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A Study on Comparison between Dexmedetomidine and Magnesium Sulphate in Controlled Hypotension during Cortical Mastoidectomy under General Anaesthesia

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Abstract:
Introduction: *Controlled hypotension or induced hypotension is a technique to reduce the blood loss and the necessity of blood transfusion during surgery by improving the visibility of surgical site and decreasing the arterial blood pressure until hypotension isreached*
Materials and Methods: *The study was conducted in the ENT Departments of Government Vellore Medical College and Hospital, Vellore after obtaining Institutional Ethics Committee approval. Sample size was determined based on the study "Comparison between Dexmedetomidine and Magnesium Sulphate in controlled hypotension during cortical Mastoidectomy surgery". In this study Dexmedetomidine can provide more effective controlled hypotension and thus contributes to improved visibility of the surgical site than Magnesium Sulphate.*
Results: *There was no statistical difference between the mean ages between the two groups (30.32±1.03 vs 30.19±1.06; p value 0.931). The two groups were matched according to their weight and found that there was no difference between them (59.19±1.45 vs 59.26±1.61; p value- 0.976).The two groups were matched according to the duration of surgery and found that there was significant difference between them and the above values shows that duration of surgery was decreased significantly in Dexmedetomidine group when compared to Magnesium Sulphate group (45.68±0.91 vs 49.68±0.88; p value-0.002).*
Conclusion: *We conclude that dexmedetomidine used in our study provided controlled hypotension in an effective and more stable way with better haemodynamic stability inpatients undergoing Cortical Mastoidectomy Surgery, and also increased surgeon satisfaction by achieving better surgicalfield.*
Key Words: *Controlled hypotension, dexmedetomidine, Cortical Mastoidectomy Surgery*

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I. Introduction

Controlled hypotension or induced hypotension is a technique to reduce the blood loss and the necessity of blood transfusion during surgery by improving the visibility of surgical site and decreasing the arterial blood pressure until hypotension isreached.[1]

Cortical mastoidectomy isthe primary surgical treatment for chronic suppurative otitis media. Visibility of surgical site is diminished by intraoperative bleeding leading to increased rate of complications. Therefore, important concern for anaesthesiologist here is to improve the visibility of surgical site by reducing bleeding during Cortical Mastoidectomy.[2]

Anideal agent for inducing controlled hypotension cannot be asserted. The ideal agent used for induced or controlled hypotension must have certain properties and characteristic features

- Ease ofadministration
- Shorter onset oftime
- Rapid elimination from body with negligible toxicmetabolites
- Negligible impact on vitalorgans
- Predictable and dose dependenteffects.[3,4]

Intraoperative bleeding during cortical mastoidectomy surgery can be controlled by various methods such as packing adrenalin soaked gauze, reverse Trendelenburg position during surgery and hypotensive anaesthesia. Drugs such as beta-blockers, arterial and venous dilators, calcium channel blockers, alpha-1-agonistand anaesthetic agents like propofol, opioids, autonomic ganglionic blockersand inhalational agents are being used toachieveinduced hypotension.

CorticalMastoidectomy Surgeries is usually done under general anaesthesia which has the following advantages like immobile surgical field, effective protection of airway, adequate analgesia and ventilation. The

only limitation of general anaesthesia is intense intraoperative bleeding thanlocalanaesthesia.[5]
Dexmedetomidine is a centrally acting, highly selective, specific, and most potent alpha-2-adrenergic agonist having analgesic, sedative, antihypertensive, anaesthetic sparing effects, anxiolytic, hypnotic and sympatholytic effects.

Magnesium Sulphate is a good drug for controlled hypotension, as it stabilizes the cell membrane and intra cytoplasmic organelles by activationofNa^+-K^+ATPaseandCa^{2+}ATPaseenzymes,whichplayan important role in transmembrane ion exchange during depolarisation and repolarisation phases. Magnesium Sulphate also inhibits the release of norepinephrine by blocking N-type Ca^{2+} channels at nerve endings and this leads to decreased bloodpressure.[6]

This study is designed to compare the efficacy and safety of Dexmedetomidine and Magnesium Sulphate as hypotensive agents in Functional Endoscopic Sinus Surgeries. The quality of surgical field, satisfaction of surgeon, recovery profile and post-operative analgesia also compared.

