positive lasegue sign, (decreased tendon reflex, sensation and motor response).

Exclusion Criteria's:

Absolute:

1. Sequestrated disc fragments
2. Significant sub-ligamentous herniation
3. Segmental instability
4. Bony stenosis of neural foramina/canal
5. Severe degenerative disc disease with more than 2/3of disc height is decreased
6. Nerve compression due to facet hypertrophy
7. Asymptmatic PIVD as a Incidental finding
8. Active infection
9. Pregnancy

Relative:

1. Haemoragic diathesis
2. Anticoagulant therapy
3. Previous h/o surgery at same level
4. Primary or metastatic malignancy

Percutaneous ablating techniques of intervertebral disc were performed under fluoroscopy guidance with patients in prone position for lumbar discectomy. Appropriate preoperative preparation, draping and strict sterilization of area of interest were done according to the standard guidelines as followed at our institute. An Iodine solution, a solution containing alcohol e.g. spirit, forceps, sterile gauze swabs were included in sterile set. Pre-procedural antibiotic (Amoxiclave 1.2gm) was given 45 minutes prior to the procedure.

Standard ASA monitoring i.e. ECG, noninvasive blood pressure, pulse oxymeter were attached. Intravenous line was secured with 20G intravenous (IV) cannula and IV fluid was started @ 100ml/hr. Conscious sedation was attained with intravenous midazolam 1mg and IV fentanyl 1mcg/ Kg and repeated if required.

Intervertebral disc of interest was squared in antero-positerior projection. Scotty Dog projection was attained in oblique view. Percutaneous Needle was placed under local anesthesia under C-arm guidance. Utmost care was taken to avoid nerve roots contact and whenever patient complain of pain radiating to legs the direction of needle was changed. Needle advancement was performed under fluoroscopic control with AP and Lateral views. Annulus fibrosus puncture can be both felt as well as seen under fluoroscopy. Working distance of disc was determined and needle guard was placed accordingly. Stylet was removed and Stryker decompressor was placed in a needle and properly locked. The decompressor was switched on and needle and decompressor were moved as a single unit over a distance of one centimeter or as directed by C-arm picture and about 1-1.5ml of gelatinous nucleus pulposus was removed. After completion of procedure 1ml of injection Acuclav was given inthe disc space. Assembly was removed and aseptic dressing was applied. The patient was asked to move his lower limb to check any injury to nerves by comparing with other side. Patient kept in recovery for 3 hrs and sent home if fit with clear instructions to accompanying person.

Post procedure care:

In absence of complications, hospitalization was not required in our patients. Non steroid anti-inflammatory drugs and muscle relaxants were prescribed. A follow-up phone call was performed on the next morning following disc decompression. Patients were clinically examined one week later.

Post procedure restriction included rest during the first 3 days after the procedure and prolonged sitting position were avoided, no forward bending and twisting movements and lifting of weights, nor strenuous body activity were permitted during the first two weeks of post-procedure period, however light housework, walking and progressive physiotherapy was started after 1st week of procedure. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

[Table 1] shows that mean pre-op VAS back was 6.5, pre-op VAS leg was 7.9, post-op VAS back was 3.5, post-op VAS leg was 2, follow up VAS back was 1.5 and follow up VAS leg was 1.

Table 1: Comparison of pre-procedure, post-procedure and followup (3months) VAS for leg and back pain respectively

Sr/no	Level	Preop VAS Back	Preop VAS leg	Postop VAS Back	Postop VAS Leg	Follow up VAS Back	Follow up VAS Leg	Follow up Period
1.	L4-L5 L5-S1	8	9	6	7	7	8	Referred for surgery
2.	L4-L5 L5-S1	7	8	5	4	2	0	
3.	L4-L5 L5-S1	6	7	4	3	2	0	
4.	L4-L5 L5-S1	6	8	3	2	1	0	
5.	L4-L5 L5-S1	6	8	3	2	0	0	
6.	L4-L5 L5-S1	7	8	3	1	1	1	
7.	L4-L5 L5-S1	7	7	4	1	2	1	

