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# Comparison of combined superficial cervical plexus block (SCPB) and intercalene brachial plexus block (IBPB) with general anaesthesia (GA) in patients for clavicle surgery in terms of outcome in the immediate post-op period.

Jonan Puni Kay[1], Seni Potsangbam[2]* Dishingam Gangmei[3], Tongbram Yashobanta[4], Laishram Dhanachandra Singh[5], Daili Khuo[6], T.R.Kumaragurubaran[7]

[1]*MD,Assistant Professor,Department of Anaesthesiology,Jawaharlal Nehru Institute of Medical Sciences,Imphal*
[2]*MD, Assistant Professor, Department of Anaesthesiology,Jawaharlal Nehru Institute of Medical Sciences,Imphal*
[3]*MD,Senior Resident, Department of Anaesthesiology,Jawaharlal Nehru Institute of Medical Sciences,Imphal*
[4]*MD, Senior Resident,Department of Anaesthesiology,Jawaharlal Nehru Institute of Medical Sciences,Imphal*
[5]*Post Graduate Student, Department of Anaesthesiology,Jawaharlal Nehru Institute of Medical Sciences,Imphal*
[6]*Post Graduate Student, Department of Anaesthesiology,Jawaharlal Nehru Institute of Medical Sciences,Imphal*
[7]*Post Graduate Student, Department of Anaesthesiology,Jawaharlal Nehru Institute of Medical Sciences,Imphal*
**Corresponding Author: Seni Potsangbam*

***Background****: General anaesthesia(GA)has the disadvantage of increased neuroendocrine stress, increased usage of drugs, increased postoperative nausea and vomiting (PONV) ,increased sedation and delayed ambulation. Regional anaesthesia(RA) avoids these side effects besides providing superior analgesia and early ambulation in the postoperative period. RA for clavicular surgery has been reserved mainly for analgesia purposes and infrequently used as a sole anaesthetic technique because of its wide nerve supply and consequent difficulty in achieving adequate block. Few case reports showed successful use of combined superficial cervical plexus block and interscalene block as the sole regional anaesthesia technique in clavicular surgeries. But, studies that compares RA with GA for clavicular surgeries in its outcome are lacking.*

***Aims and Objectives:***

*To compare combined superficial cervical plexus and interscalene brachial plexus block with general anaesthesia(GA) in patients for clavicle surgery in terms of :1)Intra operative haemodynamic changes 2)Postoperative analgesia,and 3)Postoperative sedation in the first 24 hours postoperatively.*

***Study Design:*** *Experimental non – randomized clinical trial*

***Methods :*** *Ten patients who opted for RA were compared with ten patients who underwent GA.The RA technique used is combined superficial cervical plexus block and interscalene block .GA was given using conventional method. Intraoperative vitals were recorded using the same parameters in both the groups. Postoperatively, pain scores were evaluated with visual analog scale (VAS) on a horizontal 10 cm scale of 0(no pain) to 10(maximum pain).And sedation scores were evaluated with modified Observer's Assessment of Alertness/Sedation Scale(OAAS) ranging from 0(no response to noxious stimuli) to 5(responds readily to name spoken in normal tone).*

***Results****: The intraoperative blood pressures and heart rates were more stable in the RA group than the GA group. Time for first analgesic demand post surgery was 249 ± 84.91 minutes for RA and 30 ± 31.55 minutes for GA. The postoperative pain scores for the first 2 hours was significantly lesser in RA than GA. Patients in the GA group have more postoperative complaints and interventions. Patient's alertness score was also higher in the RA group than the GA group postoperatively.*

***Conclusion****: Combined superficial cervical plexus block (SCPB) and interscalene brachial plexus block (IBPB) when compared to general anaesthesia (GA) for clavicular surgeries provides better stability of intraoperative vitals with better outcome in the immediate postoperative period.*

***Key words****: Clavicular surgeries,general anaesthesia,superficial cervical plexus block,interscalene block,Visual analog scale.*

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## I. Introduction

General anesthesia has been the mainstay in clavicular surgeries.The relative ease of its administration and making the patients relaxed and unaware during the surgical procedures makes GA suitable for most patients. However, GA has the disadvantages of increased haemodynamic stress response, increased postoperative nausea and vomiting (PONV) ,increased post operative sedation due to the variety of GA drugs used and airway complications such as sore throat caused by endotracheal tube and basal lung atelectasis due to prolonged mechanical ventilation[1-3].All these side effects may delay recovery and may necessitate further close monitoring in the post operative period leading to longer stay in the post anaesthesia care unit (PACU). Regional anaesthesia (RA) such as peripheral nerve blocks(PNB) has the advantage of avoiding all these side effects, provides superior analgesia and early ambulation in the post operative period[2].The incorporation of ultrasonography in RA has further increased the ease and accuracy of the blocks thereby decreasing the transient side effects of PNB such as Horner's syndrome, phrenic nerve palsy,and rare complications such as pneumothorax ,recurrent laryngeal nerve palsy, epidural or intrathecal anaesthesia[4-6].The cost is also relatively lesser for RA than GA[7,8]. Therefore, if there is a suitable regional anesthesia technique that can replace GA, it is probably more beneficial for the patient regarding safety and expenses. However,RA in clavicular surgeries were mainly used for providing analgesia and rarely used for total anaesthesia because of the multiple nerves supply namely the supraclavicular nerves, the subclavian nerve, and the suprascapular nerve,making it difficult to achieve adequate block[9-11]. Succesful use of regional anaesthesia have been reported in selected patients undergoing clavicular surgeries who were not suitable for GA. The peripheral nerve blocks that have been tried for clavicular surgery include :1) combined interscalene and superficial cervical plexus blocks[12] 2) USG–guided placement of combined superficial cervical plexus and selective C5 nerve root catheters[9,10] and 3) selective supraclavicular nerve block using a subclavian approach[13].But there is a lack of studies regarding which technique is the best. And to the best of our knowledge, there is no study done so far which compares the outcome and patient satisfaction between general anaesthesia and regional anaesthesia(peripheral nerve blocks) in clavicular surgeries. Therefore, in this study, we have chosen combined superficial cervical plexus block and interscalene block as the regional anesthesia technique and compared with general aneaesthesia for clavicular surgeries.

