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RESEARCH ARTICLE

Comparison of clonidine and dexmedetomidine as an adjuvant to local anaesthesia in supraclavicular brachial plexus block for upper limb surgeries.

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Abstract

Introduction: Pain is an inevitable consequence of surgery. Surgical intervention to reduce human suffering is associated with pain and distress to patients.Upper limb surgeries are mostly performed under peripheral blocks(brachial plexus block) and also extend analgesia in the post-operative period.Various adjuvants has been used with local anaesthetic in past to enhance the sensory and motor block as well as for post operative analgesia. Alpha-2 adrenergic receptor agonists have been in the focus for their sedative, postoperative analgesic, intraoperatively & postoperatively haemodynamic stabilizing effects.

Aims and objectives: To compare clonidine 1µg/kg and dexmedetomidine 1µg/kg used as an adjuvant to local anaesthetic (35 ml bupivacaine 0.25%) in supraclavicular brachial plexus block with respect to efficacy in onset and duration of sensory and motor block, potency and duration of analgesia.

Material and methods: The present study was carried out on total 60 patients with ASA I and II , age between 18 to 60 years and were divided into Group C and Group D.

Results: Onset of sensory and motor block in group C was 11.07±2.14 & 15.17±1.76 mins and 9.17±1.262 & 12.63±2.189. Time to complete sensory and motor in group C was 16.4±2.09 mins & 20.17±2.60 mins and group D was 14.8±1.37 mins & 16.4±3.02 mins respectively and was statistically significant (p>0.05) The duration of analgesia was (721.33 ± 88.27) min in D group and (516.00±45.15) min in C group and was statistically highly significant.(p>0.05).

Conclusion:We concluded that dexmedetomidine with local anaesthetic in supraclavicular brachial plexus block enhance sensory and motor block and also the duration of analgesia with good hemodynamic stability and adequate sedation.

Introduction:-

For all the happiness mankind can gain is not in pleasure but in rest from pain"- John Dryden. Pain is an inevitable consequence of surgery. Surgical intervention to reduce human suffering is associated with pain and distress to patients.

Severe postoperative pain can have physiological consequences leading to increase the stress response to surgery, and can alter endocrine-metabolic and inflammatory events that may contribute to dysfunction of organ ,and also may increase morbidity, mortality and hospital stay. The pain actually causes the patient to remain immobile, thus

patient becomes vulnerable to deep venous thrombosis, pulmonary atelectasis, and urinary retention. Besides, restlessness caused by severe pain may cause postoperative hypoxemia [2.]

Acute pain after surgery is the result of a complex physiological reaction to post operative tissue injury. The dorsal horn of the spinal cord is the site where termination of primary afferents occurs and there is complex interaction between such afferent fibers, intrinsic spinal neurons, descending pain modulating fibers, and other neurotransmitters such as acetylcholine, serotonin, adenosine, glutamate and nor-epinephrine in the dorsal horn. Local anesthetics used for different regional nerve blocks are utilized to provide postoperative pain relief in different surgical procedures by blocking signal traffic to the dorsal horn.

The past half century has seen a revolution in how we approach pain with the rethinking of the organization of pain management[(1)] or interruption anywhere in the nerve's pathway .[(3)]

Effective pain control is necessary for optimal care of patients planned for surgery, especially for the patients planned for orthopaedic surgeries as these patients suffer from severe pain in the postoperative period. Pain relief may achieved by various regional anaesthetic techniques after upper limb surgeries. Upper limb surgeries are mostly performed under peripheral blocks such as the brachial plexus block. Peripheral nerve blocks not only provide intraoperative anaesthesia but also extend analgesia in the post-operative period with no other systemic side-effects.[1]

The Supraclavicular brachial plexus block is one of the most popular regional nerve blocks used for upper limb surgeries. Brachial plexus block is an another useful alternative to general anesthesia for upper limb surgeries. They produce complete muscular relaxation, keeps intraoperative hemodynamics maintained and the associated sympathetic block. Given first by Prof Halsted in 1984 and improved by Herschel kulenkampff and Winnie it became a first choice of anaesthesia for upper limb surgeries as it minimally alters systemic physiology ,good choice for day care and emergency surgery even in full stomach patients and in serious patients where general anaesthesia is undesirable [(4)]
Use of peripheral nerve blocks allows bypass of the phase I anesthetic recovery room, and reduce the prolong post-anesthesia care unit (PACU) stay, thereby decreasing overall cost of hospital stay. Peripheral nerve blocks also provide analgesia in the immediate postoperative period.

Supraclavicular approach for brachial plexus block is most commonly used for upper limb surgeries. It is performed at the level of the brachial plexus branches are in close proximity to each other so entire arm can be blocked successfully (hence the name – "spinal of the arm").It is good for forearm/hand surgery. The major limitation of regional anaesthesia slow onset time, short duration of action and limited duration of postoperative analgesia. Different adjuvant have been tried to overcome these limitations.

There has always been a search for adjuvants to the regional nerve block with drugs that prolong the duration of analgesia but with lesser adverse effects. The search for the ideal additive continues, and led us to try the α2 adrenergic agent, dexmedetomidine and clonidine.

Alpha-2 adrenergic receptor agonists have been in the focus for their sedative, postoperative analgesic, intraoperatively & postoperatively haemodynamic stabilizing effects with reduced anaesthetic requirements. They are used as an adjuvant with local anaesthetic to enhance the duration of spinal, extradural and peripheral nerve blocks. [(5)(6)(7)] Alpha 2 adrenergic agonist drugs improves the nerve block characteristic of local anesthetic agents by local vasoconstriction and facilitation of C fiber blockade or a spinal action which is caused by slow retrograde axonal transport or simple diffusion along the nerve.

Clonidine is an alpha 2 adrenergic agonist with few alpha 1 agonist properties. Clonidine possibly increases the sodium channel blockade action of local anesthetics and opens the potassium channels which results in hyper polarization of membranes, a condition in which the cell is not responsive to excitatory input. Clonidine is also used as an anti-hypertensive agent. Several studies have shown in the past that clonidine also increases the analgesic effect and have significant peripheral antinociceptive effects. Local administration of clonidine alone showed very limited clinical efficacy. The major role of clonidine is as an adjuvant to other analgesic, as shown in number of studies where clonidine has been investigated in combination with local anaesthetic agents to enhance the effects. During the past decade clonidine has been used as an adjuvant for general and regional anaesthesia and in the post-

operative period. Clonidine as an adjuvant improves analgesia after peripheral nerve blocks, and prolongs the analgesic action of local anaesthetics agent. [8]

Dexmedetomidine, is a potent α2 adrenoceptor agonist, is approximately eight-times more selective towards the α2 adrenoceptor than clonidine.[9] Other clinical studies have showed that intravenous dexmedetomidine resulted in significant opioid sparing effects and also decrease the requirements of inhalational anaesthetic. In various studies, dexmedetomidine has been reported to increase sensory and motor blockade also prolongs the duration of analgesia.[10][11][12][13] In humans, dexmedetomidine has also shown to increase the duration of block and post-operative analgesia when used with local anaesthetic in various regional blocks[14][15][16][17].

Our study is designed to compare clonidine with dexmedetomidine, when used as an adjunct to bupivacaine (local anesthetic) in supraclavicular brachial plexus block planned for upper limb surgeries, in terms of efficacy in onset, duration, potency of sensory, motor block, sedation score and analgesia .

Material and methods:-

The present study "Comparison of clonidine (1μg/kg) and dexmedetomidine (1 μg/kg) as an adjunct to local anaesthetic solution in Supraclavicular brachial plexus block in upper limb surgeries" was carried out in the Anaesthesia Department of SBKS medical college and research centre, Piparia, Vadodara after getting approval from the institutional ethics and research committee.

Study Population:-Total 60 patients of ASA I & II of either sex, 30 patients in each group planned for elective upper limb surgeries.

Study Design:-
A randomized, prospective and comparative study

Duration of study:-
One and half years

Inclusion Criteria:-
Patients with

- ASA I and II physical status,
- Within the age group of 18 to 60 years of both genders.
- Undergoing upper limb surgeries

Exclusion Criteria:-

- ASA III and above.
- Patients refusal.
- Patients with coagulopathy or on anti coagulants
- Patients with central and peripheral neuropathy
- Local cutaneous infections
- Pregnant and lactating patients
- Patients with known hypersensitivity to study drugs.
- Patients with severe cardiopulmonary disorders
- Patients with pneumothorax and chest injuries .
- Patients with personality disorder.

Patients were assessed prior to surgery, detailed history was elicited. Detailed systemic and local examination was done. All routine and relevant investigations were done and whenever required specific investigations were asked for and ASA grading of the patient was determined. Patient was informed about the anaesthesia procedure, drugs that would be used, its effects and side effects. Written and informed consent was taken. Patients who fulfilled the inclusion and exclusion criteria and satisfied the requirement of preoperative evaluation were selected for the study. Visual analogue scale was explained to the patient. Bupivacaine sensitivity test was done. Patients were randomly divided into two groups C and D, of thirty patients each.

Preapartion of solution:-
Group C
Bupivacaine 0.25% (35 cc) + inj clonidine 1 µg / kg.
Group D
Bupivacaine 0.25% (35 cc) + inj dexmedetomidine 1 µg / kg

Procedure:-

All patients were kept nil per mouth for 6 hours prior to surgery. Intravenous access was secured with 18 G cannula on non operated hand, and IV Ringer Lactate was started. All patients were premedicated with Inj Glycopyrrolate 0.2mg and Inj Ondensetron 4 mg.