8.	L4-L5 L5-S1	6	8	3	0	0	0	
9.	L4-L5 L5-S1	6	8	2	0	0	0	
10.	L4-L5 L5-S1	6	8	2	0	0	0	
Mean		6.5	7.9	3.5	2	1.5	1	
SD		0.707	0.567	1.269	2.211	2.121	2.494	

Table 2: Statistical analysis

S. No	VAS	Mean	Standard deviation	P value
1	Pre op vas back	6.5	0.707	.005
	Post op vas back	3.5	1.269	
2	Pre op vas leg	7.9	0.567	.005
	Post op vas leg	2.0	2.211	
3	Pre op vas back	6.5	0.707	.004
	Follow up vas back	1.5	2.121	
4	Pre op vas leg	7.9	0.567	.004
	Follow up vas leg	1.0	2.494	

Figure 1: Final needle placement in lateral view L4-L5 under C-arm.

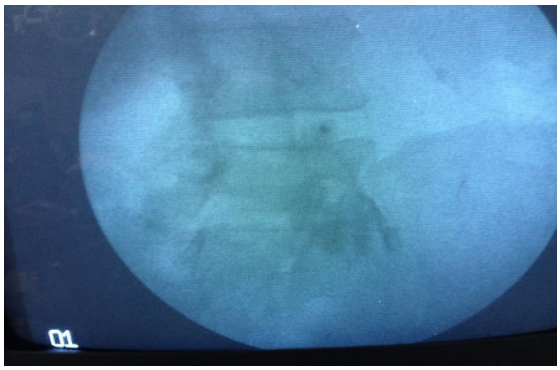

Figure 2: Scotty Dog projection L4-L5 with needle on End- On view under C-arm.

Figure 3: Final needle placement in AP-view under C-arm.

[Table 2] shows significant difference in pre-operative and post-operative VAS value of back and leg (P< 0.05).

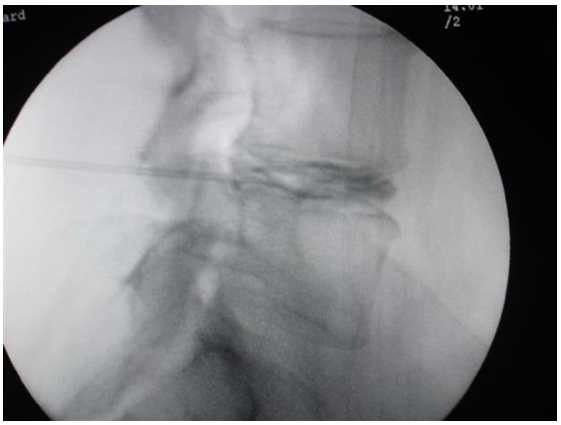

Figure 4: Lateral view under C-Arm after administration of radio-opaque dye showing contained intervertebral disc.

DISCUSSION

Conventional open surgery was considered to be the "gold standard" for treating herniated intervertebral disc. With the use of microlumbar discectomy, there was a significant reduction in morbidity of open surgery. Microlumbar discectomy has definitive advantages over open surgery in terms of hospital stay, blood loss, postoperative pain and epidural fibrosis. However, the disadvantages of open surgery are still present with microlumbar discectomy. These disadvantages include retraction and denervation of paraspinal muscles, postoperative pain, blood loss, bone resection, and scarring.[6]

Microdiscectomy is associated with significant intraoperative and postoperative complications. Long term complications of microlumbar discectomy include recurrence, epidural fibrosis and spinal instability which are a challenge even for an experienced spinal surgeon.[7] In many cases, it is the beginning of a failed back surgery syndrome. Results of microlumbar discectomy in recurrent disc

prolapse are not good when compared to primary case. Percutaneous ablating techniques of intervertebral disc were performed under fluoroscopy guidance with patients in prone position for lumbar discectomy.[8] In present study, we included 10 patients. We found that mean pre-op VAS back was 6.5, pre-op VAS leg was 7.9, post-op VAS back was 3.5, post-op VAS leg was 2, follow up VAS back was 1.5 and follow up VAS leg was 1. A significant difference in pre-operative and post-operative VAS value of back and leg ($P< 0.05$) was seen.