Aim of The Study
The aim and objective of the study is to compare the efficacy of Dexmedetomidine and Magnesium Sulphate for controlled hypotension during Cortical Mastoidectomy surgeries.

II. Materials And Methods

The study was conducted in the ENT Departments of Government Vellore Medical College and Hospital, Vellore after obtaining Institutional Ethics Committee approval.
Sample size: 62
Sample size was determined based on the study "Comparison between Dexmedetomidine and Magnesium Sulphate in controlled hypotension during Cortical Mastoidectomy surgery".
In this study Dexmedetomidine can provide more effective controlled hypotension and thus contributes to improved visibility of the surgical site than Magnesium Sulphate.

Description:
- The confidence level is estimated at95%
- With a z value of1.96
- The confidence interval or margin of error is estimated at+/-10
- Assuming p% =80 andq%=20

n = p% x q% x [z/e%] ² n= 80 x 20 x [1.96/10]²
n= 61.47
Therefore 61 is the minimum sample size required for the study.
In my study I plan to recruit a minimum of 31 subjects per intervention arm.
The aim of the study is to compare the efficacy of Dexmedetomidine and Magnesium Sulphate for controlled hypotension in Cortical Mastoidectomy surgery, taking into account thefollowing:

- **Haemodynamic parameters** - Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), Mean Arterial Pressure(MAP),Pulse Rate, Oxygen saturation (SPO_2) – intraoperatively & postoperatively
- Average Category Scale for assessing of intraoperative surgical field
- Duration ofsurgery
- The interval between the discontinuation of anaesthetic agents to response of eye opening to verbal command and time toextubation
- Time to attain Modified Aldrete post-anesthesia recovery score≤9
- Verbal Numerical Rating Scale (NRS), nausea & vomiting post operatively
- Time to first analgesicrequest
- Anycomplications

Study Design: A prospective, Randomized, Single-Blinded Controlled study.
The study was conducted after receiving Institutional Ethics Committee approval and written informed consent from all the patients.
Randomization: Simple randomized sampling was done by computer generated randomnumbers.

Sample Size: Sixty-two patients were studied, randomized into two groups of 31 each.
Group allocation: Patients were allocated into two groups:
Group A (n= 31): Patients receivingDexmedetomidine
Group B (n= 31): Patients receiving MagnesiumSulphate
Masking: The surgeon who performed the surgery was blinded to the study drug. The surgeon was asked to provide scores for the quality of the surgical field using a predefined category scale and duration of surgery.

Inclusion Criteria
- Age 18 - 60yrs
- ASA I & IIpatients
- Males andfemales
- Valid written informedconsent
- Posted for electivesurgery

Exclusion Criteria
- Patientrefusal
- ASA grade III andIV
- Known allergy to study drug
- Recurrent earsurgery
- Systemichypertension
- Diabetesmellitus
- Patients with coagulopathies or receiving drugs influencing blood coagulation
- Coronary ArteryDisease
- Renal, Hepatic or Cerebralinsufficiency
- Patients on adrenergic blockingdrugs
- Any type of A-V block on electrocardiogram (ECG), heart failure, severebradycardia
- Current psychiatric disorder or any respiratorydisorders.
- Impaired ability to communicate (e.g., confusion, poor hearing or languagebarrier)
- Pregnantpatients.

Materials
1. Boyles apparatus/ Workstation
2. Laryngoscope with different bladesizes
3. Monitors- ECG, NIBP, PulseOximeter
4. Airway gadgets used in case of difficultintubation
5. Endotrachealtubes
6. Drugs for administering general anaesthesia
7. Inj. Dexmedetomidine, available as ampoules (one ampoule contains 1ml,
8. each ml contains 100 mcg ofDexmedetomidine)
9. Inj. Magnesium Sulphate, available as ampoules (one ampoule contains 2ml, each ml contains 500mg of Magnesiumsulphate)
10. Equipment & drugs for resuscitation
11. Working suctionapparatus

Methods
Pre-Operative Preparation
The patients were assessed preoperatively and they were explained about the purpose of the study, procedure of the study and about the possible adverse events that can occur due to the study drug, and written informed consent was obtained from those patients who were willing to take part in the study.
Conduct of Anaesthesia: On arrival of the patient in the operating room, monitors to be connected - Pulse oximeter, Non-Invasive Blood Pressure (NIBP) and ECG were connected and baseline values were recorded. Two 18G intravenous cannula were inserted, one for infusion of the study drug and the other for administration of fluids and other anaesthetic drugs.