## II. Methodology

This was an uncontrolled clinical trial conducted between June 2017 to May 2018 in a tertiary hospital. After obtaining approval from the institutional ethical committee,written informed consents were taken from twenty patients between the age group of 18-65 ,who came for elective clavicular surgery**.**Ten patients who opted for regional anaesthesia were compared with ten patients who underwent GA for the surgery.Patients with neurological deficits of the brachial plexus, phrenic nerve paralysis, local site infections, bleeding diasthesis,and allergy to local anaesthetics ie bupivacaine and lignocaine were excluded from the study.

**GA group:** In the operating room,standard basic anaesthesia monitors were applied to all patients and the baseline parameters were noted.After 3 minutes of preoxygenation,induction was done with fentanyl 2 mcgs/kg ,propofol 1-2mg/kg , vecuronium 0.1mg/kg with O2 and after intubation , maintained on O2:N2O(40:60) and Sevoflurane 1.5% and intermittent vecuronium top ups as required .Intraoperatively,patients were monitored with multi-channel monitors(HR, noninvasive blood pressure, $SpO_2$, $EtCO_2$, electrocardiogram) .The SPO2,SBP,DBP and HR were recorded at 5 mins interval for the first 30 minutes and thereafter every 10 mins till the end of surgery .The time from the start of the surgery (handing over to the surgeons) to the end of surgery were also recorded.Inj diclofenac was given approximately thirty minutes before the completion of the surgery.After the surgery,the patients wree monitored in the PACU for 30 minutes for any side effects or complications,and post operative pain was assessed with visual analogue scale (VAS). Postoperatively, the patients were evaluated for pain with Visual Analogue Scale (VAS) - on a horizontal 10 cm scale rated by the patients that ranges from 0 (no pain ) to 10 (worst pain possible ) at interval of 30 mins,1 hr,2hrs,4hrs,6hr,8 hrs,24hrs after the surgery.VAS score of $\geq 4$ were considered as inadequate analgesia and were treated with IV analgesics. Post operative sedation level of the patients were also evaluated with Observer's Assessment of Alertness/Sedation Scale(OAAS) ranging from 0(no response to noxious stimuli) to 5(responds readily to name spoken in normal tone) at intervals of 30 mins,1 hr,2hrs,4hrs,6hr,8hrs,24hrs after the surgery.

**RA group(Combined SCPB and interscalene block):** Standard anaesthesia monitors were applied to all patients and the baseline parameters were noted.Patients were premedicated with IV midazolam at 0.02mg/kg.Superficial cervical plexus block was given with 10 ml of local anaesthetics (2% lignocaine 5ml + 0.5% bupivacaine 5ml) using landmark technique.Thereafter,USG guided interscalene block was given with 20 ml of local anaesthetics(2% lignocaine 10ml + 0.5% bupivacaine 10ml).The SPo2, SBP,DBP and HR(heart rate) were recorded at 5 mins interval.The onset of anesthesia which was indicated by loss of pain sensation to pin prick over the C3,C4,and C5 dermatome and loss of motor power (inability to abduct or raise the arm).Intraoperative pain score of VAS $\geq 4$ was treated with local anaesthetic infiltration .The side effects or

complications that can arise from the block such as Horner's syndrome(stellate ganglion block), hemidiaphragmatic paralysis (ipsilateral phrenic nerve palsy), and hoarseness of voice(recurrent laryngeal nerve palsy)were also recorded. The time from the start of the surgery (handing over to the surgeons) to the end of the surgery were recorded.The peripheral nerve block was considered successful if the surgery could be completed without having to convert to GA. In the post operative period,all patients were evaluated for pain with Visual Analogue Scale (VAS) - on a horizontal 10 cm scale rated by the patients that ranges from 0 (no pain ) to 10 (worst pain possible ) at interval of 30 mins,1 hr,2hrs,4hrs,6hr,8 hrs,24hrs after the surgery. Patients with VAS score of $\geq 4$ were treated with IV analgesics. Post operative sedation level of the patients were also evaluated with Observer's Assessment of Alertness/Sedation Scale(OAAS) ranging from 0(no response to noxious stimuli) to 5(responds readily to name spoken in normal tone) at intervals of 30 mins,1 hr,2hrs,4hrs,6hr,8hrs,24hrs after the surgery.

