



**COMPARISON OF ORAL CLONIDINE VS INTERSCALENE BLOCK ON PERIOPERATIVE
HAEMODYNAMIC RESPONSE AND POSTOPERATIVE ANALGESIC REQUIREMENT IN PATIENTS
UNDERGOING SHOULDER ARTHROSCOPIC SURGERY UNDER GENERAL ANAESTHESIA**

Anesthesiology

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ABSTRACT

Shoulder arthroscopic surgery is a minimally invasive surgery that is done to examine or repair the tissues inside or around shoulder joint. Bleeding is a frequent complication that limits the surgeon's field of view and affects the operative technique so hypotensive anaesthesia is commonly used to decrease bleeding and improve visualization. Another problem of shoulder surgery is severe postoperative pain. If postoperative pain and intraoperative bleeding can be taken care of by a single method then patient compliance will be better. The purpose of this study was to investigate the effect of oral clonidine as premedication vs Interscalene block given preoperatively on perioperative haemodynamic response and postoperative analgesic requirement. Fifty patients scheduled for shoulder arthroscopic surgery under general anaesthesia were randomly allocated to receive premedication with either Interscalene block (Group B, n = 25) or oral clonidine 2 - 3 µg/kg (Group C, n = 25) 30 minutes prior to induction. The two groups were compared with respect to haemodynamic parameters, Arthroscopic Visualization Score, Propofol requirement, pain and sedation scores, time to request of analgesic and cumulative analgesic requirements. Oral clonidine was found to be significantly better in terms of maintaining stable haemodynamics, good Arthroscopic Visualization Score and having a Propofol sparing effect compared to the Interscalene group, though time interval to the first request of analgesia postoperatively were nearly same in the two groups i.e. about 4 and half hrs.

KEYWORDS

Shoulder arthroscopy, Clonidine, Interscalene Block, Visual field.

Introduction-

Shoulder arthroscopy is a minimally invasive surgical procedure performed to view the area in and around the joint or repair any tears in tendons, ligaments, or cartilage and remove damaged tissue. Arthroscopy allows for more accurate diagnosis of the shoulder's condition and is a precise treatment for many shoulder conditions^[1]. It is also used to assess the need for further treatment options and possible future surgical procedures. During a shoulder arthroscopy, particularly those involving the sub acromial space, bleeding is a frequent complication that increases Surgeons time and affects the operative technique due to lack of clear visibility^[2,3]. Therefore, without hypotensive anaesthesia the bleeding into the joint space during surgery may be difficult to control. Another limitation is the severe postoperative pain which often accompanies major shoulder surgery^[4]. Large doses of opioids are needed to control the intraoperative and postoperative pain. Opioids can cause many adverse outcomes, such as nausea, vomiting, dizziness, physical dependence, and unexpected sedation^[5]. Though interscalene nerve block provides excellent pain management but neurological complications after regional anaesthesia is quite common also intraoperative blood pressure surge as a result of stress response to surgical stimuli cannot be blunted in totality by this technique^[6].

Clonidine, an α -2 adrenoreceptor agonist exerts central sympatholytic effect and has a half life of 9-12 h. Premedication with clonidine blunts the stress response to surgical stimuli and the narcotic and anaesthetic doses are also reduced. In addition, clonidine increases cardiac baroreceptor reflex sensitivity to increase in systolic blood pressure, and thus stabilises, blood pressure^[7,8].

Clonidine thus may be useful in the anaesthetic management of patients undergoing Arthroscopic shoulder surgeries^[9].

This study was done to compare the effects of oral clonidine premedication versus interscalene block on haemodynamic response and modulation of post-operative pain in patients undergoing arthroscopic shoulder surgeries.

Method- Approval from the Hospital research and ethical committee was taken. A prospective, randomized, single-blind, comparative study was conducted on 50 adult ASA I and ASA II patients undergoing arthroscopic shoulder surgeries. Randomization was done using a computer generated random number table and patients were divided into two groups of 25 each.

Group B patients were given Interscalene block with 40ml local

anaesthetics (20 ml of 1% lignocaine with Adrenaline and 20ml of 0.25% Bupivacaine) 30min before induction.

Group C patients were given clonidine 2-3µg/kg orally 30 min before induction.

Inclusion criteria

ASA grades I and II, both males and females, adult patients aged 20 to 60 years, with scheduled Arthroscopic shoulder surgeries.

Exclusion criteria

ASA physical status>II, Patient with uncontrolled or labile hypertension, Patient with allergy to the study drugs, Patient with psychiatric illness, Patient with hepatic or renal impairment, Pregnant females, Lack of patient consent, Drug dependence, History of bronchial asthma, Severe coronary insufficiency, recent myocardial infarction, Concomitant use of monoamine oxidase inhibitors, tricyclic antidepressants or opioids.