All patients were pre-medicated with IV Glycopyrrolate 5µg/kg, IV Midazolam 0.05 mg/kg, IV Fentanyl 2µg/kg.

In Group A, patients received loading dose of 1 µg/kg Dexmedetomidine IV diluted in 100 ml 0.9% normal saline infused over 10 min, before induction of anaesthesia, followed by continuous infusion of 0.5 - 1µg/kg/hr.

In Group B, patients received Magnesium Sulphate IV diluted in 100 ml o.9% normal saline with a loading dose 40 mg/kg, infused over10 min, before induction of anaesthesia, followed by continuous infusion of 10 - 15 mg/kg/hr.

Induction was done with IV Propofol 2 mg/kg. Endotracheal intubation was facilitated with IV Atracurium 0.5 mg/kg with suitable sized cuffed endotracheal tube. Anaesthesia was maintained with Desflurane 2-6%. All patients were mechanically ventilated with Nitrous oxide and Oxygen (50%: 50%). IV Fentanyl was given for intraoperative analgesia.Patients received lactated Ringer's solution IV according to Holliday Segar formula. Patients were placed in 15° reverse Trendelenburg position which helps to improve venousdrainage.

The following parameters were monitored and recorded intraoperatively:

Hemodynamic parameters such as Pulse Rate, Non-invasive blood pressure (Systolic Blood Pressure, Diastolic Blood Pressure and Mean Arterial Pressure), and SPO2 were recorded every 5 minutes during the 1st 15 minutes and every 15 minutes thereafter, until the end of surgery. For statistical purpose they were documented at 0, 5, 10, 15, 30, 45 minutesdepending on the duration of surgery, and at 0 and 5minutes after stoppage of studydrug.

Intraoperatively, the Mean Arterial Pressure (MAP) was maintained in the range of 60 - 70 mmHg, by adjusting the dose of the study drug within the specified dose earlier. If the MAP was higher than the desired range even with the maximum dose of the study drug, the MAP would be reduced by increasing the Desflurane concentration. If this measure fails to reduce the Mean Arterial Pressure (MAP) intraoperatively, Nitroglycerine (NTG) infusion was started to reduce MAP within the desired range. If the MAP dropped below 60 mmHg, the blood pressure was raised by reducing the dose of the study drug and maintaining inhalational agent to the lowest dose mentioned earlier. Ifthis measure fails to raise the blood pressure intraoperatively, graded doses of Inj. Ephedrine 6 mg to be used. If the heart rate falls below 50 beats/minute, Inj. Atropine 0.6 mg would be used to correctit.

When the MAP reached the desired range (60 - 70 mmHg) and was maintained for at least 10 minutes, the surgeon is asked to estimate the quality of the surgical field using a predefined category scale adopted from that of From me et al.

Average Category Scale for Assessment of Intraoperative Surgical Field:

0	**No bleeding**
1	**Minor bleeding, no aspiration required**
2	**Minor bleeding, aspiration required**
3	**Minor bleeding, frequent aspiration required**
4	**Moderate bleeding, surgical field visible only with the aspiration**
5	**Severe bleeding, continuous aspiration required, very difficult to perform surgery**

Infusion of the study drug was stopped five minutes before the anticipated end of surgery. Desflurane was stopped at the end of the surgery. Residual neuromuscular blockade was reversed with Inj. Neostigmine (0.05 mg/kg) IV and Inj. Glycopyrrolate (0.01 mg/kg)IV.Emergence time, defined as the time interval between discontinuation of anaesthetics and eye opening in response to verbal command, is noted.

Surgeon satisfaction was scored by the surgeon who performed the surgery who was blind in terms of drugs used and assessed with a 4-point scale: 1 = bad, 2 = moderate, 3 = good, 4 = excellent.

