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Drezotomy in the management of post brachial plexus injury neuropathic pain: Preliminary results



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ABSTRACT

Objective: To share our experience of DREZOTOMY in the management of post brachial plexus injury neuropathic pain.

Method: Records of patients with severe neuropathic pain following brachial plexus injury who underwent microsurgical C4-T1 DREZOTOMY were analyzed. Pain relief in the immediate postoperative period, 6 weeks and 6 months was analyzed.

Results: Total of 7 patients from July 2010 to May 2013 were included in the study. Mean age was 41.1 (26–63). There were 6 male and 1 female patients. Five patients had right-sided pain and 2 had left sided dysesthetic pain. All patients had intractable pain not relieved by medications and was affecting their activities of daily living (ADL's). After psychological counseling and detailed analysis cervical laminectomy and DREZOTOMY was performed. Findings were that the posterior rootlets were absent from the DREZ, arachnoid over the area was dull and multiple microcysts were present. Pain relief was assessed in the immediate postoperative period and later. Control of pain was graded as absence or minimal pain, requiring minimal or no analgesics in 3 patients (VAS 0 OR 1), moderate pain as requiring atypical analgesics in 4 patients (VAS 3–4). Pain control at 6 weeks follow up was good for 2 and moderate for 2 patients. At 6 months showed good pain relief in 2 patients and moderate for 2.

Conclusion: Patients whose ADL'S are affected by such pain, microsurgical DREZOTOMY can provide good relief thereby helping them to get back to a better quality of life post trauma. Copyright © 2014, Neurotrauma Society of India. All rights reserved.

1. Introduction

Pain following brachial plexus avulsion injury is resistant to most conventional pain relieving therapies. It was only in 1972 that Sindou first described selective posterior rhizotomy as a procedure for neuropathic pain relief.¹ In 1976 Nashold et al proposed the selective destruction of substantia gelatinosa for post-brachial plexus avulsion injury neuropathic pain and termed it DREZOTOMY.² In this paper we share our experience of Microsurgical DREZOTOMY for intractable post brachial plexus neuropathic pain.

2. Materials and methods

Between July 2010 and May 2013 microsurgical cervical drezotomies were performed on 7 patients with intractable deafferentation pain following brachial plexus avulsion injury.

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An interview of patients was carried out. The demographic details, mode of injury type of pain, medications used were documented.

All patients were evaluated with preoperative and postoperative VAS pain scale. The radiological images of the patients were analyzed which included brachial plexus protocol cervical MRI and X-rays to document avulsion injuries and presence of pseudomeningocoeles.

Patients were counseled regarding the procedure and the expected degree of pain relief as well as probability of continuing analgesics postoperatively, to aid in the complete relief of pain.

Intraoperative findings and postoperative complications if any were recorded and documented.

Follow up was assessed at 6 weeks and at 6 months OPD visit when the VAS scores were reassessed.

3. Results

6 patients were male and 1 was female. The age of patients ranged from 26 years to 63 years (mean age being 41.1 years). The mechanism of injury was secondary to road traffic accident involving motorcyclists in 5 (71.4%), fall into a well in one (14.28%) and injury as a result of fall of a tree branch in one (14.28%). Brachial plexus was injured on the right side in 5 (71.4%) and 2 (28.57%) on the left side. Majority (5) were operated more than 2 years after the injury and only 2 underwent surgery earlier (3 months and at 6 months).

In all cases pain had appeared within a few days after injury. Most of them had pain for many years with one patient having pain for 22 years and another for 18 years. The mean duration of symptoms was 100.71 months (range of 3 months–264 months.). All patients had taken medications both typical analgesics and atypical analgesics in the form tricyclic antidepressants either as monotherapy or as combination therapy. There was either minimal temporary relief or no relief of pain at all, as a result of which many had stopped all forms of drug therapy prior to surgery. One patient had undergone stellate ganglion block for pain relief without much improvement. Pre and postoperative pain relief was graded according to subjective assessment as per Visual Analog Scale (Table 1).

3.1. Surgery and operative findings

DREZOTOMY was done in a standard microsurgical method. A bipolar cautery with a 0.5 mm diameter and insulated at a distance of 2 mm from the tip was used. The lesions were made at an interval of around 2 mm from each other. Depth of individual lesions was 2 mm. The intraoperative findings were that, the roots were avulsed from the cord in all patients. There was evidence of gliosis and the effected segment of the cord was atrophic. The posterior rootlets were absent from the DREZ, the arachnoid over the area was dull and multiple microcysts were present in 5 of the patients (Fig. 1).

Only one patient out of the seven had CSF leak from the wound and was managed with lumbar drain. In this multiple pseudomeningocoeles were encountered during the surgery.

