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Research Article

Comparative Study of Transforaminal Endoscopic Discectomy Versus Conventional Microdiscectomy

MA Basit[1], Richa Sharma[2]* and Fayaz W Memon[1]

[1]*Orthopedic Spine Surgeon, Mannat Hospital, India*

[2]*Assistant Professor, Department of Paediatrics, SLBSGMCH, India*

***Corresponding Author:** Richa Sharma, Assistant Professor, Department of Paediatrics, SLBSGMCH, India.

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Abstract

The aim of this trial was to compare TFED to conventional Microdiscectomy (Micro). The inclusion criteria were: patients of age between 20 - 60, a single level disc prolapse with exiting and/or traversing nerve root compression not responding to conservative therapy 80 patients, age 25 - 70 years, with single level lumbar prolapse and radiculopathy, were recruited. Functional improvements were maintained at 2 years in both groups with less ongoing pain after TFED.

Keywords: Lumbar Discectomy; Microdiscectomy; Transforaminal; Endoscopic Surgery

Introduction

Over the last 50 years, spine surgery has been evolving to minimize tissue trauma, pain and disability. As open spinal surgery has higher rate of morbidity due to its approach. The concept that less aggression and lesser tissue handling during the process of decompression has led to better results and increased interest in endoscopic spine surgery. Although the first spinal endoscopic procedures were performed in the early 1980's. In 1990, Kambin emphasised on the access to the lumbar disc via a relatively 'safe zone. This has increased interest in the transforaminal approach of the disc [13-15]. It is safe to resect the disc tissue by this method. Endoscopic spine surgical techniques represent another tool in the armamentarium of the spine surgeon, full-endoscopic spine surgery offers distinct advantages [20,21].

Materials and Methods

The aim of this study was to determine whether TFED is same, better or worse in outcome as compared to micro discectomy.

The inclusion criteria were: patients of age between 20 - 60, a single level disc prolapse with exiting and/or traversing nerve root compression not responding to conservative therapy. Exclusion criteria were: previous disc prolapse surgery, massive sequestered disc prolapse, and malignancy and tumour. The patients were randomised into group I and group II one day before surgery to receive either TFED or Micro, by blind folded picking of slips by the person not related or contributing to the study [1-9].

Surgical procedure

Patients were treated in the prone position. Awake and aware anaesthesia was given. Cannula needle and endoscope placements were done using an image intensifier. After identification of the disc space by image intensifier, procedure needle was used to enter the disc space under the guidance of image intensifier after removing the stylet. Over the guide wire serial dilators were introduced into the disc space over which 6 mm cannula was put. Then with transforaminal endoscope we visualise the inside of the disc space and find the tail of extruded disc material and remove it with flexible graspers and disc punches or angled graspers or rotatable hook and confirm no loose fragment is left. Haemostasis was secured using a radiofrequency probe (Maktronics/Jayons, India) with ~0.02 mm penetration depth. Proximal or distal disc material was accessed by angled graspers, flexible graspers and rotatable hook. Microdiscectomy was done using as per the set protocol. General anaesthesia (GA) was administered. By paramedian approach, muscle splitting was done, using tubular retractor system and dilator locked, interlaminar space was entered. Dura and root were identified, disc bulge or protrusion was seen under magnification. Discectomy was done and root was decompressed. Irrigation was done after the extraction of the prolapse to ensure that none of the sequestered fragments remained. A small piece of hemostatic gelatin sponge was used on the Dural area, where decompression was done. Postoperative treatment and rehabilitation remained same for both the groups. However patients were mobilised six hours postoperatively and was thoroughly examined before mobilisation. Patients were

discharged home when comfortable and fit. Physiotherapy and rehabilitation was done in follow up OPD. Patient reported outcome measures were recorded at 3,6 and 12 months, postoperatively. A change from baseline approach was implemented using preoperative and 1year postoperative Work status and length of postoperative sickness absence were recorded at follow-up.

Statistical analysis

The data obtained was calculated and analysed using SPSS Version 19. Parametric (unpaired T tests) test was used to assess continuous variables and significant differences between TFED and Microdiscetomy. Variables were assessed using a Chi-square test. ANOVA was used to examine changes. A p value of <0.05 was considered statistically significant. Post hoc analysis of PROMs was performed using paired t tests.

Results

Of 100 patients with a single-level disc prolapse assessed for eligibility to this trial, 80 met the inclusion criteria, who were recruited and randomised to the two treatment arms. With 40 patients in each group respectively.