Surgeon Satisfaction Score

Scale	Score
1	**Bad**
2	**Moderate**
3	**Good**
4	**Excellent**

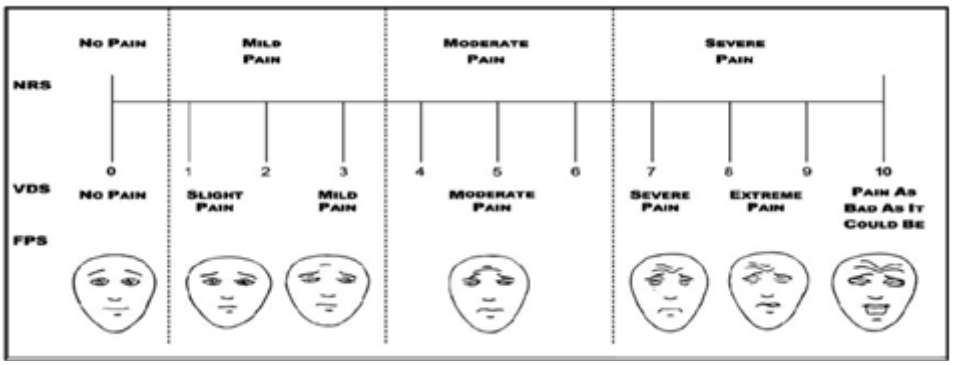
Postoperative recovery was evaluated using a Modified Aldrete Score (0-10), and time needed to achieve ≤9 was noted.

Chart 1. The 'modified' Aldrete Scale

RESPIRATION	2	1	0
	Able to take deep breath and cough	Dyspnea/Shallow Breathing	Apnea
O2 SATURATION	2	1	0
	Maintains > 92% on room air	Needs O2 inhalation to maintain O2 saturation > 90%	Saturation < 90% even with supplemental O2
CONSCIOUSNESS	2	1	0
	Fully awake	Arousable on calling	Not responding
CIRCULATION	2	1	0
	BP ± 20mmHg pre op	BP ± 20-50mmHg pre op	BP ± 50mmHg pre op
ACTIVITY	2	1	0
	Able to move 4 extremities voluntarily or on command	Able to move 2 extremities voluntarily or on command	Able to move 0 extremities voluntarily or on command

Once the Modified Aldrete Score was attained ≤ 9, patients will be shifted to post-operative ward.Intensity of post-operative pain can be measured by NRS scale – Numeric Rating Scale.When NRS > 4, patients were treated with Inj. Tramadol 100mgIM.

Patients were monitored in the postoperative ward for any complications including nausea, vomiting, bradycardia or tachycardia, hypotension or hypertension, etc. during the first 24 hours following surgery and were managedaccordingly.



III. Results

Statistical tools: The data collected from all the selected cases were recorded in a Master Chart. Statistical analysis performed with the help of statistical package SPSS (Statistical Package for theSocial Sciences) version 11and Microsoft Excel 2016.

1. Baseline characteristics of both the groups were tabulated by descriptive statistics (mean, standard deviation/ standard error) and frequencytable.
2. Independent t test is used to compare two mean of continual variables.
3. Chi-square test is used to compare differences between two ordinal variables.

A 'p' value less than 0.05 is taken to denote significant relationship.

RESULTS

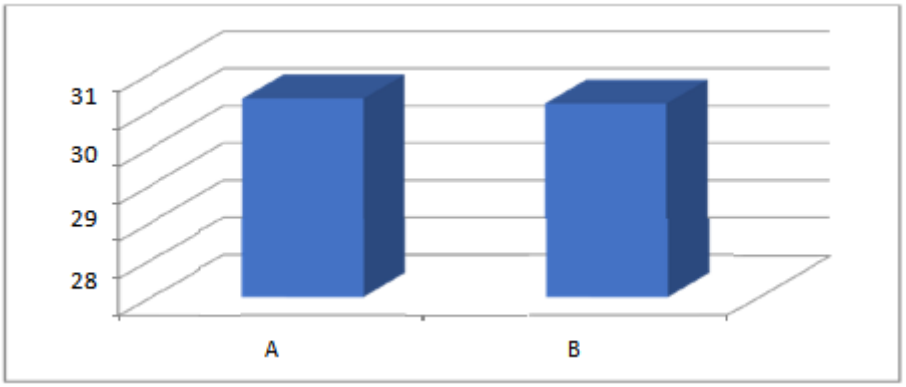
Group A: Dexmedetomidine

Group B: Magnesium Sulphate

A: PROFILE OF CASES STUDIED

Table A1: Age Distribution (years)