All the necessary equipment's and drugs needed for administration of general anaesthesia and for resuscitation was kept ready in order to manage the case of failed block or toxic reactions occurring during the procedure

Following monitors were connected to the patients in the operating room-

1. Pulse oximeter
2. Non invasive blood pressure monitor
3. Three lead ECG monitoring.

Baseline parameters were recorded i.e.

- Pulse rate
- Systolic (SBP) and diastolic (DBP) Blood Pressure
- SpO2 on room air

Patient was placed in supine position. A pillow was placed below the shoulder to make landmarks prominent. The head was turned 35^0- 45^0 away to the contralateral side. The arm to be anaesthetized was adducted. The midpoint of the clavicle was identified and marked. By asking the patient to raise his head slightly the posterior border of sternocleidomastoid was palpated. The palpating fingers were rolled over the belly of the anterior scalene muscle into the interscalene groove, where a mark was made approximately1.5 to 2.0cm posterior to the midpoint of clavicle and around 1finger breadth above the clavicle. Palpation of the subclavian artery at this site confirmed the landmark. The block was performed by the classical (mode) approach using 22 G with nerve stimulator technique.

The electrical stimulation was started with an intensity of 3.0 mA and a pulse width of 100 ms.

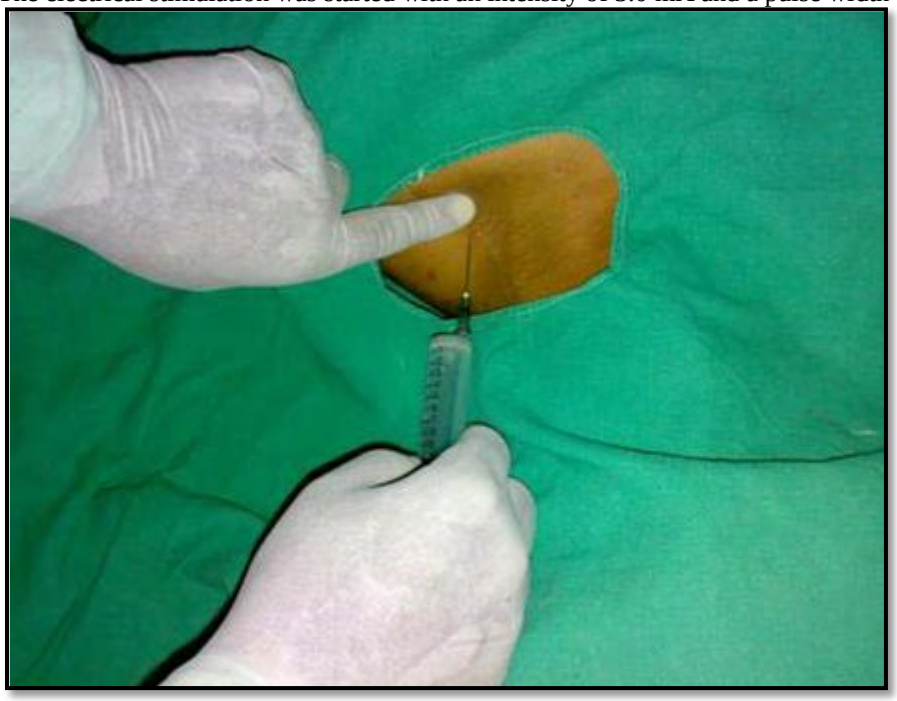


Fig 8

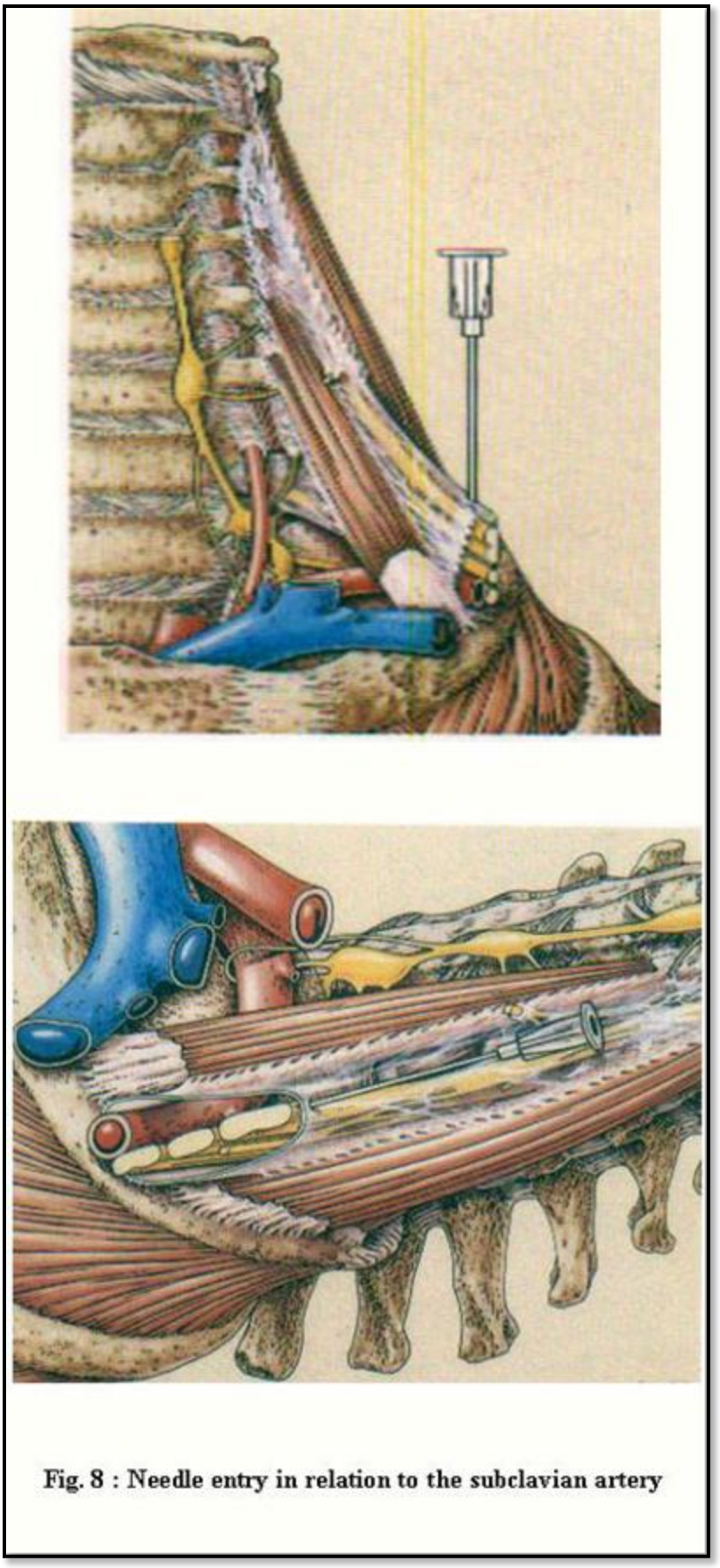


Fig. 8 : Needle entry in relation to the subclavian artery

Once the desired response was obtained, a distal motor response in the median nerve region, the current strength was reduced in cerements of 1 mA to 0.5 mA. If the desired response persisted at 0.5 mA the drug solution containing 35 ml bupivacaine 0.25% combined with clonidine or dexmedetomidine as mentioned above was injected following negative aspiration for blood.. A 3-min massage to be performed to facilitate an even drug distribution.

Parameters Observed:-

- Onset and duration of sensory blockade
- Onset and duration of motor blockade
- Duration of postoperative analgesia
- Side effects, if any

Assessment:-

- The sensory block was evaluated by pinprick on skin dermatomes C4 to T2 with 22G hypodermic needle
- Motor block was evaluated by thumb movements e.g. abduction (Radial nerve), adduction(ulnar nerve), Opposition(Median nerve). Musculocutaneous nerve block assessed by flexion of elbow and supination-pronation of forearm
- Hollmen scale was used to assess both sensory and motor blockade

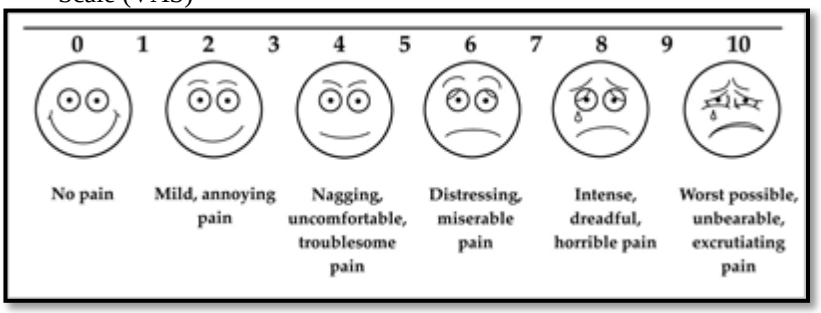
Sensory Block:-

1. normal sensation of pinprick,
2. pin prick felt as sharp pointed but weaker compared with same area in the other upper limb,
3. pin prick recognised as touch with blunt object,
4. no perception of pin prick

