EVALUATION OF EPIDUROPLASTY BY RACZ CATHETER IN POSTLUMBAR LAMINECTOMY SYNDROME WITH AND WITHOUT EPIDUROSCOPY

Ahmed F. El Molla, MD (Egypt), FIPP(USA), PGcert. (UK).

Professor of Anesthesiology & Chief of Pain Relief Unit, Medical Research Institute, Alexandria University, Egypt.

Fellowship of interventional Pain Practice-WIP-USA-Postgraduate Certificate of pain management Cardiff University-UK

E-mail: aelmulla@yahoo.co.uk

Abstract

Epidural fibrosis has been implicated in persistent pain after back surgery. Epiduroplasty is assumed for targeted epidural medication delivery nearby the desired nerve root may result in better relief. The primary goal of the current study was to evaluate the efficacy of flurouscopic-guided epiduroplasty with and without epiduroscopy (EDS) in failed back surgery syndrome (FBSS).

FBSS patients were allocated randomly into two groups; the NON-EDS group in whom patients underwent caudal epiduroplasty by flurouscopic-guided insertion of Racz catheter and the EDS group in whom patients underwent caudal epiduroplasty by flurouscopic-guided insertion of Racz catheter assisted with EDS. Pain severity was measured by visual analogue score for chronic radicular leg pain and functional activities were assessed using Waddel and Main score with a follow up to 6 months, whereas, satisfaction was observed at 3 and 6 months.

There was significant reduction in leg pain score (P<0.001) at 1, 3, and 6 months when compared to the pre-procedure baseline values in both groups. Also, there was significant reduction in leg pain score in EDS group (P<0.001) at 3, and 6 months compared to the non-EDS group. The function abilities and satisfaction scores showed statistical significant improvement (P<0.001) at 3 and 6 months in both groups. No complications were recorded and side effects were minimal.

Epiduroplasty by flurouroscopic-guided insertion of Racz catheter with epiduroscopy assistance is more effective in reduction of mono-segmental unilateral radicular leg pain and improvement of functional abilities with good satisfaction and minimal side effects in FBSS.

Keywords: Epiduroplasty; Racz catheter; Epiduroscopy; FBSS (failed back surgery syndrome)

Introduction

The painful symptoms in FBSS following surgical spinal procedures reflect a combination of pathological processes, such as interruption of blood flow, venous congestion, ischemia, axonal damage and intraneural fibrosis. Epiduroplasty (adhesiolysis) was tried by numerous modalities including invasive and non-invasive techniques. The invasive surgical procedures have proved ineffective in relieving pain in many cases, in addition some complications have been reported. Epidural steroid injection has been one of the “gold standard” in the management of FBSS. Controversy, however, continues its efficacy.

Using fluoroscopy in patients with previous back surgery, epidural steroid injection will spread to reach the level of pathology in only 26% of cases which was attributed to the adhesions which may “shield” the compromised nerve root. Other useful techniques of epidural injections were used e.g. the use of stainless-steel-tipped catheter, transforaminal epiduroplasty and finally epiduroscopy (EDS).

The primary goal of the current study was to evaluate the efficacy of epiduroplasty by flurouscopic guided insertion of Racz catheter with and without epiduroscopy on mono-segmental radicular leg pain severity in FBSS patients. The secondary goals were to evaluate functional abilities, satisfaction, and complications.

Patients & Methods

Patients were randomly allocated into two groups. **Non-EDS group**; the patients underwent epiduroplasty by flurouscopic guided insertion of Racz catheter, whereas, **EDS group**; the patients underwent flurouscopic-guided insertion of Racz catheter with epiduroscopy assistance.

Inclusion criteria: All patients had been undergone discectomy and/or spinal fusion at one or two lumbar disc levels for a persistent lumbar monosegmental unilateral radicular pain within two years. MRI with gadolinium for all patients detected the presence of an enhanced granulation tissue. All other modalities of conservative treatment failed to provide substantial pain relief for at least 6 weeks &/or epidural steroid injections were received at least 3 times without significant pain relief.