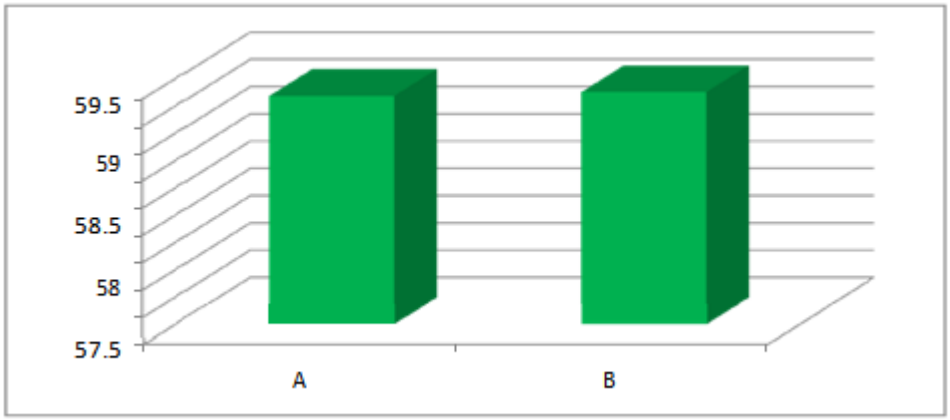
Group	Age		T value	P value
	Mean	SE		
A	30.32	1.03		
B	**30.19**	**1.06**	0.087	**0.931**



There was no statistical difference between the mean ages between the two groups (30.32±1.03 vs 30.19±1.06; p value 0.931)

Table A2: Weight (kg)

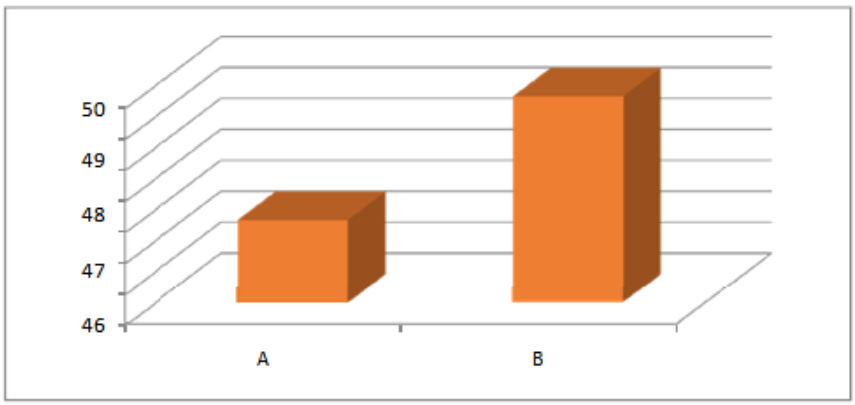
Group	Weight		T value	P value
	Mean	SE		
A	59.19	1.45		
B	**59.26**	**1.61**	-0.030	**0.976**



The two groups were matched according to their weight and found that there was no difference between them (59.19±1.45 vs 59.26±1.61; p value- 0.976).

TableA3: Duration of Surgery(minutes)

Group	Duration of surgery (in minutes)		T value	P value
	Mean	SE		
A	45.68	0.91		
B	**49.68**	**0.88**	-3.169	**0.002**