## III. Results

The study groups were comparable in terms of the demographic characteristics .Seven patients in the RA group underwent open reduction and internal fixation(ORIF) and the remaining three patients underwent implant removal.In the GA group,four patients underwent ORIF and the remaining six patients underwent implant removal (**table 1)**. All the the patients in RA group were able to complete the surgery successfully without having to convert to GA.

**Table 1.** General Demographic Characteristics and Surgical Procedures:

| Particular | Regional Anaesthesia (n= 10) | General Anaesthesia (n= 10) | P-value |
|---|---|---|---|
| Age | 40.50 ± 12.43 | 37.50 ± 12.87 | 0.602 |
| Weight | 66.10 ± 10.07 | 63.70 ± 12.23 | 0.638 |
| Height | 168.90 ± 6.14 | 167.70 ± 5.49 | 0.638 |
| Gender | | | |
| Male | 8 (80%) | 9 (90%) | |
| Female | 2 (20%) | 1 (10%) | |
| Surgical Procedures | | | |
| ORIF | 7 (70%) | 4 (40%) | |
| Implant Removal | 3 (30%) | 6 (60%) | |

Comparison of the systolic blood pressure (SBP)using t-test showed no significant difference($P<0.05$) between the two groups at baseline and for the first 30 minutes but thereafter the difference in the SBP levels between the two groups becomes significance($P>0.05$) till 120 mins of monitoring indicating more stability of the SBP in the RA group intraoperatively(**table 2**) .Similarly,the changes in diastolic blood pressure(DBP) in the initial 30 minutes were insignificant ($P>0.05$) in comparison but thereafter it becomes significant ($P<0.05$) till 120 minutes of monitoring indicating more stability in the RA group intraoperatively( **table 3**).

**Table 2**. Systolic blood pressure (SBP) of the patients at different time intervals with respect to ( w.r.t.) different types of anaesthesia during surgery.

| Sl.No. | Test variable | Type of anaesthesia | No. of observation | Mean±Std. Dev. | t-test | P-value |
|---|---|---|---|---|---|---|
| 1 | SBP at 0 min ( pre-anaesthesia/baseline) | Regional | 10 | 122.4000±12.02959 | -1.620 | 0.123 |
| | | General | 10 | 132.3000±15.12944 | | |
| 2 | SBP at 5 mins | Regional | 10 | 124.300±11.451 | -1.994 | 0.061 |
| | | General | 10 | 136.800±16.178 | | |
| 3 | SBP at 10 mins | Regional | 10 | 118.700±7.775 | -1.802 | 0.095 |
| | | General | 10 | 128.700±15.734 | | |
| 4 | SBP at 15 mins | Regional | 10 | 119.300±5.438 | -1.416 | 0.184 |
| | | General | 10 | 126.900±16.079 | | |
| 5 | SBP at 20 mins | Regional | 10 | 120.400±8.262 | -1.299 | 0.216 |
| | | General | 10 | 128.200±17.093 | | |
| 6 | SBP at 25 mins | Regional | 10 | 119.900±9.255 | -2.426 | 0.028 |
| | | General | 10 | 133.500±15.124 | | |
| 7 | SBP at 30 mins | Regional | 10 | 121.900±7.325 | -1.766 | 0.102 |
| | | General | 10 | 131.900±16.340 | | |
| 8 | SBP at 40 mins | Regional | 10 | 121.300±6.273 | -2.868 | 0.010* |
| | | General | 10 | 135.000±13.744 | | |
| 9 | SBP at 50 mins | Regional | 10 | 119.200±6.106 | -2.433 | 0.032* |
| | | General | 10 | 132.000±15.478 | | |
| 10 | SBP at 60 mins | Regional | 10 | 118.000±4.295 | -2.952 | 0.014* |
| | | General | 10 | 135.200±17.918 | | |
| 11 | SBP at 70 mins | Regional | 10 | 117.200±4.131 | -2.655 | 0.024* |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | General | 10 | 132.900±18.236 | | |
| 12 | SBP at 80 mins | Regional | 10 | 115.900±5.152 | -3.473 | 0.005* |
| | | General | 10 | 134.900±16.516 | | |
| 13 | SBP at 90 mins | Regional | 10 | 115.900±6.100 | -3.030 | 0.011* |
| | | General | 10 | 133.100±16.882 | | |
| 14 | SBP at 100 mins | Regional | 10 | 115.600±6.381 | -2.795 | 0.017* |
| | | General | 10 | 131.100±16.333 | | |
| 15 | SBP at 110 mins | Regional | 10 | 114.400±6.518 | -3.008 | 0.011* |
| | | General | 10 | 130.900+16.072 | | |
| 16 | SBP at 120 mins | Regional | 10 | 113.700±5.618 | -3.435 | 0.006* |
| | | General | 10 | 132.500±16.372 | | |

