Original Article

Comparing the Effect of Stellate Ganglion Block and Gabapentin on the Post Mastectomy Pain Syndrome

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ABSTRACT

Objective: To evaluate the effect of stellate ganglion block and gabapentin on post mastectomy pain.

Methods: Sixty patients referred from departments of oncology and surgery to pain clinic were allocated to two groups. In group A, stellate ganglion block was performed with 8ml bupivacaine 0.25%. In group B, patients were treated with gabapentin 900mg per day in three divided doses. Drug dose was increased if necessary until eight weeks**.** Pain score and quality of life were determined. Data were collected before treatment, 48 hours and every 15 days after treatment until three months.

Results: Pain scores at 48 hours after treating were higher in group B than group A and lower at one week, one month and three months after treatment which were statically significant. ($P<0.001$, 0.024, 0.047 and <0.001 respectively)

Conclusions: Gabapentin was found to be superior treatment for chronic pain following breast surgery. (Rawal Med J 2008;33:21-24).

Keywords: Post mastectomy, pain, stellate ganglion, gabapentin.

INTRODUCTION

Neuropathic pain, a persistent chronic pain resulting from damage to the central or peripheral pain signaling pathway includes a range of heterogenous conditions that differ in etiology, location and initiating cause. Steady increase in understanding of anatomical, cellular and molecular basis of neuropathic pain, coupled with the availability of a number of experimental models of neuropathy has permitted relatively rapid progress and the prospects for the emergence of new and effective therapy.[1]

Post mastectomy pain syndrome (PMPS) is a neuropathic pain condition that can follow surgical treatment for breast cancer, including radical mastectomy, modified radical mastectomy, and segmental mastectomy (Lumpectomy).[2] This syndrome consists of persistent pain in the anterior chest, axilla, medial and posterior parts of the arm following breast surgery. The reported incidence of PMPS varies considerably with reports from as low as 4-6%[3] to as high as 100%[4] This pain can be sufficiently severe enough to interfere with sleep and performance of daily activities[5] and patients may develop an immobilized arm, which can lead to severe lymph edema, frozen shoulder syndrome, and complex regional pain syndrome.[6] PMPS can develop from surgical damage to the intercostobrachial nerve, the lateral cutaneous branch of the second intercostal nerve that is often resected at mastectomy.[7] Because it is believed that this nerve is injured in 80-100% of mastectomy patients who undergo an axillary dissection,[8] stellate ganglion block can be a therapeutic option for PMPS. Its symptoms include an electric shock-like pain sensation overlying a continuous aching and burning pain associated with chronic dysesthesia.[9] Pain typically begins in the immediate postoperative period but may be delayed six or more months after surgery.

Anticonvulsants have been used for chronic neuropathic pain and gabapentin was effective in relieving indexes of allodynia and hyperalgesia, so it could be considered for treatment of neuropathic pain.[10,11] In this study, we compared the effect of stellate ganglion block and gabapentin on PMPS.

PATIENTS AND METHODS

After obtaining informed consent from patients and approval from the ethics committee of hospital, sixty patients referred from departments of oncology and surgery to pain clinic for the treatment of PMPS were enrolled in this trial. The study was performed from April 2003 to July 2006 at Tabriz Imam Khomeini Hospital. Patients were randomly allocated to two groups (block randomization). Patients with history of simple mastectomy, lumpectomy, or modified radical mastectomy for breast cancer without any metastasis with at least two of the following symptoms: allodynia, burning pain, shooting pain, hyperalgesia were included. Those with history of radiation, chemotherapy, receiving any concomitant analgesics or other drugs acting on central nervous system, neurological disorders, diabetes mellitus, metastasis and other painful disabling condition such as arthritis were excluded.

In group A, stellate ganglion block was performed with 8ml bupivacaine 0.25%. Block was performed under guided fluoroscopy in anterior approach (Para tracheal) with patients in supine position. We injected drug toward C7 instead of injection toward C6, and used high concentration instead of low.[12] The block was confirmed by registering the following changes in effector organ activity: 1) observed signs (e.g, Horner's syndrome: miosis, ptosis, enophtalmus and redding of sclera) 2) objective measurements of changes in skin temperature, skin blood flow (laser doppler flowmetry) and digital pletismography. Stellate ganglion block was

performed every 5 day (maximum 5 blocks). Patients were examined with appropriate sensory nerve block for possible diffusion of local anesthetic solution.

In group B, patients received gabapentin 900mg per day in three divided doses and dose was increased if necessary upto eight weeks (maximum dose of 1800mg). If any complication occurred, gabapentin was discontinued. Location, onset, quality and degree of pain were assessed by asking patients to rate their pain at the time of responding to the questionnaire. (numerical rating scale:0-10). The quality of life which measured satisfaction of life and difficulties of activity such as daily living and quality of sleep were measured by numerical rating scale (0-10). All data were collected before treatment, 48 hours and every 15 days after treatment until three months. Data were analyzed using the SPSS 13 statistical software package. We used the sample t test for independent variables and repeated measure t- test for pain scores. $P<0.05$ was considered statistically significant.