On arrival to the pre hold room SpO₂, pulse, ECG and non-invasive blood pressure was recorded for all patients and a wide bore intravenous line established. Group B patients were given Interscalene block with 40ml local anaesthetics (20 ml of 1% Lignocaine with Adrenaline and 20ml of 0.25% Bupivacaine) 30min before induction. Group C patients received clonidine 2 - 3 µg/kg orally with a sip of water 30 min before induction. On arrival to the OT the patients were pre-medicated with intravenous Ondansetron 0.1mg/kg, Glycopyrrrolate, Midazolam 0.05mg/kg and Fentanyl 2 µg/kg. General anaesthesia was induced with intravenous Propofol 2 mg/kg and Vecuronium 0.1 mg/kg and maintained with sevoflurane- 1% in 67% N₂O/ 33%O₂ mixture. Mechanical ventilation was done to maintain end tidal CO₂ between 30-40 mmHg. Intravenous Paracetamol 1gm was given during the course of surgery. The mean arterial blood pressure (MABP) was maintained at 20% below the pre-operative value by bolus doses of Propofol (if required). Intra-operatively end tidal carbon dioxide (ETCO₂), inspired and expired concentration of Sevoflurane was also measured. In case of severe haemodynamic fluctuations, medical intervention was done. For bradycardia (heart rate lower than 40 bpm), atropine 0.6 mg i.v. was administered. Hypotension (MABP <60 mmHg) was managed with fluid challenges and/or i.v.mephentermine 6 mg bolus. Hypertension (MABP > 110 mmHg) was treated with inj. nitroglycerine 0.5-5µg/kg/min i.v.

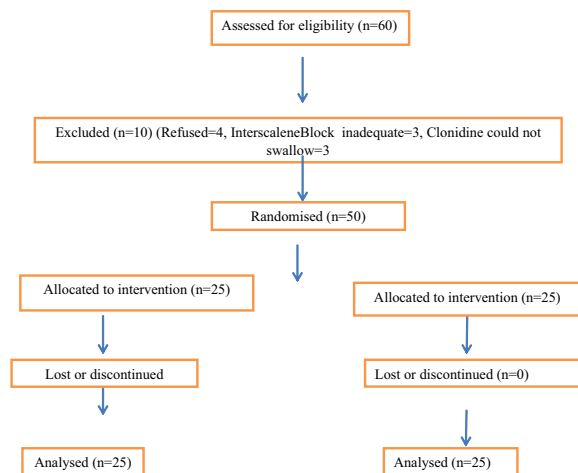
MAP and HR was measured prior to induction, then at intubation and thereafter at 10 min interval intraoperative and at half an hour interval for 4 hrs.post-operative. Occurrence of any adverse events like nausea,

vomiting, hypotension, hypertension and bradycardia were recorded. The arthroscopic visualization was evaluated by the surgeon using a score provided at the end of each step; these scores ranged from 0 to 10, with 10 being the best possible visualization. The scores of the two groups were compared for statistical purposes.

Post operatively pain intensity was assessed using a 10-cm visual analog scale (VAS). Zero denoting no pain and 10 denoting intolerable pain. Sedation was assessed using Ramsay sedation score from 1 to 6. VAS, sedation score and adverse events were recorded at 30 min. interval postoperatively for 4hrs from the time of administration of GA. Time of the first request of analgesic (TAR) signifying the period of time elapsed from the surgery to the time when the first dose of analgesia was given at patients request (VAS>4) was recorded. Rescue analgesia was given in the form of a combination of Inj. Diclofenac sodium 75 mg i.v. over 30 min and Inj. Tramadol Hydrochloride 3 mg/kg i.v. The total dose of post-operative analgesic was also recorded.

Statistical Analysis—Data were collected and expressed as number and mean $\pm$ standard deviation. Statistical significance for continuous variables like Heart rate, Mean Arterial Pressure (MAP) and Arthroscopic Visualization Score was calculated using Independent Samples T Test. Group differences with nominal variables were analysed using Fisher's exact test. A p value of <0.05 was considered to be statistically significant. IBM SPSS software Version 20 was used.

Results:



Consort diagram for the flow off participants in each stage

A total of 50 patients were included in this study, Group B and Group C having 25 patients in each group. Patients of the study groups were comparable with respect to demographic data.