* Significance at 0.05 probability level

**Table 3**. Diastolic blood pressure (DBP) of the patients at different time intervals w.r.t. different types of anaesthesia during surgery.

| Sl.No. | Test variable | Type of anaesthesia | No. of observations | Mean±Std. Dev. | F-test (ANOVA) | P-value |
|---|---|---|---|---|---|---|
| 1 | DBP at 0 min(baseline) | Regional | 10 | 79.2000±7.131 | 1.389 | 0.254 |
| | | General | 10 | 89.3000±26.141 | | |
| 2 | DBP at 5 mins | Regional | 10 | 81.0000±7.1655 | 2.543 | 0.128 |
| | | General | 10 | 90.7000±17.852 | | |
| 3 | SBP at 10 mins | Regional | 10 | 77.7000±7.646 | 0.185 | 0.672 |
| | | General | 10 | 80.8000±21.457 | | |
| 4 | SBP at 15 mins | Regional | 10 | 77.7000±7.651 | 0.828 | 0.375 |
| | | General | 10 | 84.0000±20.854 | | |
| 5 | DBP at 20 mins | Regional | 10 | 78.9000±8.937 | 1.849 | 0.191 |
| | | General | 10 | 87.7000±18.409 | | |
| 6 | DBP at 25 mins | Regional | 10 | 80.5000±11.588 | 1.758 | 0.201 |
| | | General | 10 | 89.2000±17.210 | | |
| 7 | DBP at 30 mins | Regional | 10 | 81.0000±9.626 | 1.244 | 0.279 |
| | | General | 10 | 89.5000±22.100 | | |
| 8 | DBP at 40 mins | Regional | 10 | 80.1000±7.695 | 4.536 | 0.047* |
| | | General | 10 | 94.2000±19.470 | | |
| 9 | DBP at 50 mins | Regional | 10 | 79.4000±6.328 | 2.281 | 0.148 |
| | | General | 10 | 89.2000±19.521 | | |
| 10 | DBP at 60 mins | Regional | 10 | 78.9000±6.315 | 5.932 | 0.025* |
| | | General | 10 | 90.8000±14.101 | | |
| 11 | DBP at 70 mins | Regional | 10 | 77.7000±6.093 | 8.030 | 0.011* |
| | | General | 10 | 90.7000±13.166 | | |
| 12 | DBP at 80 mins | Regional | 10 | 76.7000±6.881 | 5.477 | 0.031* |
| | | General | 10 | 88.8000±14.831 | | |
| 13 | DBP at 90 mins | Regional | 10 | 75.9000±5.527 | 7.773 | 0.012* |
| | | General | 10 | 89.7000±14.644 | | |
| 14 | DBP at 100 mins | Regional | 10 | 75.7000±5.314 | 5.130 | 0.036* |
| | | General | 10 | 86.8000±14.559 | | |
| 15 | DBP at 110 mins | Regional | 10 | 74.7000±5.832 | 6.728 | 0.018* |
| | | General | 10 | 86.0000±12.481 | | |
| 16 | DBP at 120 mins | Regional | 10 | 74.5000±5.380 | 7.287 | 0.015* |
| | | General | 10 | 85.3000±11.451 | | |

* Significance at 0.05 probability level

The heart rate (HR) of the patients observed at different time intervals using ANOVA reveals significant difference ($P<0.05$) between the heart beat rates of the patients receiving regional and general anaesthesia. At 0 min, 10 mins, 15 mins, 20 mins, 25 mins and 30 mins , the difference between the means of the heart rates of the patients in the two study groups are found to be significant. Again, at 50 mins, 60 mins and 120 mins , the differences were also found to be significant. The differences of the means do not show a particular pattern. But, correlating with the standard deviations, the fluctuations in the HR with respect to the patients receiving RA were found to be comparatively less than those of the patients receiving GA.

**Table 4**. Examination of heart rate (HR) of the patients at different time intervals w.r.t. different types of anaesthesia during the surgery.