RESULTS

Patients' age and weight in two groups were not different ($P>0.05$). Type of surgery, onset and site of pain are shown in table 1. Success rate in stellate ganglion block was 83% and 5 patients failed block (they were non-responders but remained in the study and analysis to show the true treatment response). In group A 20 patients were blocked three times, 7 patients four times, and 3 patients five times. Five patients with anterior chest wall pain noted incomplete pain relief from block and needed adjunctive therapy. In group B 70% of patients were medicated for four weeks, 20% for six weeks and 10% for eight weeks. There were no significant differences in pain score between two groups before intervention (table 2). The mean of multiple measured pain score after block showed that pain scores at 48 hours after treating were higher in group B than group A and lower at one week,one month and three months after treatment ($P < 0.001$

,0.024 , 0.047 and <0.001 respectively) (table 2). Mean life quality (satisfaction) score after intervention indicated that life satisfaction in group A was significantly higher than group B (table 3). Sleep quality scores indicated that patients in group B slept better than group A (P=0.03). Patients in group A had good general daily activity than group B (P<0.001).

Table 1. Type of surgery, site and onset of pain.

		Group A		Group B		Total	
		n	%	n	%	n	%
Type of surgery	Lumpectomy	8	26.66	7	23.33	15	25
	Mastectomy	4	13.33	3	10	7	11.6
	Axillary ND*	18	60	20	66.66	38	60.33
Site of pain	Axilla	22	73.3	21	70	43	71.66
	Medial upper arm	21	70	19	63.3	40	66.66
	Chest wall	7	23.3	6	20	13	21.66
	Shoulder						
Onset of pain (post operative)	immediate	20	66.66	23	76.66	43	71.66
	One month	6	20	4	13.33	10	16.66
	Three months	4	13.33	3	10	7	11.66

* node dissection

Fifty-four percent of patients had sleep disturbances after intervention which was more in group A than group B.

DISCUSSION

Different therapies have been used for PMPS which include medical treatment[13] (antidepressants, NSAIDS, antiepileptics, opioids, NMDA receptor antagonists, lidocain, magnesium, adenosine), peripheral nerve stimulation and spinal cord stimulation,[14] nerve blocks,[15] surgery[16] and prevention.[17] Not all anticonvulsant drugs have the same mode of action, which explains why their relief of different symptoms of neuropathic pain (allodynia, hyperalgesia, burning pain) is varied. Gabapentin is a first-choice drug for relieving allodynia and hyperalgesia, but it is usually less effective for decreasing paresthesia and dysesthesia. A combination of gabapentin and amitriptyline reduced the neuropathic pain markedly whereas opioids failed to provide sufficient analgesia.[18]

Table 2. Pain score, before and after therapy in two groups.

Pain score	Group A	Group B	P value
Before treatment	7.46±1.07	7.40±0.85	0.712
After 48 hours	3.86±2.27	6.48±1.00	<0.001
After one week	3.06±1.70	2.33±0.54	0.024
After one month	2.13±1.50	1.36±1.18	0.047
After three months	1.73±1.59	0.53±0.50	<0.001

Mexiletin (600 mg/day) was compared with gabapentin (1200 mg/day) and gabapentin seemed to be superior analgesic for managing acute and chronic pain following breast cancer surgery, since it possesses antihyperalgesic and antiallodynic effects in the setting of peripheral tissue injury.[19] In a multicenter study for treatment of phototherapeutic neuralgia, side effects for gabapentin were somnolence, dizziness, confusion and ataxia, however, these patients were treated with a dose up to 3600 mg /day.[20]

Table 3. Life satisfaction, general activity and sleep quality scores before and after therapy in two groups.

	Group A	Group B	P value
Life satisfaction			
before	2.66±0.92	2.26±0.82	0.103
after	7.03±1.15	5.40±1.40	<0.001
General activity			
before	2.56±0.89	2.50±0.90	0.670
after	7.96±0.99	3.50±1.19	<0.001
Sleep quality			
before	3.10±0.88	2.80±0.93	0.080
after	5.50±1.40	6.60±1.01	0.030

We injected a high concentration of drug toward C7 but same as the other studies it didn't have very good results but better than previous results, which is mostly due to incomplete block. As Malmqvist EL et al concluded, complete criteria of stellate ganglion block were seen in less than 50% of patients.[12] In comparing our groups, pain was less in group A than group B in the first post operative day (P<0.001) but after that, it was significantly less in group B than group A. This shows more rapid onset of analgesic effect in group A which is lost with the periods of time. Thus, stellate ganglion block is not sufficient for analgesia alone and can be used in addition to other therapies to provide rapid onset of analgesia after surgery. Gabapentin gave better quality of sleep but due to its sedative effect, quality of life and general activities were less in group B. In conclusion, stellate ganglion block reduces pain score for short duration and gabapentin can be used as an effective analgesic for more durable effect..

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