Exclusion criteria: Patients who developed signs of progressive motor disorders or incontinence, had local or systemic infections, coagulation disorders or receiving anticoagulants, cerebrovascular disease, CNS space occupying lesions, glaucoma, malignancy, pregnancy, anatomical abnormalities, language barriers and mental handicaps and patients with multi-segmental pain manifestations.

The procedure was done while the patient was placed prone, awake & cooperative; under conscious sedation. In non-EDS a fluoroscopic-guided advancement of 16 gauge epidural needle into the sacral hiatus in both PA & lateral view was performed. Epidurography was done to locate the scar area (filling defect) (fig. 1). In non-EDS group Racz catheter (fig. 2) was passed through the needle into the filling defect. Moreover, a nerve stimulator was applied to the metallic distal end of Racz catheter, in order to locate the target nerve. Thereafter, a protocol for epiduroscopy was followed as in table 1.

Table 1. Protocol of Epiduroplasty.

Time of injections	Solution	Volume
Day of intervention	X-ray contrast media, 240mg/ml	20 ml
	Hyaluronidase in normal saline, 150 U/ml	10 ml
	Bupivacaine 0.25% triamcinolone acetate, 4mg/ml	10 ml
	NaCl, 10% (over 30 minutes)	10 ml
Postprocedure day 1	Bupivacaine 0.25%	10 ml
	NaCl, 10% (over 10 minutes)	10 ml
Postprocedure day 2	Bupivacaine, 0.25%	10 ml
	NaCl, 10% (over 10 minutes)	10 ml

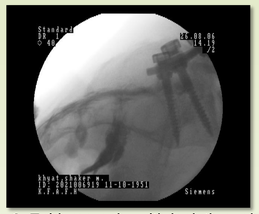

Fig 1. Epidurography with leak through sacral foramen due to high resistance in the epidural space in FBSS patient.

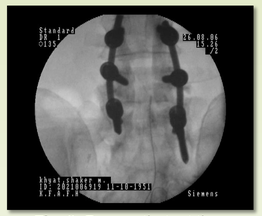

Fig. 2. Racz catheter t the level of L5

In EDS group a 0.8-mm guide wire, was introduced through the 16 gauge epidural needle, was directed cranially. A small incision was made at the introduction site and with the guide in situ, the needle was removed, using Seldinger’s technique by a dilator and introducer sheath. The guide wire and the dilator were then removed.

Through the introducer an epidurography in the same manner as in Non-EDS group was done to identify the filling defect to which epiduroscopy was directed. A flexible, 2.7-mm fibre optic endoscope attached to video-guided camera was introduced into the caudal epidural space. The epidural space was irrigated and distended by infusion of PF saline during the procedure with a total volume infusion not > 100 ml, at rate of not > 30 ml/min and the time from the introduction of EDS was limited to not > 30 min.

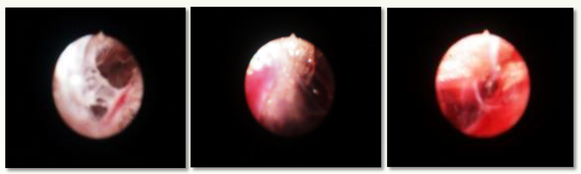

Fig. 3, Epiduroscpic views in FBSS patient.
A, Band of epidural adhesion B, Dense granuloma tissue C, Swollen nerve root.

EDS showed adhesions, granulation tissue, and/or chronic inflammation at the suspected nerve root (Fig. 3), those would mobilized by means of the tip of EDS. Then, the Racz catheter was introduced via the port of epiduroscopy, nerve stimulator was used to locate the desired nerve in the same manner as in Non-EDS group. Next, 1500 U of hyaluronidase in solution with 10 ml of PF saline was injected. Afterward a mixture of 10 ml of bupivacaine 0.25% and 40 mg of triamcinolone were injected through the catheter in divided doses after negative aspiration for further lysis of adhesions. When the procedure is completed in both groups, Racz catheter is secured to the skin with 3-0 silk. The catheter was left in place for 3 days (table 1).