| Sl. No. | Test variable | Type of anaesthesia | No. of observations | Mean±Std. Dev. | F-test (ANOVA) | P-value |
|---|---|---|---|---|---|---|
| 1 | HR at 0 min(baseline) | Regional | 10 | 88.2000±14.25794 | 2.698 | 0.118 |
| | | General | 10 | 77.6000±14.59985 | | |
| 2 | HR at 5 mins | Regional | 10 | 83.0000±9.93311 | 6.572 | 0.020* |
| | | General | 10 | 70.2000±12.27282 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | HR at 10 mins | Regional | 10 | 87.0000±10.64581 | 10.334 | 0.005* |
| | | General | 10 | 68.1000±15.24212 | | |
| 4 | HR at 15 mins | Regional | 10 | 84.8000±10.26104 | 7.477 | 0.014* |
| | | General | 10 | 70.4000±13.11657 | | |
| 5 | HR at 20 mins | Regional | 10 | 83.4000±9.34761 | 7.821 | 0.012* |
| | | General | 10 | 70.5000±11.19772 | | |
| 6 | HR at 25 mins | Regional | 10 | 82.1000±9.31486 | 7.803 | 0.012* |
| | | General | 10 | 68.5000±12.25878 | | |
| 7 | HR at 30 mins | Regional | 10 | 81.3000±8.19282 | 4.552 | 0.047* |
| | | General | 10 | 71.1000±12.70564 | | |
| 8 | HR at 40 mins | Regional | 10 | 80.9000±7.47514 | 3.770 | 0.068 |
| | | General | 10 | 71.9000±12.60908 | | |
| 9 | HR at 50 mins | Regional | 10 | 80.1000±7.10946 | 5.858 | 0.026* |
| | | General | 10 | 68.5000±13.38532 | | |
| 10 | HR at 60 mins | Regional | 10 | 79.7000±7.31893 | 5.099 | 0.037* |
| | | General | 10 | 69.6000±12.10326 | | |
| 11 | HR at 70 mins | Regional | 10 | 78.5000±8.51469 | 2.356 | 0.142 |
| | | General | 10 | 70.2000±14.83090 | | |
| 12 | HR at 80 mins | Regional | 10 | 78.0000±14.83090 | 1.676 | 0.212 |
| | | General | 10 | 71.0000±14.70450 | | |
| 13 | HR at 90 mins | Regional | 10 | 77.9000±7.82375 | 3.982 | 0.061 |
| | | General | 10 | 68.2000±13.23128 | | |
| 14 | HR at 100 mins | Regional | 10 | 77.2000±7.43565 | 1.384 | 0.255 |
| | | General | 10 | 71.2000±14.31239 | | |
| 15 | HR at 110 mins | Regional | 10 | 77.7000±6.61732 | 3.366 | 0.083 |
| | | General | 10 | 70.7000±10.08905 | | |
| 16 | HR at 120 mins | Regional | 10 | 78.0000±6.42910 | 5.695 | 0.028* |
| | | General | 10 | 69.0000±10.04435 | | |

* Significance at 0.05 probability level

The duration of surgery in both the groups were also comparable although it was slightly prolonged in the RA group ie 74.00±18.37mins as compared to GA ie 60.50±4.99 mins..The difference was statistically insignificant ( P > 0.05)**(table 5)** (**fig 1**)**.** However,the time for first analgesic demand post surgery was significantly prolonged in the RA group ie 249.00 ± 84.91 mins as compared to GA group ie 38.00± 31.55 mins (P<0.05)(**table 6**) (**fig 1**).

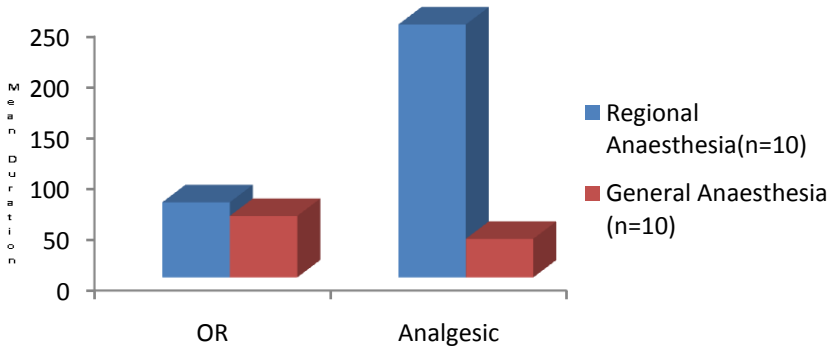
**Table 5.** Duration of surgery with respect to (w.r.t.) different types of anaesthesia

| **Types of anaesthesia** | No. of observations | Duration of surgery ( mins) | t-test | P-value |
|---|---|---|---|---|
| | | Mean ± SD | | |
| Regional | 10 | 74.00 ± 18.37 | 1.800 | 0.089 |
| General | 10 | 60.50 ± 4.99 | | |

**Table 6**. Time for first post operative analgesic injection w.r.t. different types of anaesthesia

| **Types of anaesthesia** | No. of observations | Time for first analgesic demand post-surgery ( mins) | t-test | P-value |
|---|---|---|---|---|
| | | Mean ± SD | | |
| Regional | 10 | 249.00 ± 84.91 | 7.366 | 0.000* |
| General | 10 | 38.00± 31.55 | | |

* Significance at 0.05 probability level




OR = Duration of Surgery in minutes, Analgesic = Time for first post-op analgesic demand in minutes

**Fig 1**.Graph comparing the duration of surgery and duration of analgesia of the study groups

Pre and post operatively, the pain level of the patients were assessed by VAS scale and compared using Mann-Whitney U test. Pre-operatively, there was no significant difference in the pain level between the patients in both groups (**table 7**). But, post operatively, there was significant difference (P<0.05) in the pain level of the patients for the first two hours, where the patients in RA group were found to have lesser pain scores than those in GA group (**table 7**). After four hours of post-operative period, the difference between the level of pain in the study groups became insignificant (P>0.05)(**table 7**).

