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Original Research Article

Efficacy of anatomical landmark guided suprascapular nerve block in arthroscopic shoulder surgeries for post-operative pain management

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ABSTRACT

Background: Minimally invasive arthroscopic shoulder surgery is the treatment of choice for conditions such as rotator cuff injury, arthritis, and tendonitis. The incidence of severe postoperative pain in shoulder arthroscopies is as high as 45%. The aim of this study was to compare post-operative pain management in patients undergoing arthroscopic shoulder surgeries with and without anatomical landmark guided suprascapular nerve block.

Materials and Methods: A Retrospective observational study, data of 44 patients who underwent arthroscopic surgery. Out of the 44 patients, 22 patients had received blind suprascapular nerve block and the other 22 patients didn't receive block. Pain scores (NRS), rescue analgesia for breakthrough pain, and the total fentanyl consumption were recorded for both the groups.

Results: The NRS value between GA+SSNB and GA only groups was statistically significant in immediate (0 hour) postoperative period only (p=0.048). There was no significant difference between the two groups at 1, 4, 8 and 12 hours. There was no significant difference between the two groups in terms of amount of fentanyl consumption over 12 hours (p=0.916) and number of demand doses of fentanyl (p=0.605)

Conclusion: Although the pain relief was better in the immediate postoperative period in patients who received SSNB, there was no difference in the pain over the first 24 hrs of the surgery. Post-operative fentanyl consumption was same in both the groups. We conclude that blind SSNB does not offer additional advantage in terms of pain relief in arthroscopic shoulder surgeries.

1. Introduction

Arthroscopic shoulder surgery, being minimally invasive, is the treatment of choice for conditions such as rotator cuff injury, arthritis, and tendonitis. The incidence of severe postoperative pain in shoulder arthroscopies is as high as 45%.[1] Adequate pain relief after surgery is very essential, as delayed mobilisation of the shoulder can lead to post-operative adhesive capsulitis.[2] Opiates and regional anaesthesia techniques have been routinely used to relieve post-operative pain. Opioid based protocols are associated with adverse effects like nausea, vomiting, pruritus, and sedation. Interscalene brachial plexus block (ISB) has been extensively studied and is the regional technique of choice for shoulder surgery.[3] Although it provides excellent post-operative analgesia and better haemodynamic stability, it is associated with higher incidence of complications such as inadvertent vascular injections, pneumothorax, phrenic nerve palsy and Horner's syndrome. Motor blockade associated with the interscalene block might predispose patients to neuropraxia and render postoperative neurological assessment difficult.[4] Suprascapular nerve block (SSNB) is a novel nerve block used in treatment of chronic shoulder pain.[5–7]

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The Suprascapular nerve (SSN) originates from the C5 and C6 nerve roots of the superior trunk of the brachial plexus. It provides sensory fibres to 70% of the shoulder joint, including the superior and posterosuperior regions of the shoulder joint, capsule, and, variably, the overlying skin. It also supplies the supraspinatus and infraspinatus muscles of the rotator cuff.[6]

SSNB has been described as effective analgesic technique for outpatient shoulder arthroscopy.[8] The advantage of this block is the ease of performing compared to interscalene block, less profound motor block and smaller volume of injectate implying lower risk of systemic toxicity.[9–11]

However, no data is available comparing the effectiveness of anatomical landmark guided SSNB as a post operative analgesic performed at the end of the surgery. The aim of the study is to evaluate the post-operative analgesic efficacy of suprascapular nerve block in shoulder arthroscopic surgeries.

2. Materials and Methods

This is a retrospective observational study conducted in Sakra World Hospital, a tertiary care centre in Bengaluru from October 2020 to May 2021. All patients who underwent arthroscopic shoulder surgeries by single surgeon were included in the study. Patients were excluded if they underwent open surgical procedures, other concurrent surgical procedures, or were under 18yr of age or over 70yrs of age. All patients were congregated into two groups depending on whether the patient received SSNB or not.