Motor block:-

1. normal muscle function,
2. slight weakness in function,
3. very weak muscular action,
4. complete loss of muscle action

- Evaluation was carried out for every 2min for the first 10min afer completion of the injection and after that every 15min intraoperatively till the end of surgery. The time of onset was noted for both sensory and motor blockade
- Time to onset of sensory and motor block was considered as the interval between completion of local anaesthetic injection and grade 2 in sensory block.
- Time to complete sensory block: was considered as interval between completion of local anaesthetic injection and achievement of grade 4.
- Time to complete motor block: was considered as interval between completion of local anaesthetic injection and Grade-4 motor blockade.
- The duration of sensory blockade, defined as the time between onset of action and return of pinprick response in at least 3 major nerve distributions.
- Duration of motor blockade was considered as the time interval between onset of action and the ability of the patient to move his fingers.
- Duration of Analgesia was considered as the time interval between the completion of local anaesthetic injection and the onset of pain in the postoperative period. (vas >3) It was assessed by Visual Analogue Scale (VAS)



- If supplementation with IV analgesia or general anaesthesia was required due to inadequate/ partial block, the case was not included in study.
- All patients received O2 through venti mask at the rate 5-6litres/min throughout the procedure and postoperatively in PACU
- All patients were monitored with continuous pulse rate, systolic blood pressure, diastolic blood pressure ,ECG ,SPO2,Respiratory rate every 15min intraoperatively till the end of surgery.
- Intraop sedation was noted as per Ramsay sedation score-

Score	Response
	Anxious or restless or both
	Cooperative, oriented and tranquil
	Responding to commands
	Brisk response to stimulus
	Sluggish response to stimulus
	No response to stimulus

Intraoperative complications can occur and should be observed and treated. Complications are as follows

- Bradycardia was defined as drop in heart rate <50 beats/minutes. It was treated with injection Atropine 0.6mg i.v.
- Hypotension was defined as drop in systolic BP >20% of the preoperative value. It was treated with I.V. fluids and injection ephedrine boluses of 6mg. Total dose of ephedrine required by the patients were noted.
- Respiratory depression: Respiratory depression was considered if RR<8/min or SPO2 <90%.,
- pneumothorax,
- Horners syndrome,
- hematoma at the site of injection,
- nausea, vomiting
- Postoperatively Patients were shifted to PACU .Continuous spo2 and 1hrly pulse and manual BP were recorded. Postoperative complication like prolonged ipsilateral arm weakness was looked.
- Postoperative analgesia was provided by injection Diclofenac IM 1mg/kg on demand when VAS>3.
- Inj Ondensetron 0.05 to 0.15mg/kg iv was given for nausea and vomiting.

Statistical analysis:-

- Qualitative data was represented in form of frequency and percentage.
- Association between qualitative variables was assessed by Chi-Square test with Continuity Correction for all 2 X 2 tables and Fisher's exact test for all 2 X 2 tables where p-value of Chi-Square test was not valid due to small counts. Adjacent row data of more than 2X2 tables was pooled and Chi-Square test reapplied in case more than 20.0% cells having expected count less than 5.
- Quantitative data was represented using mean±sd and Median & IQR (Interquartile range).
- Analysis of Quantitative data between the two groups was done using unpaired t-test if data passes 'Normality test' and by Mann-Whitney Test if data fails 'Normality test'.
- Analysis of Quantitative data measured over more than 2 times was done using Repeated Measures ANOVA if data passed 'Normality test' and by Friedman's Repeated Measures ANOVA on Ranks test if data failed 'Normality test', with application of appropriate Post Hoc test if P-value of ANOVA came statistically significant. (p> 0.05 Not Significant)
- Results were graphically represented. SPSS (Statistical package for social sciences) Version 17 was used for most analysis.

Results and analysis:-

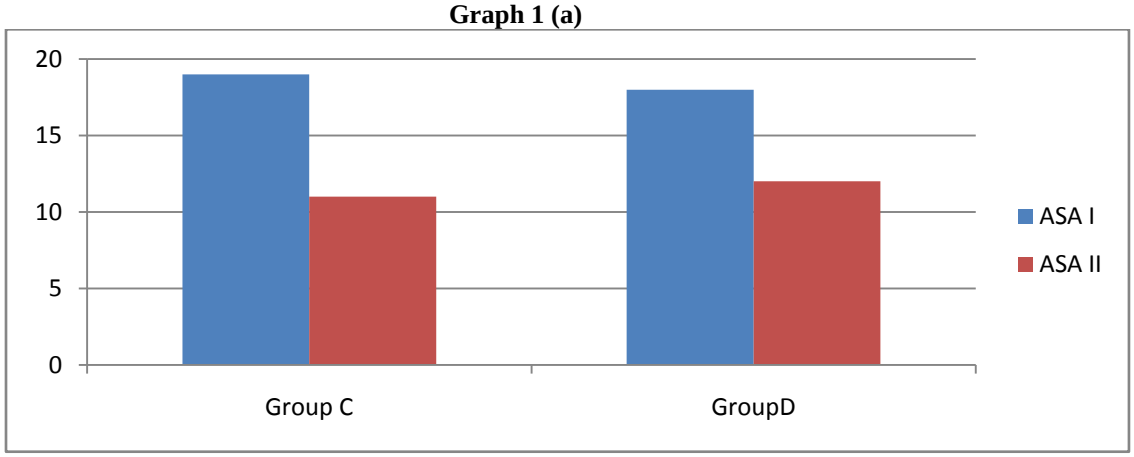
We conducted this prospective, randomized, comparative study to assess and compare the safety and efficacy of postoperative analgesia between Clonidine (1mcg/kg) and Dexmedetomidine (1µg/kg) added to local anaesthetic solution administered through supraclavicular brachial plexus block in patients undergoing upper limb surgeries

All 60 patients enrolled in the study, completed the study according to the protocol and were included in the analysis. The two groups were as follows

Group C (n=30): Received Supraclavicular brachial plexus block with a mixture of 0.25% Bupivacaine 35ml with Clonidine (1 µg/kg).

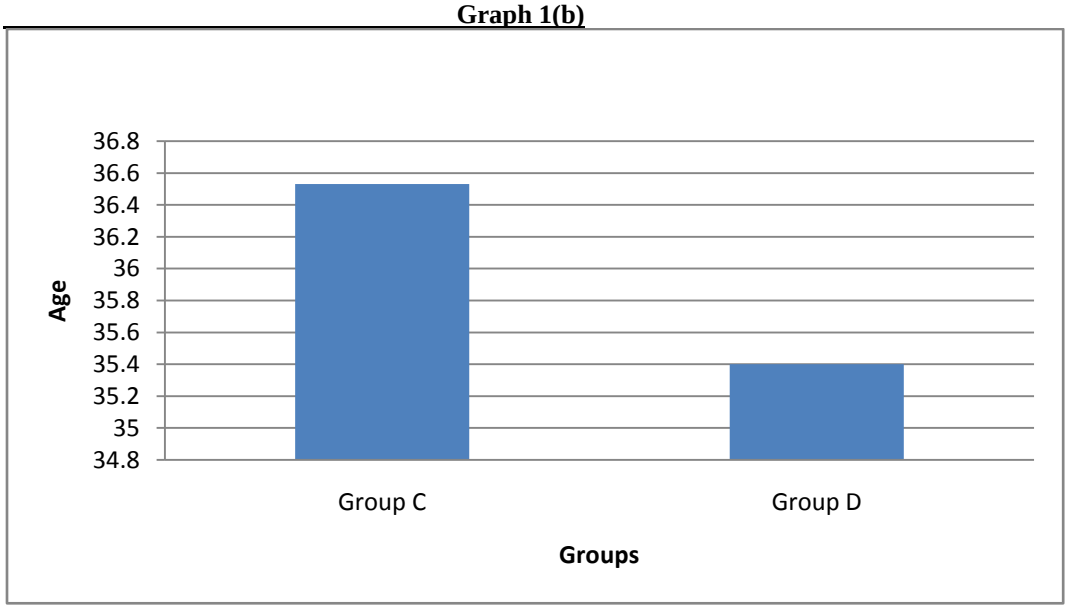
Group D (n=30): Received Supraclavicular brachial plexus block with a mixture of 0.25% Bupivacaine 35ml with dexmedetomidine (1 µg/kg) .
Following parameters and data were analysed

Graph 1 (a)



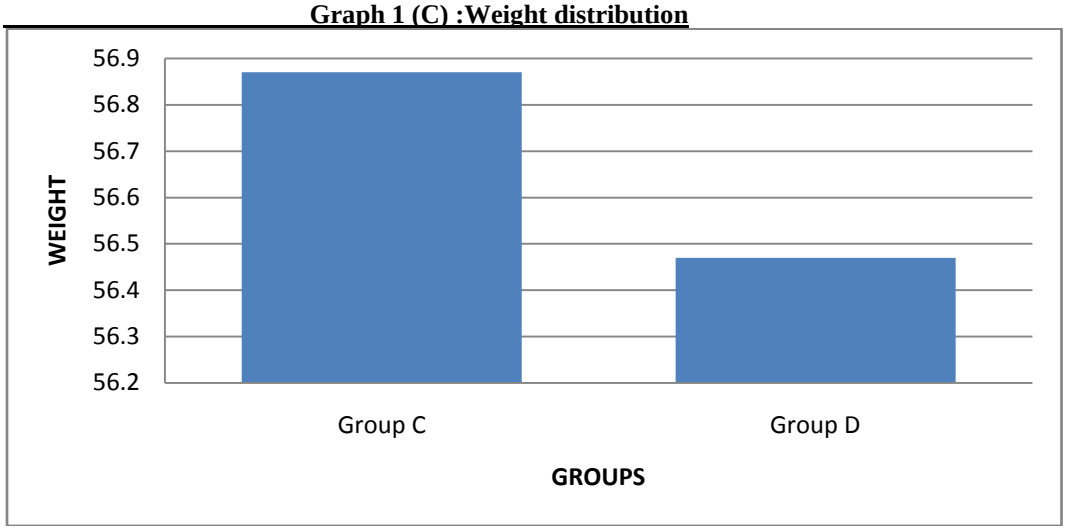
ASA status of both groups (table 1 and graph 1a) was comparable. There was no statistically significant difference between two groups (p >0.05).