	TED (n = 40)	Micro (n = 40)	Comparison (p value)
Age in years (SD)	42(9)	39(9)	0.76
Age range	20 - 60	20 - 60	
Female (%)	25(62.2%)	28(70%)	0.09
Weight in kilograms (SD)	66(17)	75(17)	0.9
Weight range	(50 - 82)	(55 - 90)	
Duration of symptoms	16(4 - 120)	18(4 - 120)	0.54
Pain only in back(SD)	6.2(2.8)	5.8(2.6)	0.57
Pain in leg	1(1.8)	0.7(1.3)	0.29
Surgical level	2	3	0.05
L3/4	20	21	
L4/5	18	16	
Disc position	Q9	Q7	
Central lateral	21	23	
Foraminal	8	8	
Extraforaminal	2	2	

Table 1

Baseline patient characteristics are shown in Table 1. Total time taken for anaesthesia and the time of operation both were same (Table 2). Radiation time and dosage was less than in TFED. The TFED group had a significantly shorter length of hospital stay (0.7 days ± 0.7, range 0 - 2 vs 1.4 days ± 1.3, range 0 - 9, p < 0.001.

Surgical outcome	TED (n = 40)	Micro (n = 40)	Comparison (p value)
Hospital stay in nights (SD)	0.7	1.4	<0.001
Hospital stay range	(0 - 2)	(0 - 5)	
Anaesthesia and set-up in minutes (SD)	28	29	0.81
Incision to closure in minutes (SD)	61	65	0.94
Radiation time in minutes (SD)	0.94	0.05	<0.001

Table 2

	TED (n = 40)	Micro (n = 40)	Comparison (p value)
3 months	27	27	0.84
1 year	20	20	0.95
2 year	16	18	0.15

Table 3: Post operative patient reported outcomes.

	TED (n = 40)	Micro (n = 40)	Comparison (p value)
Preoperative	0.534	0.531	0.88
1 year (SD)	0.560	0.575	0.97
2 years	0.580	0.582	0.39

Table 4: Health quality of life in post operative period.

Complications

There were no major intra-operative or perioperative complications in either group. Two TFED patients experienced dysesthesias which settled within 2 - 4 weeks. No adverse event reported in micro patient.

Discussion

Outcomes following TFED in patients are comparable to those following Micro. And in many areas TFED is better than Micro. This supports a previous study of TFED and Micro [10]. Pain and radiculopathy was significantly better in the TFED group at 1 year. Reported incidence of postoperative backache was lesser in TFED patients however pain is a subjective feeling and we didn't find any significant difference in both the groups. Outcomes for TFED patients were similar to those reported by Ahn., *et al.* [13]. In this trial, we only included those patients which had non-sequestered herniations [14]. Duration of symptoms displayed quiet a broad spectrum. Those patients with greater than 6 months duration before the surgery showed inferior results compared to those who had a lesser duration before surgery. Once patient was in health

care contact, the preoperative rehabilitation was same for all the patients. Following surgery, patients were referred for rehabilitation and physiotherapy as per standard protocols. We acknowledge that anaesthetic methods differed significantly between the two treatment groups. In this study awake and aware anaesthesia rather than GA was chosen for TFED group. It was a patient safeguard against the nerve root injury. The difference in time taken in anaesthesia did not alter the length of the surgical procedure as such (the longer GA induction for the Micro group was balanced by a longer theatre 'set-up' time for TFED). Awake and aware anaesthesia led to faster 'wake-up time' after surgery and reduced hospital stay found in the TFED group [15]. We consciously tried to distribute the site of disc prolapse in both groups. The transforaminal approach is best for excision of prolapse and widening of the foramen for the exiting nerve root [16]. Access to the L5/S1 disc during TFED is quiet difficult if the patient's pelvic crest is high. Difficulty was with up migrated disc associated with Tans iliac crest approach. For these patients we decided to follow trans iliac crest [24]. However, all outcomes are collected by the patients independently. Conscious and aware anaesthesia was used which could have favoured shorter hospital stay in the TFED group. On this basis, we found no significant between the two groups except for few advantages of TFED as mentioned above.

Conclusion

Transforaminal endoscopic discectomy and microdiscectomy has given comparable outcomes, accept for few advantages of TFED over Micro. They are decreased hospital stay and less pain at 1 year. Early mobilisation of patient, lack of invasiveness and less morbidity makes TFED an ideal day care procedure for coming times.

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