**Table 7:** Visual Analogue Scale(VAS) for pain in terms of Median scale at different time intervals in the two study groups.

| Sl. No. | Test variable | Type of anaesthesia | No. of observations | Median | Mann-Whitney U test | P-value |
|---|---|---|---|---|---|---|
| 1 | VAS pre-operative | Regional | 10 | 1.00 | 41.000 | 0.475 |
| | | General | 10 | 0.00 | | |
| 2 | VAS at 30 mins post operative | Regional | 10 | 0.00 | 5.000 | 0.000* |
| | | General | 10 | 3.50 | | |
| 3 | VAS at 1 hr post operative | Regional | 10 | 0.00 | 5.000 | 0.000* |
| | | General | 10 | 3.00 | | |
| 4 | VAS at 2 hrs post operative | Regional | 10 | 0.00 | 21.000 | 0.020* |
| | | General | 10 | 2.00 | | |
| 5 | VAS at 4 hrs post operative | Regional | 10 | 1.00 | 42.500 | 0.535 |
| | | General | 10 | 2.00 | | |
| 6 | VAS at 6 hrs post operative | Regional | 10 | 2.50 | 29.500 | 0.104 |
| | | General | 10 | 2.00 | | |
| 7 | VAS at 8 hrs post operative | Regional | 10 | 2.00 | 45.000 | 0.648 |
| | | General | 10 | 2.00 | | |
| 8 | VAS at 24 hrs post operative | Regional | 10 | 2.00 | 30.000 | 0.081 |
| | | General | 10 | 1.00 | | |

* Significance at 0.05 probability level

Post operatively, for the first 24 hours, only pain was the complaint of patients in the RA group while those in GA group reported additional symptoms like nausea, dizziness, sore throat etc.along with the pain. ( **table 8** ) .

**Table 8.** Post-operative complaints of the two groups:

| Type of complaints | Anaesthetic Procedure | |
|---|---|---|
| | Regional Anaesthesia (n=10) | General Anaesthesia (n=10) |
| Pain only | 10 (100%) | 1 (10%) |
| Pain & Nausea | - | 1 (10%) |
| Pain, Nausea & Dizziness | - | 1 (10%) |
| Pain, Nausea & Sore throat | - | 1 (10%) |
| Pain, Nausea, Sore throat & Thirst | - | 1 (10%) |
| Pain & Sore throat | - | 2 (20%) |
| Pain, Sore throat & Thirst | - | 1 (10%) |
| Pain, Sore throat & Dizziness | - | 1 (10%) |
| Pain, Dizziness & Thirst | - | 1 (10%) |

Analysis of patient alertness in the post operative period based on OAAS scale reveals that in the first 2 hours of post-operative period, the patients in RA group were more alert than the patients in GA group. But after 2 hours, there was no significant difference (P>0.05) between the two group up to 24 hours of the post-operative period (**Table 9**).

**Table 9:** Post-operative Observer's Assessment of Alert/Sedation (OAAS) scale at different time intervals in the two study groups:

| Sl. No. | Test variable | Type of anaesthesia | No. of observations | Median | Mann-Whitney U test | P-value |
|---|---|---|---|---|---|---|
| 1 | OAAS scale pre-operative | Regional | 10 | 5 | 35.000 | 0.067 |
| | | General | 10 | 5 | | |
| 2 | OAAS scale at 30 mins post-operative | Regional | 10 | 5 | 25.000 | 0.012* |
| | | General | 10 | 5 | | |
| 3 | OAAS scale at 1 hr post-operative | Regional | 10 | 5 | 30.000 | 0.030* |
| | | General | 10 | 5 | | |
| 4 | OAAS scale at 2 hrs post-operative | Regional | 10 | 5 | 30.000 | 0.029* |
| | | General | 10 | 5 | | |
| 5 | OAAS scale at 4 hrs post-operative | Regional | 10 | 5 | 35.000 | 0.068 |
| | | General | 10 | 5 | | |
| 6 | OAAS scale at 6 hrs post-operative | Regional | 10 | 5 | 35.000 | 0.068 |
| | | General | 10 | 5 | | |
| 7 | OAAS scale at 8 hrs of post-operative | Regional | 10 | 5 | 35.000 | 0.068 |
| | | General | 10 | 5 | | |
| 8 | OAAS scale at 24 hrs post-operation | Regional | 10 | 5 | 50.000 | 1.000 |
| | | General | 10 | 5 | | |

* Significance at 0.05 probability level

## IV. Discussion

The results of our study indicated that clavicular surgeries can be safely performed under regional anaesthesia namely combined superficial cervical plexus block and interscalene block.As compared to those who received GA,patients who received the peripheral nerve blocks had more stable haemodynamics intraoperatively.They had better post operative analgesia and longer duration of analgesic free period in the post operative period leading to lesser consumption of analgesics.The alertness level in the post operative period was also higher in the case of PNBs and they achieved earlier ambulation as compared to those who received GA.