Graph 1(b)



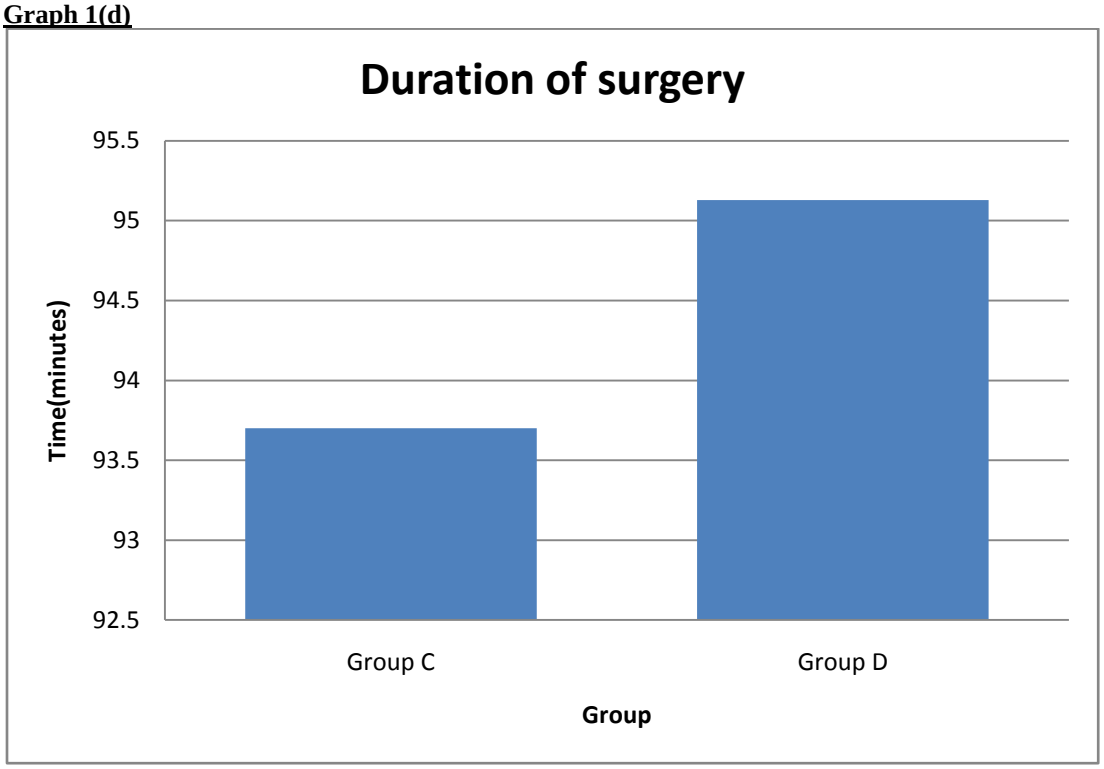
(b): Age distribution in clonidine and dexmedetomidine group.

Graph 1 (C) :Weight distribution



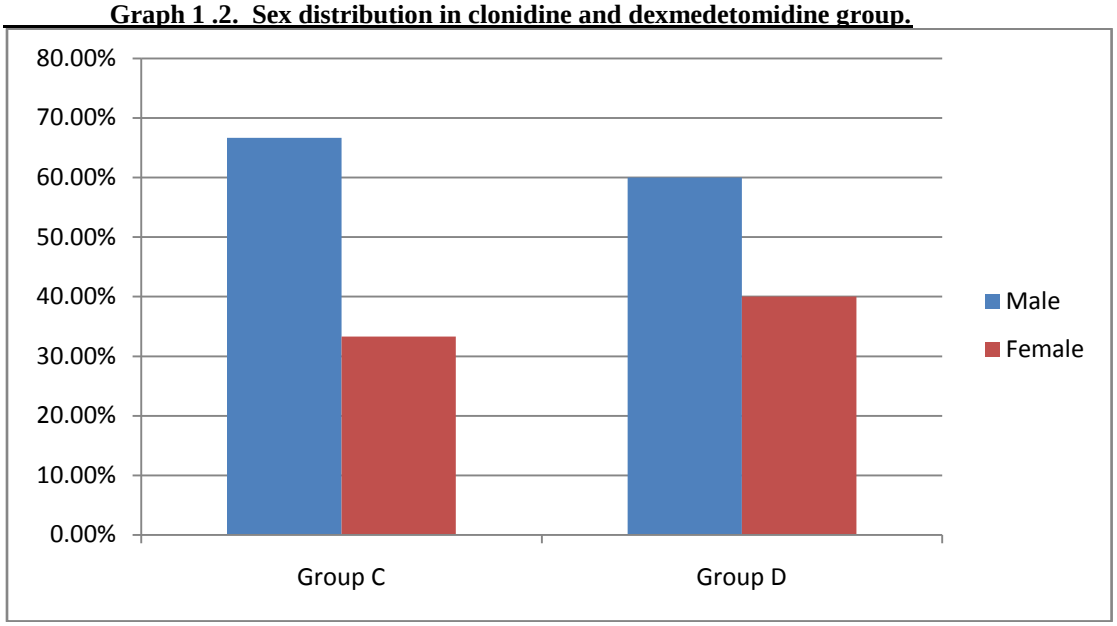
Graph shows average weight distribution between two groups and it is comparable ($p > 0.05$)

Graph 1(d)



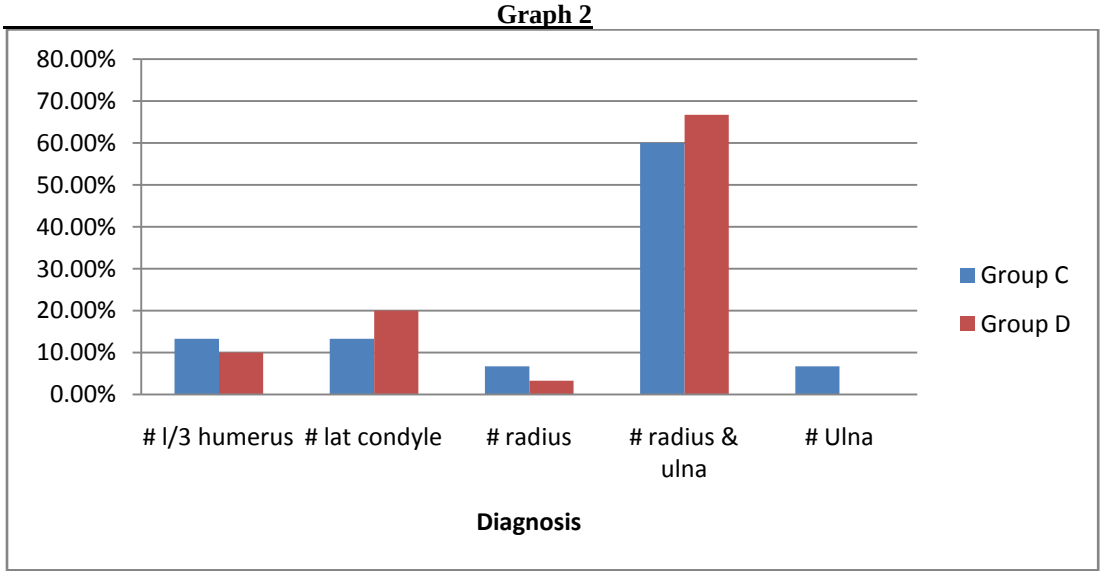
Graph shows duration of surgery in two groups and there is no significant difference ($p>0.05$)

Graph 1 .2. Sex distribution in clonidine and dexmedetomidine group.