2.1. Anaesthesia protocol

As a standard operating protocol in our institute, all the shoulder surgeries were conducted under general anesthesia. The anaesthetic management plan for each patient was based on a combination of patient comorbidities and anaesthetist preference. Once the surgery was over, surgeon gave the SSNB using anatomical bony landmark technique in selected patients. The block was given at the area of suprascapular notch. The scapular spine was identified and the injection site was 2cms cranial and 2cms medial to the midpoint of the spine of the scapula. The needle was inserted down to the scapula at approximately 45 degrees and walked to the scapular notch and after negative aspiration for blood, 20ml of 0.25% bupivacaine injected.

All patients in the post-operative period were put on fentanyl PCA for 12 hours with a bolus dose 20 mics and a lock-out interval of 20 mins and no background infusion. Injection Diclofenac 75mg iv was given as rescue analgesia if the NRS score more than 4.

Demographic information and surgical characteristics, including the type of shoulder surgery, were collected from the anaesthetic record. Anesthesia protocol, agents and opioids during induction and maintenance were reviewed and recorded. The postoperative pain scores, rescue analgesia for breakthrough pain and the total fentanyl consumption were recorded from the Acute Pain Services (APS) sheet.

Quantitative variables were described as means and standard deviations or median and interquartile range based on their distribution. Qualitative variables were presented as count and percentages. The association of qualitative variables between the treatment were analysed using Chi square test or Fisher Exact test as appropriate. Normally distributed quantitative variables were analysed using independent samples student t-test between the groups and repeated measures ANOVA for within group analysis of time course data. Non normally distributed quantitative data and ordinal data were analysed using Mann-whitney U test for between group comparison and Friedman's test for within group analysis of time course data. P – value < 0.05 is taken as level of statistical significance.

3. Results

From October 2020 to May 2021, 44 charts were retrieved for all patients who underwent shoulder surgery by a single surgeon. No significant differences in age, sex, height, weight, ASA status, between the two groups were found. Patient demographics has been summarised in Table 1.

Table 1: Patient demographic characteristics

Total	GA Only	GA + SNNB
No of patients	22	22
Male /Female	12/10	13/9
Age	51.59 ± 12.95	58.95 ± 11.96
Height	165.5 ± 8.5	166.2 ± 8.6
Weight	71.3 ±11.3	67.5 ± 8.6
ASA Status I	9	7
ASA Status II	13	15

Of the total number of cases (44), 33 were rotator cuff repair, 3 were SLAP repair and 4 were bankart repair.

In GA only group the average NRS in the pre operative period was 2.4 ± 1.26 at rest and 5.2 ± 1.1 on movement. In GA+SSNB group the average NRS was 2.09 ± 1.56 at rest and 5.09 ± 1.67 on movement. Preoperative difference between the two groups was statistically insignificant.

The mean NRS in GA only group and in GA+SSNB group is shown in Table 2. The NRS value between the groups was statistically significant in immediate (0 hrs) postoperative period only (p value = 0.048). There was no statistically significant difference between the two groups at 1, 4, 8 and 12 hrs as shown in Table 2.

Table 2: Mean NRS scores of both the groups

Time (HRS)	Groups	Mean± SD	P value
0	GA+SSNB	5 .± 2.29	0.048
	GA only	6.27 ± 1.83	
1	GA+SSNB	4.9 ±1.9	0.828
	GA only	5.0± 1	
4	GA+SSNB	4.4 ±1.8	1.0
	GA only	4.4± 2	
8	GA+SSNB	3.7 ±1.7	0.479
	GA only	3.3 ±2	
12	GA+SSNB	3.1 ±1.22	0.071
	GA only	2.5 ±0.9	

Table 3: Total fentanyl consumption between the groups

Parameter	Type of anesthesia	No of patients	Median	IQR	P – Value
Total fentanyl consumption	GA+SNNB	22	230.00	140,335	0.916
	GA only	22	250.00	135,300	
Fentanyl no of demands	GA+SNNB	22	36.00	19,61	0.605
	GA only	22	43.50	14.75,117	

3.1. Post-operative analgesic consumption

The average amount of fentanyl consumed in the GA only group over 12 hours was 250 mcg and in GA+SNNB group was 230 mcg. No statistically significant difference was observed between the groups. The total number of fentanyl doses demanded over 12 hours was extracted from the charts maintained by the acute pain service. The demanded doses were more in GA only group as compared to GA+SNNB (43 v/s 36). The fentanyl consumption is shown in Table 3. The proportion of patients requiring postoperative rescue analgesics was reviewed. In GA, 18 out of 22 patients received rescue analgesia where as in GA+ SNNB group, 15 out of 22 patients received rescue analgesia.