Surgery of the clavicle is relatively rare as they comprise only about 2.6 to 4% of all adult traumatic fractures[14,15].Undispaced fractures of the clavicle are often managed conservatively but due to the rising incidence of malunion or non-union among the displaced fractures,the surgical fixation procedures such as open reduction and internal fixation are gaining popularity in the recent times[16,17].The surgeries of the clavicle were mostly performed under general anaesthesia in the past as studies regarding the use of regional anesthesia such as peripheral nerve blocks in such surgeries were lacking.Moreover,the multiple nerve supplies of the clavicle and the consequent apprehension of inadequate block was always a concern. However, with the advent of ultrasonography in the field of anaesthesia,there has been case reports of successful use of regional anaesthesia for providing perioperative analgesia and anaesthesia in clavicular surgeries. Herring AA et al[11] reported a successful first case of USG – guided superficial cervical plexus block for anesthesia and analgesia for clavicular fracture in emergency care settings. Vandepitte C et al [12] reported a successful use of combined superficial cervical plexus and interscalene blocks for clavicular surgery in a pregnant woman. These case reports suggested the potentiality and possibility of using peripheral nerve blocks in routine clavicular surgeries.A recent study by Balaban O et al [18] who conducted a retrospective observational study on12 patients found that that USG-guided combined interscalene - cervical plexus block can be successfully used for surgery of the clavicle without complications**.** In their study,in addition to the interscalene block,they blocked the cervical plexus deep to the sternocleidomastoid muscle(SCM) but reported no complications such as Horner's syndrome,phrenic nerve palsy etc,which are the common side effects of the blocks.This was supportive of our study where we also successfully performed the combined superficial cervical plexus block(SCPB) and interscalene block without complications. However, for our study, we had chosen to block the superficial cervical plexus subcutaneously along the posterior border of SCM in order to minimise the risk of extension of the local anaesthestics into deeper structures and cause complications.Also,we did not find it necessary to use ultrasonography for the SCPB as we gave the block subcutaneously after marking the posterior border of SCM which was identified easily in all the patients by turning their heads to the opposite side and asking them to lift their heads. Contractor HU et al [19] conducted a prospective observational study on 30 patients and found that USG-guided superficial cervical plexus and interscalene brachial plexus block was effective for routine clavicular surgeries with dexmedetomidine boluses of 1 µg/kg on all the patients after the block was given before the surgery. But to the best of our knowledge,there is no reported study till date that compares the outcome of regional anaesthesia(PNB) with GA in clavicular surgeries.In our study, none of the patients in both groups had hypertension or hypotensive crisis but we found that patients who received GA had greater fluctuations of the blood pressure and heart rate intraoperatively as compared to those patients who received regional anaesthesia(PNBs).This could be explained by the interplay between the dynamics of increased stress response in GA leading to increased level of catecholamines in the circulation at one end and the direct suppressive action of the GA drugs on the CNS and CVS at the other end.Attari MA et al[20] who compared GA with spinal anaesthesia(SA) in patients undergoing elective spinal surgery also reported similar results where the SA group had better haemodynamic stability and lesser blood loss as compared to the GA group.In PNBs,the local anaesthetics are deposited locally around the peripheral nerves thereby decreasing the systemic side effects and resulting in more stable vitals.In our study,the patients in RA group also had better post operative analgesia as depicted by the lesser VAS scores in the first few hours after the surgery as compared to GA group.But,as the action of the local anaesthetic wears off,the VAS scores became comparable in both the groups so that at 4hrs,6hrs,8hrs and 24 hours post operatively,the difference in VAS scores was insignificant.The time for first analgesic demand( analgesic free period)was also significantly prolonged in the RA group ie 249.00 $\pm$84.91 mins as against 30.00$\pm$ 38.55 mins in GA group.This led to lesser consumption of IV analgesics in the immediate post operative period in the RA group as compared those in GA group.The patients in GA group also had other post operative complaints such as PONV,sore throat,dizziness etc, for which they received additional interventions.This increased the overall drugs consumption in the GA group.We did not add any adjuvants to the local anaesthetics for the PNBs..However,we believe that addition of adjuvants like clonidine and dexamethasone could further prolong the duration of action of the blocks.The alertness level of patients in the PACU was also more in the case of RA group who showed higher OAAS/S scores as compared to those in GA group in the first 2 hours after surgery.This could be due to the residual sedative effects of the GA drugs which delayed the recovery of senses in the immediate post operative period.This is in congruent with the study conducted by Hadzic et al[2] who compared infraclavicular nerve block with GA for hand and wrist in outpatients

coming for day-case surgeries.They found that the patients who received regional anaesthesia had faster recovery,fewer adverse events,better analgesia,greater patient acceptance and early discharge from the PACU as compared to those who received GA.In our study also,the patients who received PNBs were able to ambulate early and start oral feeds early decreasing the period of perioperative fasting which was prolonged in those who received GA due to delayed recovery.This increased the comfort and acceptability of the patients in the RA group.However,one can argue that regional anaesthesia is more time consuming than GA delaying the turn over of cases,which usually concerns the surgeon.But they are usually insignificant[2].We believe that this issue of induction time could be solved further by giving the peripheral nerve blocks in the preoperative room with proper monitoring of the vitals before shifting the patient to the OT.The time of induction of the nerve blocks are further decreased in experienced hands.