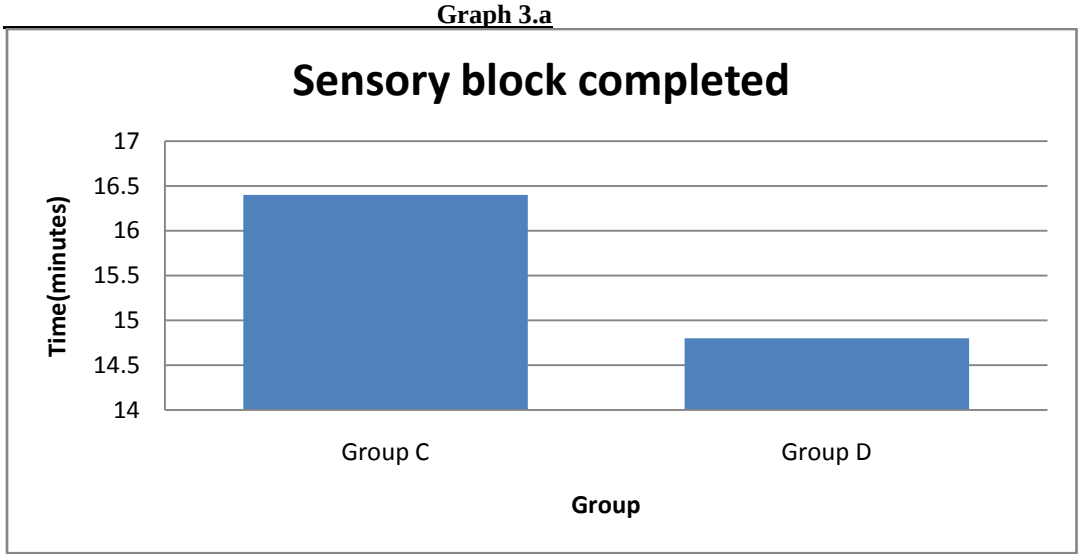
As shown in above table no 1 and graphs demographic criteria like age, sex, weight were comparable in both groups and there was no statistically significant difference between two groups ($p > 0.05$).

Graph 2



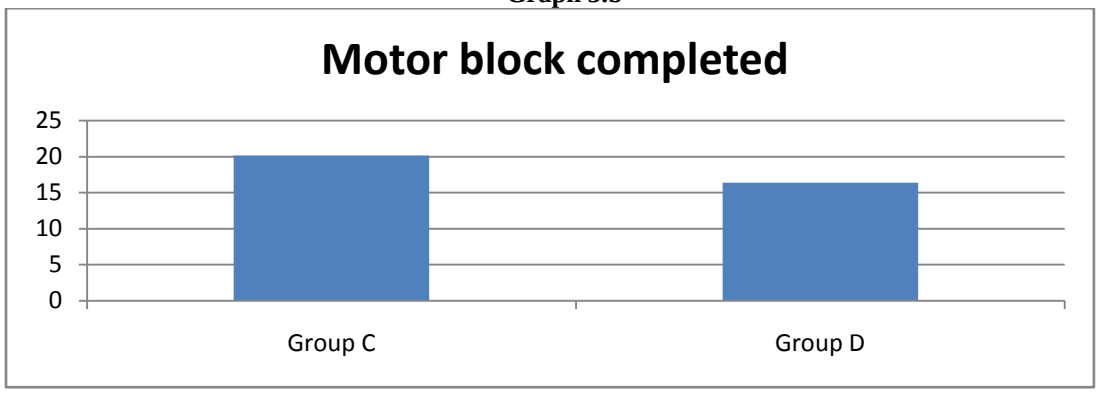
Above graph shows diagnosis of patients were posted for surgeries in both groups.

Graph 3.a



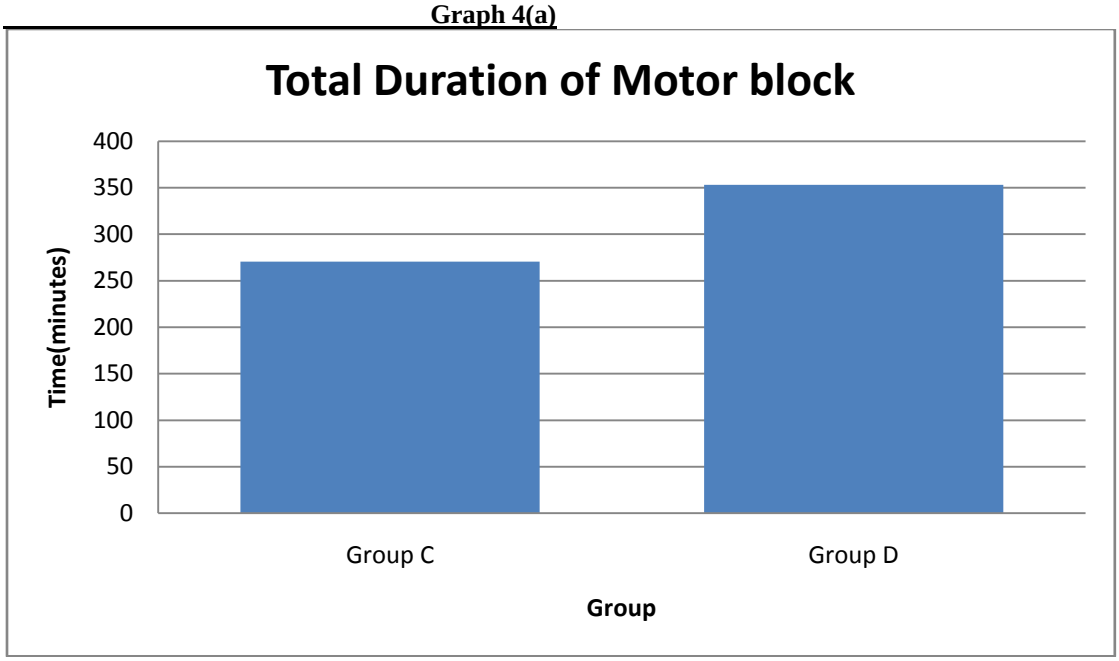
As shown table 3 and graph 3 (c) onset of sensory block completed in group C was (16.4±2.09) mins and that observed in group D was (14.8±1.37) mins. This difference was statistically significant ($p<0.05$ is significant).

Graph 3.b



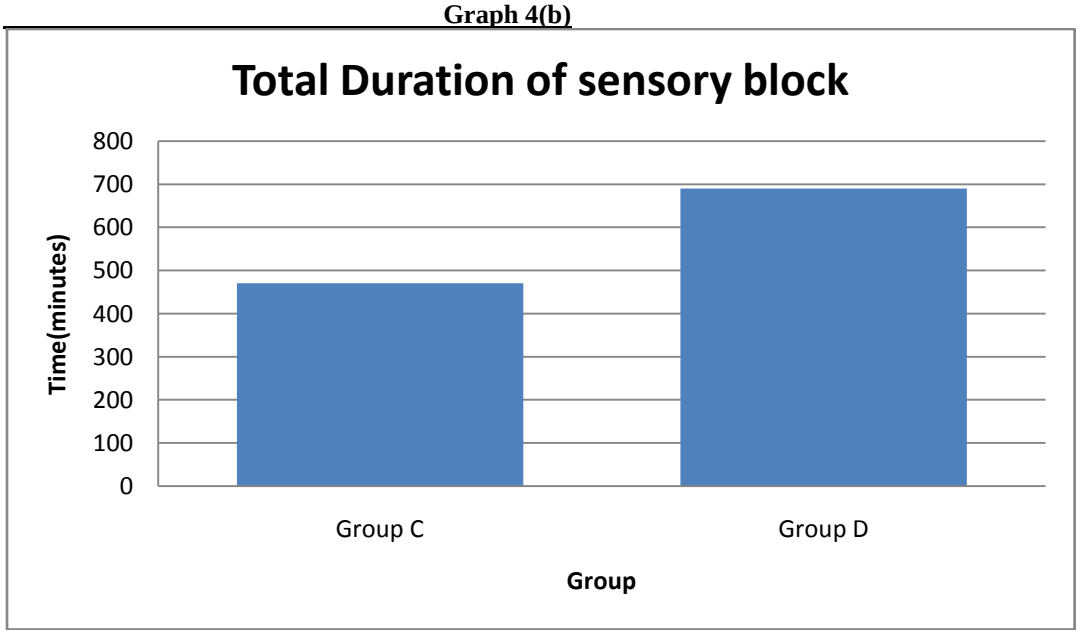
As shown table 3 and graph 3(d) onset of motor block completed in group C was (20.17±2.60) mins and that observed in group D was (16.4±3.02) mins. This difference was statistically significant ($p<0.05$ is significant).

Graph 4(a)



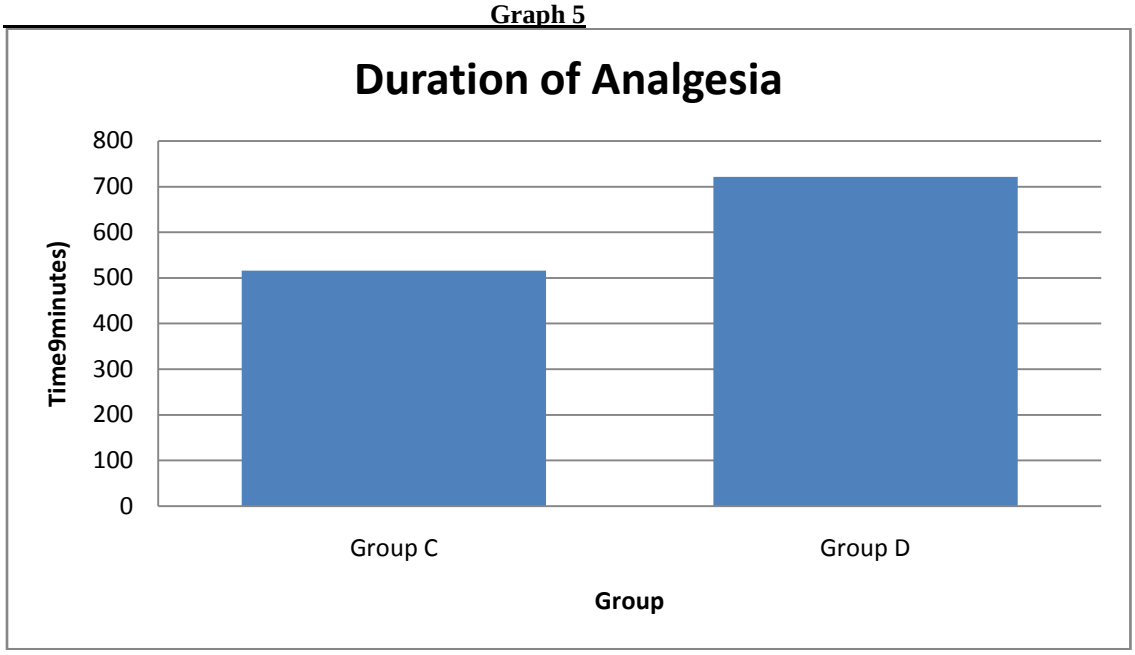
As shown table 5 and graph 5(a) duration of motor block in group C was (270.67±31.61) mins and that observed in group D was (353.17±41.24) mins . This difference was statistically highly significant ($p<0.05$ is significant).

