TRANSNASAL SPHENOPALATINE GANGLION BLOCK, AN INNOVATIVE MODALITY FOR TREATMENT OF POST DURAL PUNCTURAL HEADACHE

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ABSTRACT

Objective: To evaluate the efficacy of a new& novel technique Sphenopalatine Ganglion Block (SPG) for the treatment of post duralpunctural headache (PDPH) at Combined Military Hospital, Skardu.
Study Design: Case series.
Place and Duration of Study: The study was conducted at department of Anesthesiology, pain and intensive care, Combined Military Hospital, Skardu, from Mar to Oct 2017.
Material and Methods: Total of 53 patients of PDPH fulfilling inclusion criteria were offered SPG block and their response was quantified on visual analogue scale (VAS) from 0-10.
Results: Out of total n=53 all the patients were females, the age of the patients were between 18-37 years, with the mean of 27.08 and ± SD of 5.188), VAS score before undergoing SPG block was between 8 and 10 with the mean of 9.377 ± SD 0.664. For the patients after undergoing SPG block significant decrease on mean i.e. 1.175 with ±SD 0.657 was noted with *p*-value<0.001 which was considered significant.
Conclusion: SPG block was found more innovative modality for treating post duralpunctural headache.

Keywords: Post duralpunctural headache, Sphenopalatine ganglion block, Spinal anesthesia.

INTRODUCTION

Treatment of Post duralpunctural headache (PDPH) has always been a challenge for anesthesiologists. It is an extremely painful condition which not only increases the agony of patients but also results in prolonged hospital stay with extra financial burden on patients and health care facilities[1]. PDPH is a dreadful complication that occurs due to inadvertent dural puncture with a Tuohy's needle while administering epidural anesthesia[2]. More frequently it is a sequel of an intentional dural puncture while performing a spinal anesthetic for obstetrics & lower abdominal surgeries, diagnostic or therapeutic lumbar punctures, intrathecal antineoplastic drugs and certain antibiotics therapies[3]. The incidence and severity of PDPH depends upon number of factors, the types of the needle used (Whitacre spinal needle or Tuohy's epidural needle), number of attempts to administer the block, gender of the patients, as it is most common in obstetric patients. An autologous epidural blood patch (EBP) is considered to be the gold standard for treating.

PDPH when the headache persists even after conservative management such as supine position, hydration, abdominal binder, analgesics, caffeine, sumatriptan, and laxatives[4]. Therapeutic EBP has a success rate ranging from 68% to 90%[5]. Use of the prophylactic EBP in patients who have a DP is not recommended. Success rate of EBP has been reported around 75% in different studies relieving PDPH5.

Invasiveness of the procedure, technical difficulty, inadvertent dural puncture, risk of meningitis, refusal by the patient and delayed relief were the problems which compelled anesthesiologist to look for an easy, less invasive and more effective method of pain relief in settings of PDPH[6]. There are a number of case reports and case series claiming effectiveness of SPG block for the management of spinal headache in obstetric patients[7,8].

SPG block has emerged as a useful technique which is less invasive and has very good results.

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Received: 17 Jan 2018; revised received: 24 Jan 2018; accepted: 25 Jan 2018

It is easy to administer and is not associated with the complications which are common with EBP[9].

The rationale of our study was to evaluate the efficacy of new& novel therapies like SPG

block for the treatment of a PDPH in local setup and avoiding the problems associated with EBP.

PATIENTS AND METHODS

This descriptive cross-sectional study was conducted at department of Anesthesiology, pain and intensive care, Combined Military Hospital, Skardu after taking permission from hospitals ethical review board from March to October 2017. Total 53 patients irrespective of age were included in the study. Sample size was calculated by using W.H.O calculator by keeping the confidence level 95%, confidence interval of 10 and population size 115. Sampling was done by using non probability consecutive sampling technique. All the patients were females as it is common in females and rarely seen in male patients.

All the patients with PDPH who were fulfilling the inclusion criterion of having VAS Score 7-10 and were American Society of Anesthesiologist (ASA) I & II were included in the study whereas patients who were ASA III & IV or having previous history of epistaxis were excluded from the study.