Our study is limited in that we did not record the induction time for the study groups.The sample size was also very small due to the fact that surgeries of the clavicle were comparatively less in our hospital.It was an uncontrolled study and the patients were grouped according to their choice of anaesthesia.This made our study vulnerable to bias in selection and response of the patients. The follow up period was only 24 hours and the outcome beyond the first post-operative day were not recorded.A randomized controlled trial of larger sample size comparing the two groups will have a stronger implication on the outcome of the study.

## V. Conclusion

We conclude that combined superficial cervical plexus and interscalene blocks when compared to GA provides better outcome in terms of haemodynamics, post operative analgesia and early ambulation in patients undergoing elective clavicular surgeries.

## References


[1]. Harris M,Chung F.Complications of general anaesthesia.Clinics of plastic surgery. 2013 oct;40(4):503-13

[2]. Hadzic A, Arliss J, Kerimoglu B, Karaca PE, Yufa M, Claudio RE, Vloka JD, Rosenquist R, Santos AC, Thys DM . A comparison of infraclavicular nerve block versus general anesthesia for hand and wrist day-case surgeries.Anesthesiology. 2004 Jul;101(1):127-32.

[3]. Movasseghi G, Hassani V, Mohaghegh MR,Safaeian R, Safari S, Zamani MM, Nabizadeh R.Comparison between spinal and general anesthesia in percutaneous nephrolithotomy. Anesth Pain Med. 2013 Dec 26;4(1):e13871

[4]. Alzahrani T,Alnajjar M,Algarni AD. Delayed Horner's syndrome following ultrasound- guided interscalene brachial plexus block. Saudi J Anaesth 2014 Jan;8(1):121-3

[5]. Thukral S, Gupta P,Gupta M. Recurrent laryngeal nerve palsy following interscalene brachial plexus block.How to manage and avoid permanent sequelae? J Anaesthesiol Clin Pharmacol 2015 Apr-Jun;31(2):282-3

[6]. Jariwala A, Raju PB, Coventry DM. Sudden severe postoperative dyspnoea following shoulder surgery: Remember inadvertent phrenic nerve block due to interscalene brachial plexus block. Int J Shoulder Surg 2014;8:51-4

[7]. Chakladar M,White SM. Cost estimates of spinal versus general anaesthesia for fractured neck of femur surgery.Anaesthesia 2010 Aug;65(8):810-4.

[8]. PondeV,Borse D,More J. Is dedicating an ultrasound machine to regional anaesthesia an economically viable option? J Anaesthesiol Clin Pharmacol 2016 Oct-Dec;32(4):519-22

[9]. Kline JP . Ultrasound – guided placement of combined superficial cervical plexus and selective C5 nerve root catheters:A novel approach to treating distal clavicle surgical pain. AANA journal 2013 feb 81(1): 19-22

[10]. Shanthanna H. Ultrasound guided selective cervical nerve root block and superficial cervical plexus block for surgeries on the clavicle. Indian J Anaesth 2014 May-Jun; 58(3): 327–329

[11]. Herring AA, Stone MB, Frenkel O, Chipman A, Nagdev AD.The ultrasound – guided superficial cervical plexus block for anesthesia and analgesia in emergency care settings. American Journal Of Emergency Medicine 2012;30:1263 – 1267.

[12]. Vandepitte C,Latmore M, O'Murchu E et al. Combined interscalene and superficial cervical plexus blocks for surgical repair of a clavicular fracture in a 15 week pregnant woman. International journal of obstetric anesthesia 2014 May,23(2)194-5

[13]. Ueshima H, Otake H. Successful clavicle fracture surgery performed under selective supraclavicular nerve block using the new subclavian approach. JA Clinical reports 2016;2:34

[14]. Donnelly TD, MacFarlane RJ, Nagy MT, Ralte P, Waseem M. Fractures of the Clavicle: An Overview. The Open Orthopaedics Journal. 2013;7:329-333.

[15]. Postacchini F, Gumina S, De Santis P, Albo F. Epidemiology of clavicle fractures. J Shoulder Elbow Surg. 2002;11:452-6.

[16]. Fanter NJ, Kenny RM, Baker CL, Baker CL. Surgical Treatment of Clavicle Fractures in the Adolescent Athlete. Sports Health. 2015;7(2):137-141.

[17]. Paladini P, Pellegrini A, Merolla G, Campi F, Porcellini G. Treatment of Clavicle Fractures. Translational Medicine @ UniSa. 2012;2:47-58.

[18]. Balaban O, Dülgeroğlu TC, Aydın T, "Ultrasound-Guided Combined Interscalene-Cervical Plexus Block for Surgical Anesthesia in Clavicular Fractures: A Retrospective Observational Study," Anesthesiology Research and Practice, vol. 2018, Article ID 7842128, 6 pages

[19]. Contractor HU, Shah VA, Gajjar VA. Ultrasound guided superficial cervical plexus and interscalene brachial plexus block for clavicular surgery. Anaesth Pain & Intensive Care 2016;20(4):447-450

[20]. Attari MA, Mirhosseini SA, Honarmand A, Safavi MR. Spinal anesthesia versus general anesthesia for elective lumbar spine surgery: A randomized clinical trial. Journal of Research in Medical Sciences : The Official Journal of Isfahan University of Medical Sciences. 2011;16(4):524-529.