4. Discussion

Inadequate post operative analgesia is associated with decrease in quality of recovery in the post operative period and use of nerve blocks as adjunctive therapy often can relieve pain and restore activity.ISB has been conventionally used for shoulder surgeries, recently SSNB has been studied given its theoretical efficacy along with the possibility of a reduced complication risk.[12]

In the present study, SSNB was used as an adjunctive mode of analgesia in one group of patients. Both the groups received IV PCA with fentanyl and results were compared. Our study showed that the mean NRS in GA only group in immediate post operative period was 6.273 and 5.09, 4.45, 3.31, 2.59 at 1, 4, 8 and 12 hrs respectively. The mean NRS in GA+SSNB group in immediate post operative period was 5 and 4.95, 4.45, 3.72, and 3.13 at 1, 4, 8 and 12 hrs respectively. These results were in contrast with the study conducted by Park et al in which mean VAS scores in the group with PCA and SSNB was 7.2 and 6.6 at 1h and 12h postoperatively.[11] Kumara et al (2016) compared VAS between ISB and SSNB groups in arthroscopic shoulder surgeries. Their study in contrast had VAS pain scores of 4.1, 3.27, 2.53, 2.43 at 30 min, 1 h, 2 h and 4h postoperatively in the SSNB group.[13] Our study showed that the NRS differed significantly in GA only and GA+ SSNB groups in the immediate post operative period only. The results did not vary significantly at 1, 4, 8, 12 hours between the two groups. These results were in agreement with the results of Lee at al who reported that VAS scores at 1, 3, 6, 12, 18, and 24 h did not differ significantly between SSNB group (6.9, 4.9, 3.9, 3.3, 2.9, 2.4) and placebo group (6.9, 5.2, 4.2, 3.6, 3.0, 2.5) in their study.[10] In a study conducted by Singelyn et al, SSNB group had lower VAS scores of 1.9 and 1.1 during rest at 4 h and 24 h postoperatively. VAS scores during movement was 3.5 at 24 h postoperatively.[14]

In our study, the average amount of fentanyl consumed was 250 mcg in GA only and 230 mcg in GA+SSNB group over 12 hours. No statistically significant difference was observed between the groups. Ovesen et al (2014) in their study noted the supplemental morphine administered during first 24 hours after surgery. They noted no significant difference in total morphine (mg per 24 h) consumption between SSNB (3.65 ± 7.71) and control groups (5.67 ± 10.46) ($p > 0.573$).[15] Park et al used patient controlled analgesia in their study but they did not note the total amount of fentanyl consumed by the patients. On reviewing the literature, no study was found where the patients received patient controlled analgesia. We do have certain limitations of the study, (1) Ultrasound or nerve stimulator for the suprascapular block was not used. (2) Axillary block was not used. (3) Pain score was assessed only at rest in the postoperative period as a shoulder immobiliser was used. (4)

Study conducted in a smaller group of patients.

5. Conclusion

Although the pain relief was better in the immediate postoperative period in patients who received SSNB, there was no difference in the pain over the first 24 hrs of the surgery. Amongst patients who received SSNB versus patients who received only IV PCA, total opioid consumption was not reduced significantly in the SSNB group. We conclude that blind SSNB does not offer additional advantage in terms of pain relief in arthroscopic shoulder surgeries. However, further studies with a larger group of patients can help provide more insight into this method of postoperative analgesia.

6. Source of Funding

None.

7. Conflict of Interest

None.

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