Follow-up protocol
(period at 1,3,& 6 mon)

Pain severity was measured by visual analogue score (VAS) for monosegmental radicular leg pain and functional activities were assessed using Waddell and Main score with a follow up period to 6 months whereas, satisfaction was observed at 3 and 6 months. Success was defined as a reduction of VAS-leg of at least 50%. Post-procedure neurological monitoring (sensory and motor) was done. Complications were monitored with each follow up period.

A single non-treating independent physician or pain nurse, who were blinded to the technique, made all follow up assessment. An epidurography after 6 months for all patients was done to assess the degree of adhesiolysis in a qualtitative manner.

Results

There were no patients missed in the follow up period. Patient’s characteristics and clinical data were comparable in the studied groups (table 2).

Table 2. Patients characteristics and clinical data.

Variable	Non-EDS (n=22)	EDS (n=20)
Gender (M/F)	12/10	9/11
Age (years)	30±12	35±10
Height (cm)	150±7	155±3
Weight (kg)	90±5	85±8
Neurological deficits		
Motor		
Marked	0	0
Mild	13	14
Non	9	6
Sensory		
Marked	2	1
Mild	17	14
Non	3	5
Involved dermatomes		
L_{4-5}	10	11
L_{5-1}	12	9

Data are expressed as mean±SD and number.

VAS-leg pain score was significantly reduced (P<0.0001) compared to the preoperative values at 1, 3, and 6 months. However, leg pain score in EDS group was significantly reduced (P<0.001) at 3 and 6 months compared to Non-EDS group (Fig 4).

Functional activities showed very poor pre-operative abilities with a baseline of 1.74±1.25 and 1.63±1.33 in Non-EDS group and EDS group, respectively. In the postprocedure, the total function scores showed statistical significant improvement (P<0.001) when compared to the preoperative values at 1, 3, and 6 months in both groups. However, functional activities were significantly improved (P<0.05) at 3 and 6 months in EDS group compared to Non-EDS group (Fig. 5).

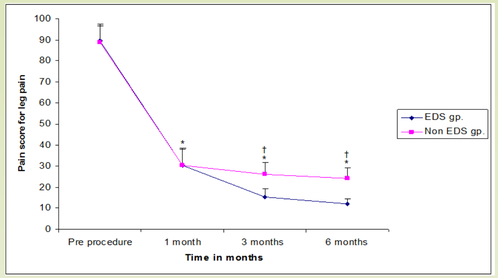

Figure 4. Leg pain score (individual points are represented as mean±SD).
*=Significant compared to pre-procedure value, †=Significant compared to other group.

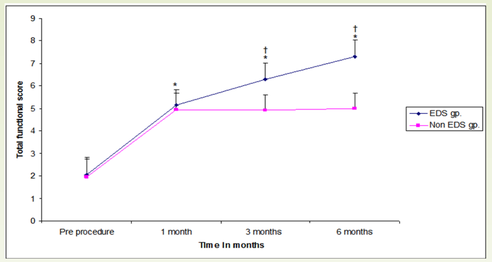

Figure 5. Functional score (individual points are represent as mean ±SD).
*=Significant compared to pre-procedure value, †=Significant compared to other group.

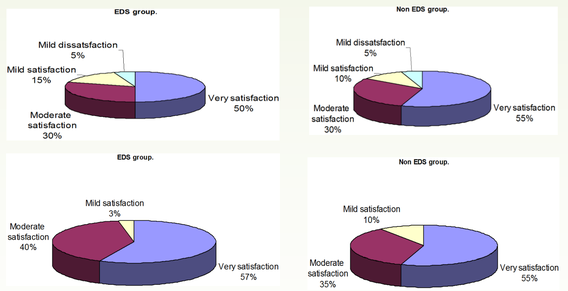

Figure 6. Dissatisfaction/satisfaction score after epiduroplasty at 3 (above) and 6 (below) months.

Conclusion

In conclusion, Epiduroplasty by flurouscopic guided insertion of Racz catheter via epiduroscopy is more effective in reduction of mono-segmental unilateral radicular leg pain and improvement of functional abilities with good satisfaction and minimal side effects in FBSS.