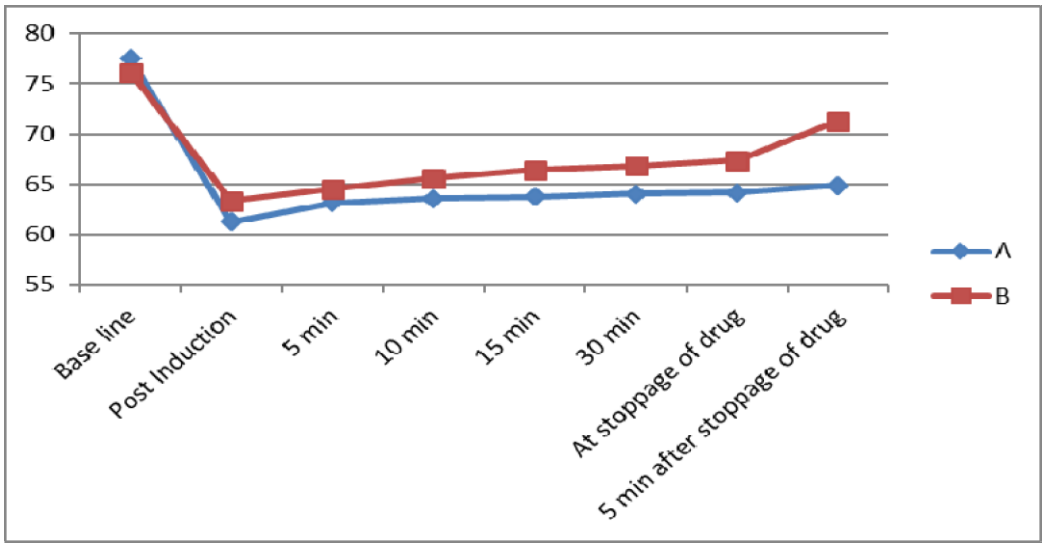


The two groups were matched according to the duration of surgery and found that there was significant difference between them and the above values shows that duration of surgery was decreased significantlyin Dexmedetomidine group when compared to Magnesium Sulphategroup (45.68±0.91 vs 49.68±0.88; p value-0.002).

B: INTRAOPERATIVE HEMODYNAMIC PARAMETERS

TableB1: Intraoperative Pulse Rate(beats/minute)

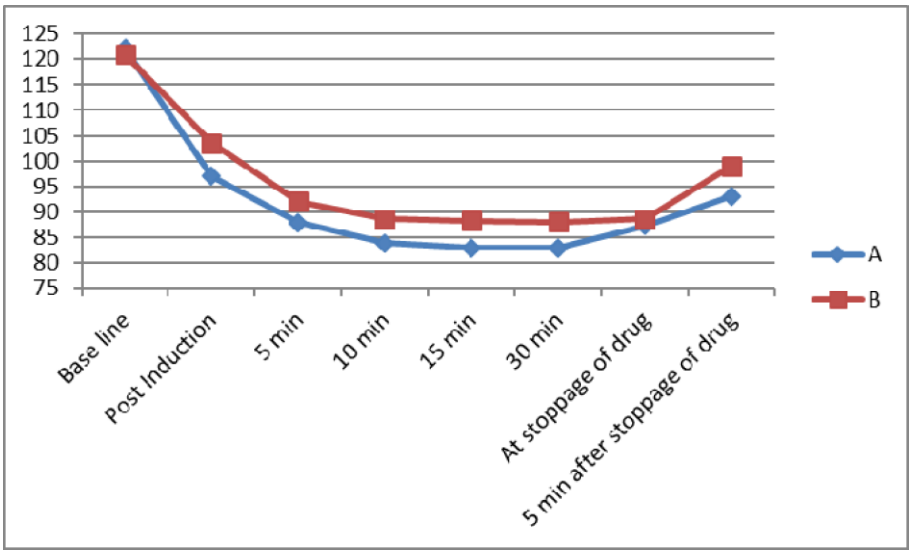
Intra Operative Pulse Rate	A	B	T test	P value
Base line	77.52 ± 1.53	76.13 ± 1.47	0.652	**0.517**
Post Induction	61.26 ± 0.84	63.35 ± 0.75	-1.859	**0.068**
5 min	63.19 ± 0.91	64.55 ± 0.77	-1.141	**0.258**
10 min	63.58 ± 0.92	65.58 ± 0.77	-1.667	**0.101**
15 min	63.77 ± 0.90	66.45 ± 0.84	-2.178	**0.033**
30 min	64.06 ± 1.01	66.84 ± 0.79	-2.166	**0.034**
At stoppage of drug	64.19 ± 0.86	67.39 ± 0.79	-2.741	**0.008**
5 min after stoppage of drug	**64.87 ± 0.87**	**71.26 ± 0.82**	**-5.350**	**0.0001**



The pulse rates remained comparable between the two groups during pre-induction, post induction, 5 minutes and 10 minutes post induction. There was a significant difference in pulse rate at 15 minutes (63.77±0.90vs66.45±0.84,pvalue-0.033),30minutes(64.06±1.01vs66.84±0.77 p value- 0.034), at stoppage of drug (64.19±0.86 vs 67.39±0.79 p value- 0.008) and 5 minutes after stoppage of drug (64.87±0.87 vs 71.26±0.82 p value-0.0001), which shows that pulse rate was significantly lower in Dexmedetomidine group than Magnesium Sulphategroup.