Table: 1 Demography

	Gr B	Gr C
Age(years)	44.32 $\pm$ 10.94	43.24 $\pm$ 11.76
Male	21	20
Female	4	5
Weight (Kg)	53.8 $\pm$ 14.87	52.4 $\pm$ 6.18

Base line values of MAP and HR were comparable in both groups. In B and C groups, there was a significant reduction of intraoperative MAP and heart rate in both groups compared to that of baseline value. The MAP between Group B and Group C just after intubation were comparable. . But there was significantly lower (p < 0.05) MAP in Group C than that of Group B when the MAP was measured at 10 min interval intraoperative and thereafter at half an hour interval till 4 hours post operatively.

Table : 2 Comparison Between MAPS

Time interval	GR B(MAP)	GR C(MAP)	P Value
Base line	88.84 $\pm$ 5.35	85.76 $\pm$ 6.52	0.07
Intubation	95.00 $\pm$ 7.59	93.28 $\pm$ 7.85	0.43
10 min	83.20 $\pm$ 5.55	72.44 $\pm$ 8.00	0.00

20 min	81.44 $\pm$ 5.89	67.48 $\pm$ 6.5	0.00
30 min	80.16 $\pm$ 5.9	65.36 $\pm$ 5.92	0.00
40 min	79.28 $\pm$ 6.73	63.72 $\pm$ 6.58	0.00
50 min	79.84 $\pm$ 6.18	65.00 $\pm$ 5.22	0.00
Extubation	89.1 $\pm$ 3.652	78.0 $\pm$ 11.371	0.00
30 min post op	85.0 $\pm$ 5.003	74.1 $\pm$ 2.481	0.00
1hr post op	80.3 $\pm$ 6.369	68.0 $\pm$ 7.502	0.00
1.5 hr post op	80.0 $\pm$ 5.003	69.1 $\pm$ 2.481	0.00
2 hr post op	78.3 $\pm$ 6.188	71.5 $\pm$ 4.462	0.00
2.5 hr post op	81.1 $\pm$ 3.652	70.0 $\pm$ 11.371	0.00
3hr post op	82.1 $\pm$ 2.541	71.0 $\pm$ 10.260	0.00
3.5 hr post op	79.0 $\pm$ 4.003	68.1 $\pm$ 1.481	0.00
4 hr post op	80.5 $\pm$ 5.685	70.1 $\pm$ 7.508	0.00

The HR between Group B and Group C just after intubation were comparable. But there was significantly lower (p < 0.05) MAP in Group C than that of Group B when the HR was measured at 10 min interval intraoperative and thereafter at half an hour interval till 4 hours post operatively.

Table :3 Comparison Between Heart Rate

Time interval	GR B(heart rate)	GR C(heart rate)	P value
Base line	81.48 $\pm$ 13.03	80.42 $\pm$ 12.03	0.76
At intubation	91.08 $\pm$ 12.10	87.81 $\pm$ 11.17	0.32
10 min	79.44 $\pm$ 7.31	73.65 $\pm$ 9.31	0.01
20 min	80.20 $\pm$ 6.53	67.12 $\pm$ 8.56	0.00
30 min	77.00 $\pm$ 5.39	64.85 $\pm$ 7.72	0.00
40 min	78.40 $\pm$ 5.56	62.50 $\pm$ 7.55	0.00
50 min	78.56 $\pm$ 5.46	63.38 $\pm$ 8.25	0.00
At extubation	109.84 $\pm$ 7.41	89.40 $\pm$ 0.24	0.007
30 min post op	82.3 $\pm$ 6.18	75.5 $\pm$ 4.46	0.00
1 hr post op	94.40 $\pm$ 3.91	83.76 $\pm$ 0.45	0.00
1.5hr post op	94.08 $\pm$ 4.18	83.76 $\pm$ 0.04	0.00
2 hr post op	92.40 $\pm$ 4.32	82.40 $\pm$ 0.32	0.00
2.5hr post op	89.68 $\pm$ 4.42	81.44 $\pm$ 1.33	0.00
3 hr post op	89.5 $\pm$ 5.13	74.6 $\pm$ 4.46	0.00
3.5hr post op	80.5 $\pm$ 5.685	70.1 $\pm$ 7.508	0.00
4 hr post op	89.1 $\pm$ 3.652	78.0 $\pm$ 11.371	0.00

The arthroscopic visualization score of surgeons for the clarity of the surgical field shows that Group C patients have statistically significant (p value < 0.001) higher visualization score than that of Group B patients and therefore having better surgical field than group B.

Arthroscopic Visualization Score

Gr B 7.14 $\pm$ 0.42 Gr C 8.06 $\pm$ 0.58

P value 0.00.