Graph 4(b)



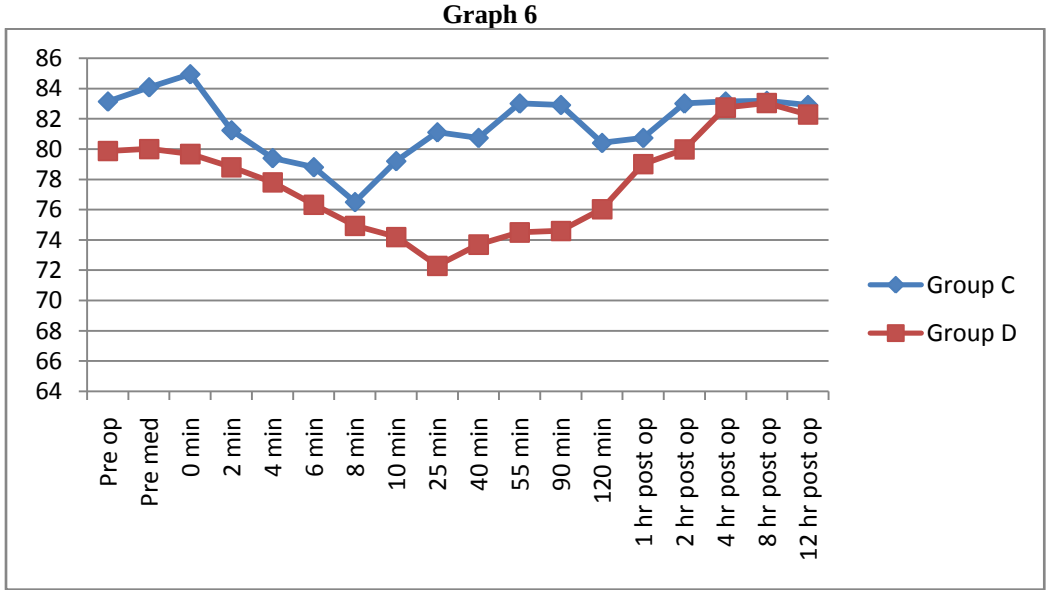
As shown table 4 and graph 4(b) duration of sensory block in group C was (470.33±55.67) mins and that observed in in group D was (690±87.45) mins . This difference was statistically highly significant ($p<0.05$ is significant).

Graph 5



As shown table 5 and graph 5, duration of analgesia in group C was (516±45.15) mins and that observed in group D was (721.33±88.26) mins . This difference was statistically highly significant (p<0.05 is significant).

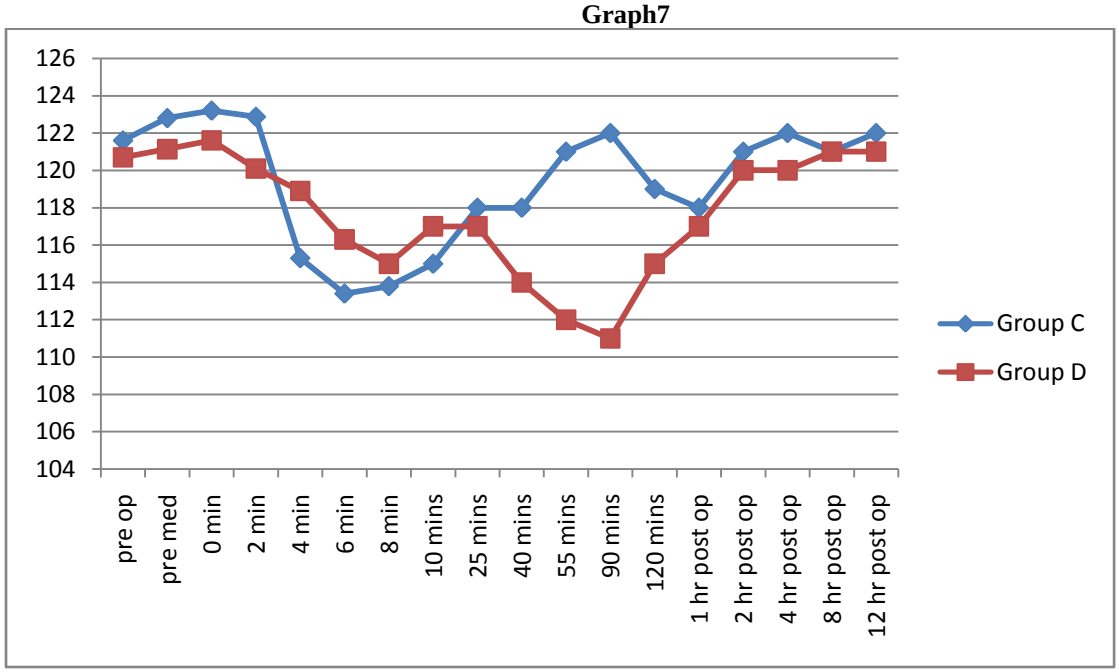
Graph 6



As shown in table 6 and graph 6

- The baseline pulse rate was (82.27 ± 5.58) bpm in group D and (83.13±4.86) bpm in group C and was comparable in both groups
- There was fall in mean pulse rate compared to baseline from 2min which continued throughout intraoperative and post-operative period upto 12 hrs in group D .The lowest pulse rate was 72.3±5.134 bpm at 25thmin after giving block. However, this fall in pulse rate was within physiological range.
- There was fall in mean pulse rate as compared to baseline from 2 min to 25 min in group C. The lowest pulse rate was 76.33±4.21 bpm at 8thmin after giving block. However, this fall in pulse rate was within physiological range. None of the patients developed bradycardia (pulse rate< 50 bpm)
- The mean pulse rate was statistically significantly lower in group D than group C from 10 min to 120 in intraoperatively and post operatively from 2 hrs to 12 hrs but this was clinically significant.

Graph7



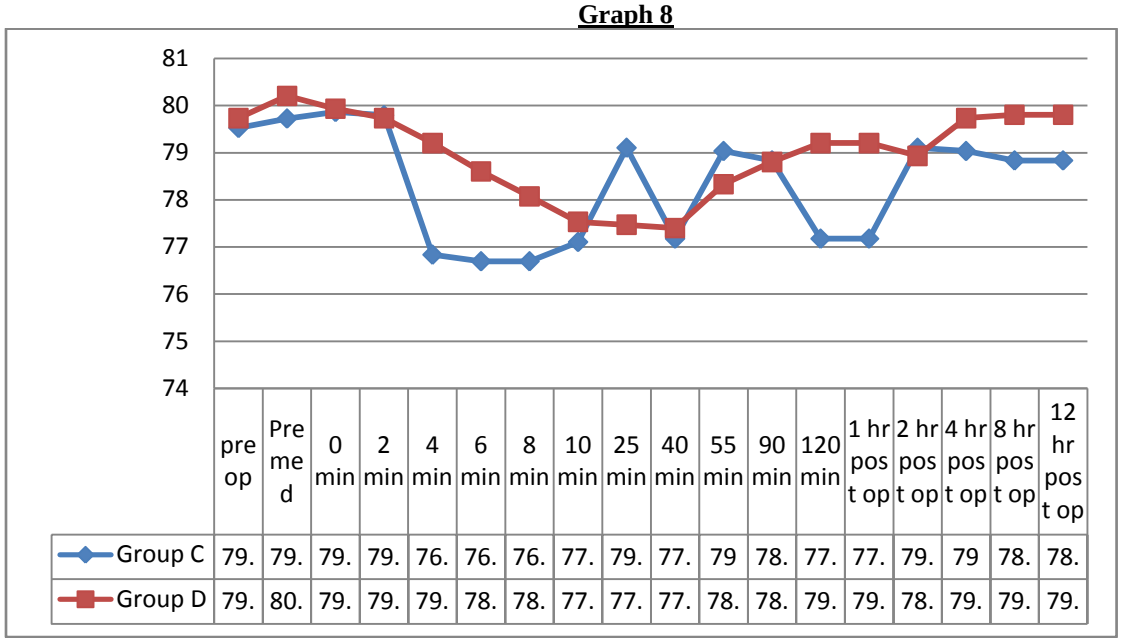
As shown in Table 7 and Graph 7

- Baseline systolic blood pressure in two groups was comparable. (121.60 ± 5 .79 mmHg and 120.73± 6.40 mmHg in group C and group D respectively).
- There was statistically significant decrease in mean systolic blood pressure as compared to baseline in group D from 25 min to 90 min after giving block and immediate postoperatively in group D. The lowest systolic blood pressure was 108.27mmHg at 40 min after giving block. However this fall in systolic blood pressure was within physiological range.