Table B2: Intraoperative Systolic Blood Pressure(mmHg)

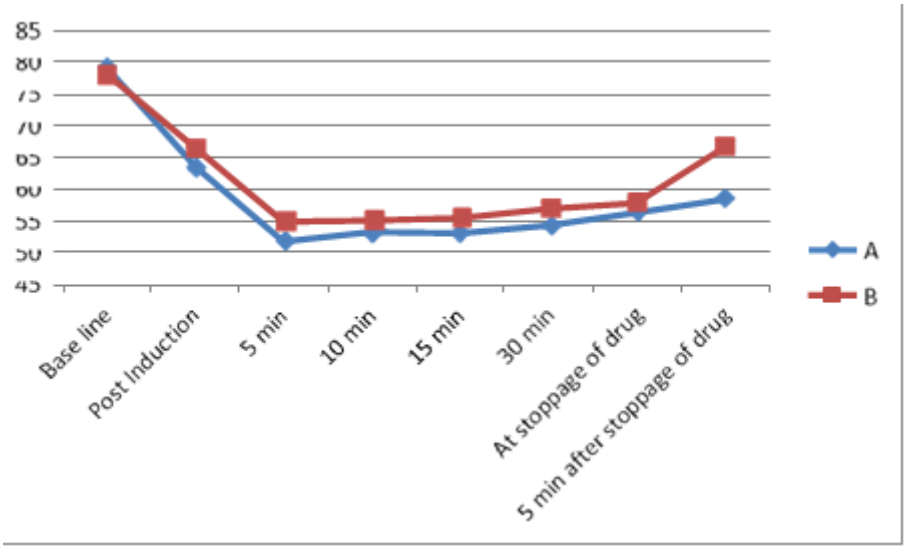
Intra Operative Systolic BP	A	B	T test	P value
Base line	122.16 ± 1.72	120.90 ± 1.79	0.507	0.614
Post Induction	97.00 ± 1.31	103.58 ± 1.12	-3.805	0.0001
5 min	87.94 ± 0.77	92.00 ± 0.91	-3.407	0.001
10 min	83.87 ± 0.87	88.58 ± 0.99	-3.581	0.001
15 min	82.90 ± 0.90	88.26 ± 1.06	-3.866	0.0001
30 min	82.90 ± 0.85	87.97 ± 1.01	-3.835	0.0001
At stoppage of drug	87.29 ± 1.04	88.58 ± 0.99	-0.898	0.373
5 min after stoppage of drug	93.06 ± 1.17	99.00 ± 0.94	-3.950	0.0001



Intraoperative Systolic Blood Pressure was significantly lower in Dexmedetomidine group than Magnesium Sulphate group (p value <0.05) except during the stoppage of drug where little increase in systolic pressure in Dexmedetomidinegroup.

Table B3: Intraoperative Diastolic Blood Pressure (mmHg)