The bolus propofol requirement to achieve the target MAP were significantly higher (Fisher's Exact Test p value 0.018) in Group B. 5 out of 25 patients in Group C required propofol whereas 14 out of 25 patients in Group B required propofol to achieve target MAP.

Table : 4 Propofol requirement

Group	Propofol required	Propofol nit required
Gr B	14	11
Gr C	5	20

Post operative pain score (for 4 hours) using the VAS scale when measured showed no statistically significant difference between the two groups.

Table : 5 VAS Score

Post op time	GR B	GR C	P value
Post op	1.08 $\pm$ 0.277	1.00 $\pm$ 0.277	1.00
1 hr	1.16 $\pm$ 0.374	1.06 $\pm$ 0.277	0.394
2 hr	1.48 $\pm$ 0.510	1.36 $\pm$ 0.490	0.40
3 hr	1.84 $\pm$ 0.374	1.64 $\pm$ 0.490	0.11
4 hr	2.44 $\pm$ 0.583	2.36 $\pm$ 0.638	0.64

Discussion- Shoulder arthroscopy has resulted in an improvement of

the understanding of shoulder injuries and techniques that can be used in shoulder surgeries. The correct performance of the arthroscopic technique requires appropriate visualization through a video camera. Among the many factors that can negatively impact the visual field, bleeding is significant issue, and the possible causes of bleeding and measures that can be taken to mitigate bleeding deserves special attention. Potential methods to decrease bleeding include hypotensive anesthesia, various drugs in infusion for pressure control, use of electrocautery and the addition of epinephrine to the infusion solution. Another issue that often accompanies major shoulder surgery is severe postoperative pain . [4]. Therefore, without large-dose opioids, the pain could be difficult to control. Opioids can cause many adverse outcomes, such as nausea, vomiting, dizziness, physical dependence, and unexpected sedation [5].

A number of studies have assessed postoperative pain severity by comparing regional block with general anesthesia. Previous studies were also conducted using different types of regional blocks or at different time points in relation to the surgeries [10,11]. In this study, we compared oral clonidine vs Interscalene block on perioperative haemodynamic response and postoperative analgesic requirement in patients undergoing Shoulder Arthroscopic Surgery under General Anaesthesia.

Clonidine an α -2 adrenoreceptor agonist exerts central sympatholytic effect. Premedication with clonidine blunts the stress response to surgical stimuli and decreases the narcotic and anaesthetic requirement. In addition, clonidine increases cardiac baroreceptor reflex sensitivity to increase in systolic blood pressure, and thus stabilises blood pressure. The patient's blood pressure declines within 30 to 60 minutes after an oral dose, the maximum decrease occurring within 2 to 4 hours. Clonidine stimulates alpha-adrenoreceptors in the brain stem. This action results in reduced sympathetic outflow from the central nervous system and in decreases in peripheral resistance, renal vascular resistance, heart rate, and blood pressure[12,13,14,15].

Patients' blood pressure levels and heart rate are related to the amount of bleeding. Hypotensive anesthesia is important during any surgical procedure in the shoulder joint as bleeding hinders surgeons visibility through the arthroscope. In our study both the blood pressure and heart rate is seen to be significantly controlled by oral clonidine. The bolus propofol requirement to achieve the target MAP were significantly higher (Fisher's Exact Test p value 0.018) in Group B. 5 out of 25 patients in Group C required Propofol whereas 14 out of 25 patients in Group B required Propofol to achieve target MAP. So, Arthroscopic visualisation score was also better when oral clonidine was used [16].

All patients received general anesthesia, with either interscalene block (ISB) or oral Clonidine [17]. Both anesthetic modalities are safe, as long as they are carried out using proper technique. Both groups were comparable in anesthesia related complications as there was no incidence of nausea ,vomiting, sedation, pruritus, sleep disturbance and constipation postoperatively [18,19]. Placing the patient in lateral decubitus was the standard position in all procedures, there was no known complications related to positioning. As only one surgeon was in charge of all surgeries, it was possible to establish an arthroscopy routine.

In our study, post- operative pain score was evaluated using the VAS scale for 4 hrs ,there was no statistically significant difference between the two groups. Time to requirement of first analgesic was comparable in both groups. Most of the patients in both the groups did not require Diclofenac Sodium and Tramadol Hydrochloride during the post-operative 4-h period.

Conclusion—Thus we can conclude that administration of oral Clonidine 2-3 μ g/kg is a simple and cost effective form of premedication in patients undergoing arthroscopic shoulder surgery, it results in improved perioperative haemodynamic stability and reduction in anaesthetic requirements perioperatively. In addition, it also reduces the post-operative analgesic requirements comparable to that of interscalene block.

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