There was statistically significant decrease in mean systolic blood pressure as compared to baseline from 25 min to 90 min after giving block and immediate postoperatively in group C. The lowest systolic blood pressure was 113.47mmHg at 6th min after giving block. However this fall in systolic blood pressure was within physiological range.

There was statistically significant difference in mean systolic blood pressure between two groups from 10 min to 40 min and at 90 min intraoperatively and immediate postoperatively, 1 , 2 and 4 hrs after that but this was not clinically significant.

Graph 8

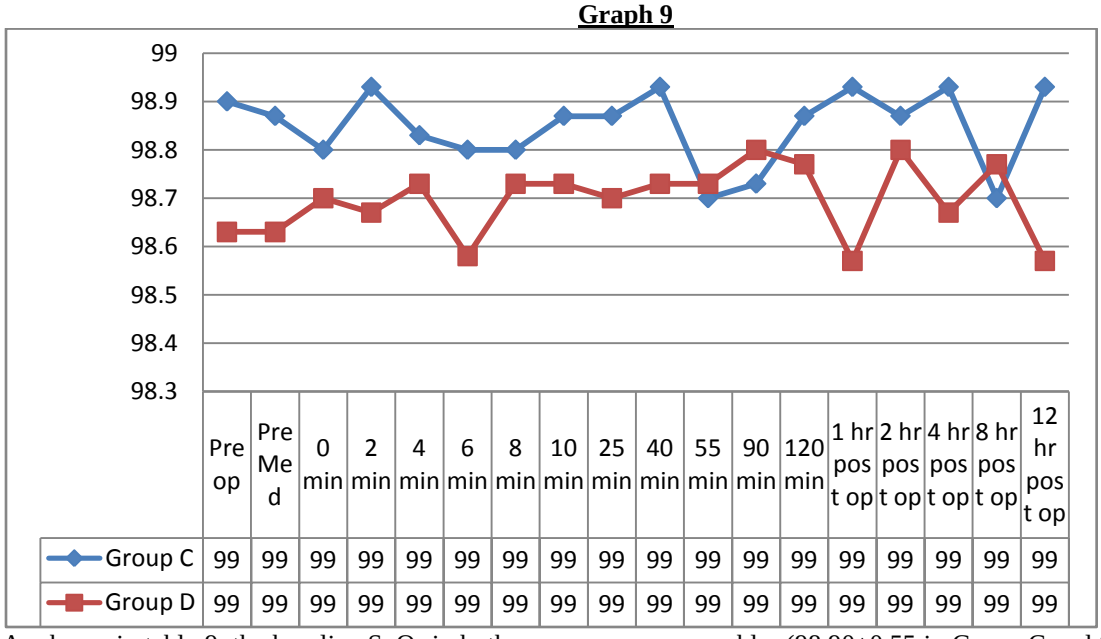


	pre op	Pre med	0 min	2 min	4 min	6 min	8 min	10 min	25 min	40 min	55 min	90 min	120 min	1 hr post op	2 hr post op	4 hr post op	8 hr post op	12 hr post op
Group C	79.	79.	79.	79.	76.	76.	76.	77.	79.	77.	79	78.	77.	77.	79.	79	78.	78.
Group D	79.	80.	79.	79.	79.	78.	78.	77.	77.	77.	78.	78.	79.	79.	78.	79.	79.	79.

As shown in table 8 and graph 8.

- The baseline diastolic blood pressure in two groups was comparable (79.40±3.87 mmHg and 79.73±3.63 mmHg) in group C and group D respectively.
- There was no statistically significant difference in mean diastolic blood pressure as compared between two groups throughout the intra operative and postoperative period .

Graph 9

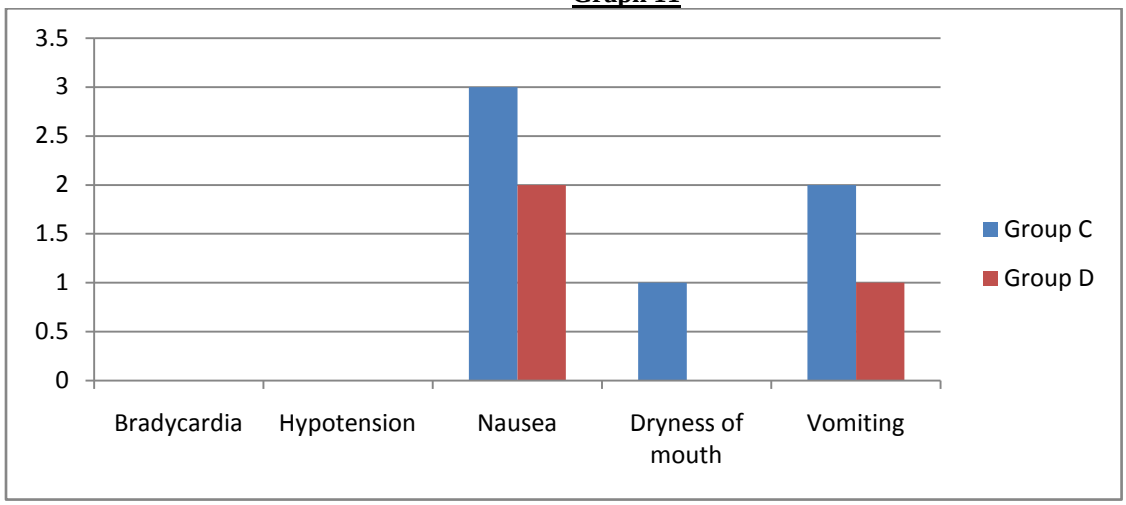


	Pre op	Pre Med	0 min	2 min	4 min	6 min	8 min	10 min	25 min	40 min	55 min	90 min	120 min	1 hr post op	2 hr post op	4 hr post op	8 hr post op	12 hr post op
Group C	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
Group D	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99

As shown in table 9, the baseline SpO_2 in both groups was comparable (98.90±0.55 in Group C and 98.63±0.56 in Group D) . None of the patients in two groups desaturated throughout the observation period. Saturation was well maintained around 99% in all patients in both groups.

Thus both dexmedetomidine and clonidine in the doses given do not produce respiratory depression.

Graph 11



As shown in table 11 and graph 11

- Patients in both groups suffered nausea and vomiting.(5 patients in group C and 3 patients in Group D).
- Dryness of mouth was observed in 1 patient in group C.

With regard to complications the difference was not statistically significant between two groups (p>0.05).

Table 1:Demographic data:-

Table 1.1: ASA, Age and weight status in clonidine and dexmedetomidine group:-

	Group	N	Mean	SD	Pvalue
ASA (I / II)	Group C	30	19/11		1.08
	Group D	30	18/12		
AGE	Group C	30	36.53	9.372	0.675
	Group D	30	35.40	11.385	
Weight(Kgs)	Group C	30	56.87	2.688	0.06
	Group D	30	56.47	2.129	
Duration of surgery(mins)	Group C	30	93.7	4.851	0.203
	Group D	30	95.13	3.702	

Table 1.2 : Sex distribution in clonidine and dexmedetomidine group:-

		GROUPS			
		Group C		**Group D**	
		No of pts	N %	No of pts	N %
SEX	**MALE**	20	66.7%	18	60%
	FEMALE	10	33.3%	12	40%
	TOTAL	30	100%	30	100%

Table 2 :Diagnosis of patients:-

		Groups			
		Group C		**Group D**	
		No of pts	**N %**	**No of Pts**	**N%**
Diagnosis	# L/3 Humerus	4	13.3%	3	10%
	# Lat Condyle	4	13.3%	6	20%
	# Radius	2	6.7%	1	3.3%
	# Radius & Ulna	18	60%	20	66.7%
	# Ulna	2	6.7%	0	0%
	TOTAL	30	100%	30	100%

TABLE 3: Characteristic of sensory and motor block:-

	GROUPS	No of pts	Mean	SD	P Value
Sensory block onset (Mins)	Group C	30	11.07	2.149	**0.001**
	Group D	30	9.17	1.262	
Motor block onset (Mins)	Group C	30	15.17	1.763	**0.021**
	Group D	30	12.63	2.189	
Complete sensory block (Mins)	Group C	30	16.40	2.094	**0.001**
	Group D	30	14.80	1.375	
Complete Motor block (Mins)	Group C	30	20.17	2.601	**0.040**
	Group D	30	16.40	3.024	

As shown table 3 and graph 3(a) onset of sensory block in group C was (11.07±2.15) mins and that observed in group D was (9.17±1.26) mins. This difference was statistically significant ($p<0.05$).

Onset of motor block in group C was 15.17±1.76 mins and in group D it was 12.63±2.18 mins which was statistically significant ($p<0.05$).