Lee et al,[9] in their study one hundred patients with lumbar disc prolapse who were treated with percutaneous endoscopic discectomy wereincluded. Clinical follow up was done at 1 month, 3 months, 6 months, 1 year, and at yearly interval thereafter. The outcome was assessed using modified Macnab's criteria, visual analog scale, and Oswestry Disability Index. The mean follow up period was 2 years (range 18 months - 3 years). Transforaminal approach was used in 84 patients, interlaminar approach in seven patients, and combined approach in nine patients. An excellent outcome was noted in ninety patients, good outcome in six patients, fair result in two patients, and poor result in two patients. Minor complications were seen in three patients, and two patients had recurrent disc prolapse. Mean hospital stay was 1.6 days.

Ahn et al,[10] conducted a study in which 100 patients with 102 herniations of the nucleus pulposus at L2-L3, L3-L4, L4-L5, and L5-S1 and unremitting radicular pain were treated by percutaneous lumbar discectomy. Fifty-nine patients have been followed for longer than two years postoperatively, with a maximum follow-up period of six years. Evaluations were based on modified MacNab criteria and patient interview, questionnaire, and examination. Eighty-one patients (87%) were judged to be successes, since they were pain-free and had returned to gainful employment and their preinjury activity levels. Twelve patients' operations (13%) were judged to be failures and required repeat surgical procedures at the level of the presenting pathologic condition. Three patients died of unrelated causes; they had been followed for a minimum of 15 months postoperatively and were previously judged to have had an excellent result. No major complications, including superficial or deep infections, discitis, or neurovascular compromise, were encountered. Meticulous selection of patients for percutaneous lumbar discectomy is the key to success with the method.

CONCLUSION

Percutaneous discectomy is a safe, very innovative, minimally invasive, less traumatic and effective treatment for herniation of intervertebral disc patients. It requires less procedure time, can be done as a day care procedure under local anaesthesia with mild sedation.

REFERENCES

1. Kambin, P. and J.L. Schaffer, Percutaneous discectomy. Review of 100 patients and current practice. Clinical Orthopedics, 1989(238): 24-34.
2. Mayer, H.M., Spine update. Percutaneous lumbar disc surgery. Spine, 1994. 19(23): 2719-23.
3. Hijikata, S., Percutaneous nucleotomy. A new concept technique and 12 years' experience. Clin Orthop, 1989(238): 9- 23.
4. Pappas, C.T., T. Harrington, and V.K. Sonntag, Outcome analysis in 654 surgically treated lumbar disc herniations. Neurosurgery 1992; 30(6): 862-6.
5. Seibel, R.M., D.H. Gronemeyer, and R.A. Sorensen, Percutaneous nucleotomy with CT and fluoroscopic guidance. J Vasc Intervention Radiology 1992; 3(3): 571-6.
6. Onik, G., et al., Percutaneous lumbar diskectomy using a new aspiration probe. ANJR, 1985; 6: 290-3.
7. Onik, G., et al., Automated percutaneous diskectomy: initial patient experience. Work in progress. Radiology 1987; 162(1 Pt 1): 129-32.
8. Hermantin FU, Peters T, Quartararo L, Kambin P. A prospective, randomized study comparing the results of open discectomy with those of video-assisted arthroscopic microdiscectomy. J Bone Joint Surg Am. 1999;81:958–65.
9. Lee DY, Shim CS, Ahn Y, Choi YG, Kim HJ, Lee SH. Comparison of percutaneous endoscopic lumbar discectomy and open lumbar microdiscectomy for recurrent disc herniation. J Korean Neurosurg Soc.2009;46:515–21.
10. Ahn Y, Lee SH, Lee JH, Kim JU, Liu WC. Transforaminal percutaneous endoscopic lumbar discectomy for upper lumbar disc herniation: Clinical outcome, prognostic factors, and technical consideration. Acta Neurochir (Wien) 2009;151:199– 206.

How to cite this article: Dutt S, Thakur R, Sharma G, Sodhi SS, Sood S. Percutaneus Discectmy; An Innovative Alternative to Surgical Discectomy: Our Initial Experience. Ann. Int. Med. Den. Res. 2020; 6(3):AN14-AN17.

Source of Support: Nil, **Conflict of Interest:** None declared