Tab	le 1 –	Clinic	al details of	the patients.					
Sl. No.	Age/ sex	Side	Interval from injury	Previous R _x	Radiology (MRI)	S_x and findings	Preop. VAS	Postop. VAS	Complications
-	33/m	Я	9 yrs	R stellate ganglion block + M	Multiple pseudomeningocoeles C5–C6 on the R	R C5-D1 MDT. Hemiatrophy, roots absent, dull arachnoid. Multiple level pseudomeningocoeles encountered	80	4	CSF leak
7	47/m	ы	18 yrs	M	Pseudomeningocoeles C8–C4 on R. SYRINX C7-T1	R C3–C7 MDT. Hemiatrophy, roots absent, dull arachnoid	ŝ	0-1	None
ŝ	32/m	ы	2 yrs 11 d	Neurotisation 1 yr after injury + M	No pseudomeningocoeles	R C4–C7 MDT. Hemiatrophy, roots absent, dull arachnoid	9	7	None
4	39/m	Ц	4 yrs18 d	Multiple S _x 2004 July, Nov 2004, April 2005 for motor recovery + M	C5–C7 pseudomeningocoeles	L C4-D1 MDT. Hemiatrophy, roots absent, dull arachnoid	∞	m	None
Ŋ	26/m	ы	3 mth	W	No pseudomeningocoeles	R C3-D1 MDT. Roots were avulsed. No hemiatrophy, no pseudomeningocoeles. Arachnoid unremarkable	7	4	None
9	48/f	ц	6 mth	М	R C4–C6 small pseudomeningocoeles	L C4—C7 MDT. Roots were avulsed. No evidence of atrophy of cord	6	4	None
7	63/m	Я	22 yrs	Neurotisation $+ M$	C4-D1 multiple R pseudomeningocoeles	R C4-D1 MDT. Hemiatrophy, roots absent, dull arachnoid	6	1	None
- u	= male,	f = fen	nale, yrs = yea.	rs, mth = month, $d = d$	day, $M =$ medications, $R =$ right, $L =$ left).				

3.2. Pain control

Pain control was graded good if there was minimal (>75% relief) or no pain according to VAS (0 or 1), requiring minimal or no analgesics. Pain control was graded moderate if post-operatively patients required atypical analgesics and there was 25–75% relief as per VAS (3 or 4). Pain control was graded poor if there was less than 25% relief according to post-operative VAS (>4). According to this grading 3 (42.85%) patients had good pain control. 4 (57.14%) patients had moderate pain control immediate postoperative period.

4 patients out of 7 had come for follow up. Out of them 2 had good and 2 had moderate pain control at 6 weeks and 6 months follow up.

4. Discussion

Dorsal horn and Dorsal Root Entry Zone (DREZ) are important integration centers for facilitation and inhibition of the sensory impulses to the spinal cord. The normal uninjured DREZ maintains its neurophysiological balance between afferent and efferent impulses under the control of excitatory and inhibitory mechanisms. With complete and/or partial deafferentation injury, this delicate balance is impaired.³

Neuropathic pain after brachial plexus avulsion injury is real and is often a neglected entity as most patients concentrate on the motor outcome. Pain following brachial plexus avulsion injury is often resistant to most conventional forms of pain relief.⁴ Although not many studies have been carried out, all have concluded that microsurgical DREZOTOMY is a good procedure to relieve such pain when all other modalities have been exhausted.^{5–7}

Microsurgical DREZOTOMY for pain control in the 7 patients who were operated for relief of dysesthetic pain, on 6 months follow up for 4 patients, was good to moderate. These results and complication rates are comparable to previous studies (Table 2). All patients had refractory pain preoperatively. Two patients had undergone DREZOTOMY within 12 months after the injury and it was in these two patients who



Fig. 1 - The intact roots at normal DREZ and absent roots (under the bipolar) at the involved site with evidence of hemiatrophy.

Table 2 – Surgical outcome and complications of various series.

Series	Cases	Good outcome (pain relief)	Complications
Emery et al	37	66.5%	5%
Thompson and Kitchen	44	68%	33%
Friedman et al	39	54%	60%
Sindou MP et al	55%	66%	-
Rath et al	14	61%	33%
Dreval et al	127	87%	25%
NIMHANS	7	50%	14%

on follow up had moderate pain relief. The exact cause of good relief of pain in the patients with trauma more than 2 years and the contrary in the patients operated in less than a year following trauma is not known and needs to be further evaluated. The operative findings in 5 patients showed that the roots were avulsed and there was hemiatrophy of the cord. DREZOTOMY was useful in these patients. The 2 patients who were operated early, patient number 5 and 6 did not show hemiatrophy of cord on the affected side.

5. Conclusion

Dysesthetic pain following brachial plexus injury is often neglected. For patients whose ADL'S are affected by such chronic pain, microsurgical DREZOTOMY can provide good relief from pain, allowing patients to get back to a better quality of life post-trauma.

Conflicts of interest

All authors have none to declare.

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