Similarly complete onset of sensory and motor block was also significantly faster in group D than in group C. ($p < 0.05$)

Table 4 : Total Duration of Motor and sensory block:-

	GROUP	N	Mean	SD	P value
Total Duration of motor block (mins)	**Group C**	30	270.67	31.616	
	Group D	30	353.17	41.241	0.0001
Total duration of sensory block (mins)	**Group C**	30	470.33	55.677	
	Group D	30	690	87.415	0.0001

Table 5 : Duration of Analgesia (VAS SCORE):-

	Group	N	Mean	SD	P Value
Duration of Analgesia	**Group C**	30	516	45.151	
	Group D	30	721.33	88.268	0.0001

Table 6: Comparison of mean pulse rate between two groups:-

	Group	N	Mean	SD	P value
Pre OP	Group C	30	83.13	5.577	0.524
	Group D	30	82.27	4.862	
Pre Med	Group C	30	84.07	5.149	0.459
	Group D	30	83.03	5.570	
0 min	Group C	30	84.93	5.884	0.155
	Group D	30	82.73	5.936	
2 min	Group C	30	81.23	5.672	0.391
	Group D	30	79.97	5.679	
4 min	Group C	30	79.40	5.219	0.779
	Group D	30	79.00	5.733	
6 min	Group C	30	77.20	4.255	0.322
	Group D	30	76.03	4.781	
8 min	Group C	30	76.33	3.829	0.100
	Group D	30	74.60	4.205	
10 min	Group C	30	76.63	4.405	0.009
	Group D	30	73.67	4.089	
25 min	Group C	30	83.13	5.134	0.000
	Group D	30	72.30	4.100	
40 min	Group C	30	80.73	6.166	0.000
	Group D	30	73.10	3.248	
55 min	Group C	30	83.00	4.708	0.000
	Group D	30	74.20	3.543	
90 min	Group C	30	82.90	4.433	0.000
	Group D	30	74.93	3.863	
120 min	Group C	30	78.40	3.198	0.026
	Group D	30	76.33	3.802	
1 hr post op	Group C	30	80.73	3.498	0.058
	Group D	30	77.80	3.248	
2 hr post op	Group C	30	83.00	4.021	0.055
	Group D	30	78.80	3.543	
4 hr post op	Group C	30	83.13	4.490	0.063
	Group D	30	79.67	4.100	
8 hr post op	Group C	30	83.17	4.927	0.057
	Group D	30	80.00	3.788	
12 hr post op	Group C	30	82.90	5.063	0.062
	Group D	30	79.87	3.863	

Table 7: Comparison of mean Systolic BP between two groups:-

	Group	N	Mean	SD	P value
Pre OP	Group C	30	121.60	5.787	0.584
	Group D	30	120.73	6.400	
Pre Med	Group C	30	122.80	5.372	0.257
	Group D	30	121.13	5.888	
0 min	Group C	30	123.20	4.916	0.266
	Group D	30	121.60	6.066	
2 min	Group C	30	122.87	5.270	0.058
	Group D	30	120.13	5.655	
4 min	Group C	30	115.33	4.559	0.061
	Group D	30	118.93	5.166	
6 min	Group C	30	113.47	3.928	0.054
	Group D	30	116.33	4.787	
8 min	Group C	30	113.80	3.943	0.313
	Group D	30	115.07	5.552	
10 min	Group C	30	115.00	3.922	0.170
	Group D	30	113.07	6.533	
25 min	Group C	30	124.00	5.558	0.001
	Group D	30	111.07	8.737	
40 min	Group C	30	118.00	4.426	0.002
	Group D	30	108.27	9.406	
55 min	Group C	30	121.93	5.496	0.001
	Group D	30	109.27	10.33	
90 min	Group C	30	122.53	5.303	0.001
	Group D	30	111.20	8.782	
120 min	Group C	30	116.73	4.502	0.306
	Group D	30	115.0	8.013	
1 hr post op	Group C	30	118.00	4.426	0.638
	Group D	30	117.27	7.249	
2 hr post op	Group C	30	121.93	5.496	0.214
	Group D	30	120.07	6.000	
4 hr post op	Group C	30	124.00	5.558	0.278
	Group D	30	120.07	5.644	
8 hr post op	Group C	30	121.60	5.519	0.793
	Group D	30	121.20	6.206	
12 hr post op	Group C	30	122.53	5.303	0.395
	Group D	30	121.33	5.542	

Table 8.Comparison of mean Diastolic BP between two groups:-

	Group	N	Mean	SD	P value
Pre OP	Group C	30	79.52	3.879	0.826
	Group D	30	79.73	3.629	
Pre Med	Group C	30	79.72	3.769	0.613
	Group D	30	80.20	3.418	
0 min	Group C	30	79.86	3.925	0.942
	Group D	30	79.93	3.542	
2 min	Group C	30	79.79	3.940	0.951
	Group D	30	79.73	3.473	
4 min	Group C	30	78.83	3.526	0.058
	Group D	30	79.20	3.951	
6 min	Group C	30	77.69	3.597	0.060
	Group D	30	78.60	4.039	
8 min	Group C	30	76.69	3.350	0.175
	Group D	30	78.07	4.283	
10 min	Group C	30	77.10	3.648	0.699
	Group D	30	77.53	4.747	
25 min	Group C	30	79.10	3.726	0.193
	Group D	30	77.47	5.606	
40 min	Group C	30	77.17	3.140	0.846
	Group D	30	77.40	5.462	
55 min	Group C	30	79.03	4.022	0.507
	Group D	30	78.33	4.037	
90 min	Group C	30	78.83	3.485	0.979
	Group D	30	78.80	4.832	
120 min	Group C	30	77.17	3.485	0.066
	Group D	30	79.20	3.773	
1 hr post op	Group C	30	77.17	3.140	0.055
	Group D	30	79.20	3.986	
2 hr post op	Group C	30	79.03	4.022	0.927
	Group D	30	78.93	4.417	
4 hr post op	Group C	30	79.10	4.021	0.522
	Group D	30	79.73	3.473	
8 hr post op	Group C	30	78.83	3.485	0.310
	Group D	30	79.80	3.800	
12 hr post op	Group C	30	78.83	3.485	0.310
	Group D	30	79.80	3.800	

Table 9. Comparison of mean Saturation between two groups:-

	Group	N	Mean	SD	P value
Pre OP	Group C	30	98.9	0.548	0.066
	Group D	30	98.63	0.556	
Pre Med	Group C	30	98.87	0.571	0.114
	Group D	30	98.63	0.556	
0 min	Group C	30	98.80	0.551	0.523
	Group D	30	98.70	0.651	
2 min	Group C	30	98.93	0.640	0.103
	Group D	30	98.67	0.606	
4 min	Group C	30	98.83	0.648	0.550
	Group D	30	98.73	0.640	
6 min	Group C	30	98.80	0.610	0.279
	Group D	30	98.58	0.658	
8 min	Group C	30	98.80	0.664	0.681
	Group D	30	98.73	0.583	
10 min	Group C	30	98.87	0.610	0.667
	Group D	30	98.73	0.583	
25 min	Group C	30	98.87	0.571	0.398
	Group D	30	98.70	0.640	
40 min	Group C	30	98.93	0.629	0.273
	Group D	30	98.73	0.535	
55 min	Group C	30	98.70	0.583	0.189
	Group D	30	98.73	0.583	
90 min	Group C	30	98.73	0.596	0.827
	Group D	30	98.80	0.583	
120 min	Group C	30	98.87	0.640	0.681
	Group D	30	98.77	0.610	
1 hr post op	Group C	30	98.93	0.629	0.539
	Group D	30	98.57	0.626	
2 hr post op	Group C	30	98.87	0.583	0.022
	Group D	30	98.80	0.626	
4 hr post op	Group C	30	98.93	0.571	0.628
	Group D	30	98.67	0.484	
8 hr post op	Group C	30	98.70	0.640	0.118
	Group D	30	98.77	0.661	
12 hr post op	Group C	30	98.93	0.596	0.674
	Group D	30	98.57	0.626	

Table 10. Comparison of Sedation score between two groups:-

Sedation Score	Group C	Group D
	No of Patients	
1	**2 (6.7%)**	**0**
2	**9 (30%)**	**8 (26.7%)**
3	**19 (63.3%)**	**17 (56.7%)**
4	**-**	**5 (16.6%)**
5	**-**	**-**
6	**-**	**-**

As shown in table 10 , both group C patients,19 patients(63.3%) achieved sedation score of 3(responding to commands), 9 patients achieved sedation score 2 (cooperative, oriented and tranquil) and 2 patients (6.7%) achieved sedation score 2 and required sedation(Inj Midazolam 1 mg was given to those 2 patients. In Group D, 5 patients (16,6%) achieved sedation score 4(brisk response to stimulus), 17 patients(56.7%) achieved sedation score 3(responding to verbal commands) and 8 patients(26.7%) achieved sedation score 2(Cooperative, oriented and tranquil) and none of them required any sedation.

Table 11. Comparison of side effects between two groups:-

		Group C		**Group D**	
		No of Pts	**N %**	**No of Pts**	**N %**
Side effects	**Bradycardia**	0	0%	0	0%
	Hypotension	0	0%	0	0%
	Nausea	3	50%	2	66.7%
	Dryness of mouth	1	16.7%	0	0%
	Vomiting	2	33.3%	1	33.3%
	Total	6	100.0%	3	100.0%

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