We used 1% lidocaine plain as a therapeutic agent. Because SPG catheter TX 360 was not available in local market so we decided to use a modified technique to administer the block. We used intra venous cannula of 18 gauge (stylet was removed and plastic sheath was used as a conduit), patient was made to lie supine with neck slightly extended, SPG was approached intranasally through middle turbinate and 3-5 ml of 1% lidocaine was sprayed around the mucosa covering the ganglion. Patient was kept in supine position for 2 minutes and after two minutes pain relief of the patient was quantified using visual analogue scale (VAS). Pain assessment was done before giving SPG block and after giving SPG block. On VAS level 0 corresponds to no pain at all and level 10 corresponds severe pain.

The data were entered in SPSS (version 17) software. Descriptive statistics were calculated for both quantitative & qualitative variables. For quantitative variables mean ± SD were calculated. Paired t-test was used for comparison between quantitative variable VAS pre and post SPG) and *p*-value less than and equal to 0.05 was considered significant.

RESULTS

Out of total n=53 all the patients were females. The age of the patients was between 18-37 years, with the mean of 27.08 and ± SD of 5.188 (table-I). VAS level 0 corresponds to no pain at all and level ten corresponds to severe pain. Stratification of descriptive data was done for pain relief, for the patients before undergoing SPG block minimum value was 8 and maximum was 10 with the mean of 9.377 ± SD 0.664. For the patients after undergoing SPG block significant decrease on mean i.e. 1.175 with ± SD 0.657 was noted (table II & III). Paired t-test was applied which gave the *p*-value<0.001 which was considered significant, supporting the decrease in pain after SPG block.

DISCUSSION

The Sphenopalatine ganglion (SPG) is a triangular shaped parasympathetic ganglion which is located in the pterygopalatine fossa about 5 mm in size, anterior to the pterygoid canal and posterior to the middle turbinate[8]. The parasympathetic preganglionic fibers stems from facial nerve in medulla which traverses as a greater petrosal nerve. Post ganglionic parasympathetic fibers innervate lacrimal, salivary and nasal glands. Thesympathetic fibers arise from upper thoracic spinal segments T1-T2. Post ganglionic fibers synapse in superior cervical ganglion and sensory innervation is via mandibular division of trigeminal nerve[9]. This explains why blocking SPG can relieve pain from different etiologies of head & neck particularly migraine, cluster headache and headache due to inflammatory conditions like sinusitis, pharyngitis and mening-

itis. According to the Monro-Kelliedoctrine, total volumes of the brain, cerebrospinal fluid (CSF), and blood in the cranial cavity remains constant. In administration of spinal anesthesia CSF is lost which is compen-sated by intracranial vasodi-lation, this compen-satory response is basis of excruciating PDPH[10]. Because vasodilation is mediated by parasym-pathetic stimulation of neurons synapsing in SPG, blocking of SPG provides pain relief[11]. Lidocaine was known to have anti inflammatory and analgesic properties and intravenous formulation was tried as an alternative to popular remedies for the treatment of acute headache. A 2018 review by Berk and Silberstein studied the mechanisms of action of IV lidocaine in headache patients and concluded that lidocaine possess anti-inflammatory effects and decreases the activity of voltage gated sodium channels (VGSCs) which are instrumental in the transmission of pain signals from the peripheral nervous system[12]. They found that IV lidocaine infusions when used adjunctively with other abortive migraine medications, such as non steriodalanti inflammatory drugs, Dihydroergo-tamine, magnesium or neuroleptics, produced a full response in 25% of patients and a partial response in 57%. The major benefit of IV lidocaine was that combined antinociceptive and analgesic effects of other medications was improved considerably and it also reduced the dosage of other medications. The authors were of the view that with careful cardiac monitoring, the combination of medicines was effective and reasonably safe. It was intranasl application which has altogether created a new dimension of possibilities for pain physicians. Because out of all four parasympathetic ganglia, sphenopalatine (SPG) is the only ganglion which has some direct link to the external environment through the nasal mucosa, pain physicians, anesthesiologists, researchers have became intrigued by the innovative approach this route offers for the delivery of lidocaine to reduce parasympathetic outflow. It is quite pertinent to mention here that neurologists and pain physicians were initially hesitant to use this approach because they were of the belief that intranasal approach may not suit the patients with acute pain. Their hesitation stemmed from the premise that It is difficult and ackward to do as acute treatment for headache patients because they have to lay still and calm, with their head down and instill it, usually they can not tolerate it but lator on after defeating this intellectual inertia they decided to give this novel idea a chance and results were amazing. Because of relatively recent interest of anesthesiologist and pain management experts in the technique, inadequate data is available which is mostly

Table-I: Age stratification.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Age	53	18	37	27.08	5.188
Valid N (listwise)	53				

Table-II: Paired t-test (VAS pre SPG vs Post SPG).

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair-1	VAS-Pre	9.3774	53	0.66438	0.09126
	VAS-Post	1.1745	53	0.65703	0.09025

Table-III: Paired t-test (VAS pre SPG vs Post SPG).

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	SD	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	VAS-Pre – VAS-Post	8.20283	0.90811	0.12474	7.95253	8.45314	65.761	52	0.000

limited to case reports or experience with 2 to 3 patients. Earliest reports in this regard were published by Cohen *et al* in which they studied[22] patients having migraine, cluster headaches and headaches from different etiologies were treated by SPG and results were promising[12]. On the basis of their series Cohen *et al* recommended the use of SPG for PDPH. In 2009 almost eight years after their pilot study Cohen *et al* shared their experience with 13 patients of PDPH who were treated by SPG block, out of 13 patients 11 patients had significant pain relief[13]. In 2018 as a sequelae to their previous research work Cohen *et al*[14] published a 17-year retrospective chart review in which they compared the effectiveness of sphenopalatine ganglion block (SPGB) to epidural blood patch (EBP) for PDPH treatment in postpartum patients. They compared Forty-two patients who received SPGB and 39 patients who received EBP. Residual headache, recovery from associated symptoms, and new treatment complications were compared between the 2 groups at 30 minutes, 1 hour, 24 hours, 48 hours, and 1 week post treatmen. They concluded that significant pain relief was observed in patients who receieved SPG block as compared to those who were offered EBP, it was also concluded that new complication were only observed in patients who received EBP. They proved that sphenopalatine ganglion block (SPG) is relatively safe, reliable and inexpensive option for obstetric patients with PDPH which is very well tolerated by patients. Our experience with 53 patients is so for single largest study in local set up whose results are almost identical with initial experiences[15-17].

Puthenveettil *et al* studied a total of 20 patients who were divided in two groups, group A was treated conservatively and group B was offered SPG block[8]. Their results were promising as they reported that in group A who received conservative treatment, no patients had adequate pain relief (NRS <4) in 30 min after initiation of the study, On the contrary amongst group B who received the spheno palatine ganglion block (SPG) eight out of nine patients (89.99%) had significant pain relief during that time. The results of their research support our results obtained by us. They concluded that other than being effective SPG block is rapid modality for pain relief that can be employed with in minutes after admission of patients in intensive care settings.

Schaffer *et al* in May 2015 shared their experience of treating 46 patients of headache and facial pain with SPG Block, they used TX 360 catheter for the block and reported a 50% reduction in pain in 15 minutes. In our study pain relief was 73 % in first 5 minutes after the block6.

Bratbak *et al* in May 2016 conducted a pilot study of 10 patients of cluster headache by blocking SPG with onabotulinumtoxin. A (BTA), they reported a 50% reduction in headache[18]. They also urged the need to conduct large sized randomized trials to explore the potential of this new and novel technique. We found lidocaine 1% more effective than onabotulinumtoxin A (BTA) because pain relief in our observation and in setting of PDPH was prompter and more promising.

Kent *et al* conducted a series of SPG block for treating PDPH in obstetric patients, they reporteda significant pain relief but once again their experience was limited to three patients. Candido KD, Massey ST, used TX 360 catheter to administer SPG Block and observed a significant pain relief in 15 and 30 minutes duration but their experience is also limited to 3 patient's only[19].

CONCLUSION

Transnasal SPG block is an innovative modality for treating post dural punctural headache. It is minimally invasive, safe, easy and reliable treatment option for PDPH.

RECOMMENDATION

It is strongly recommended that large scale randomized controlled trial to be conducted in tertiary care centers to explore the prospects of this magical technique.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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