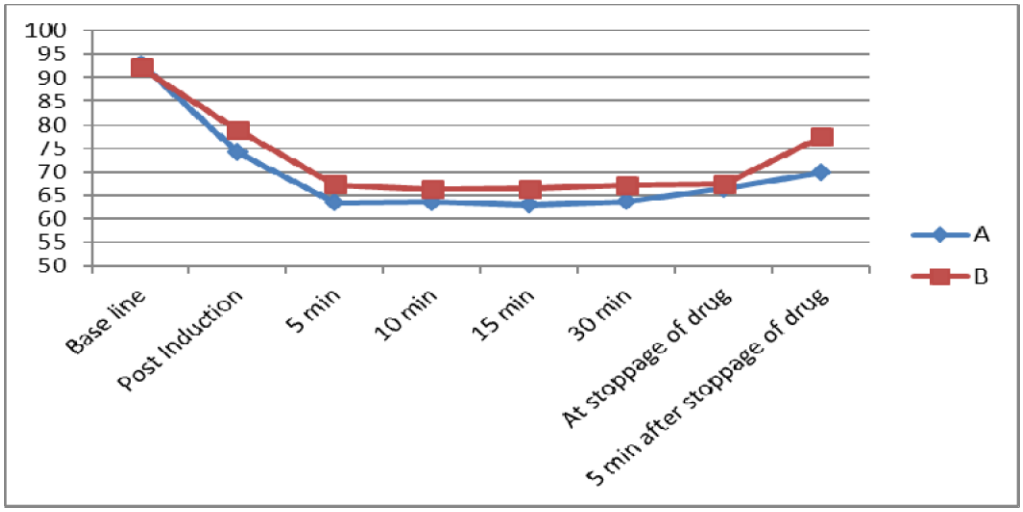
Intra Operative Diastolic BP	**A**	**B**	**T test**	**P value**
Base line	79.26 ± 1.46	78.16 ± 1.59	0.509	0.613
Post Induction	63.65 ± 1.21	66.61 ± 1.33	-1.651	0.104
5 min	51.84 ± 0.82	55.00 ± 0.66	-2.986	0.004
10 min	53.29 ± 0.76	55.19 ± 0.64	-1.929	0.05
15 min	53.13 ± 0.82	55.55 ± 0.63	-2.346	0.022
30 min	54.32 ± 0.65	56.90 ± 0.63	-2.871	0.006
At stoppage of drug	56.39 ± 0.57	57.90 ± 1.13	-1.198	0.236
5 min after stoppage of drug	58.48 ± 0.87	66.81 ± 0.86	-6.792	0.0001



Intraoperative Diastolic Blood Pressure was significantly lower in Dexmedetomidine group than Magnesium Sulphate group (p value <0.05) except during post induction and stoppage ofdrug.

Table B4: Intraoperative Mean Arterial Pressure (mmHg)

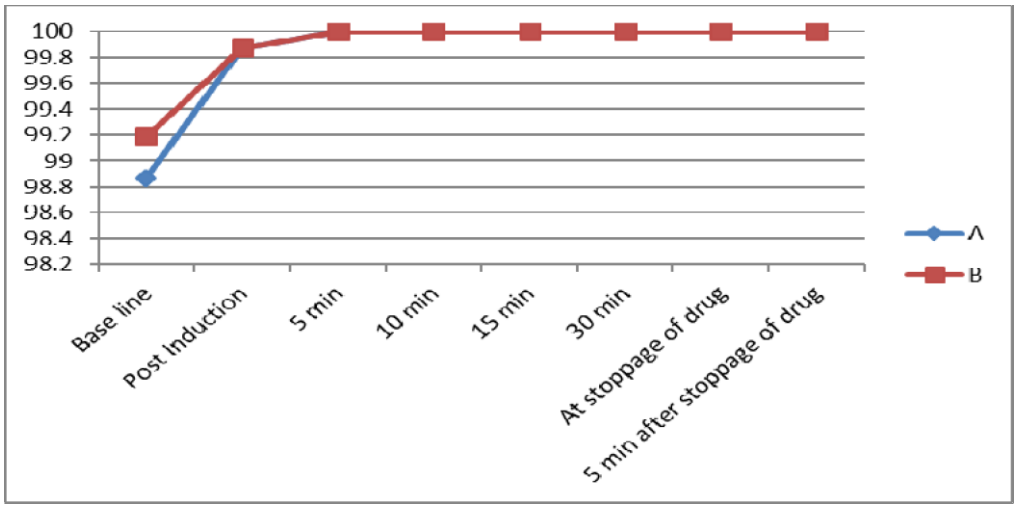
Intra Operative Mean Arterial Pressure	**A**	**B**	**T test**	**P value**
Base line	92.97 ± 1.40	92.10 ± 1.71	0.395	0.695
Post Induction	74.10 ± 1.05	78.90 ± 1.17	-3.061	0.003
5 min	63.48 ± 0.58	67.23 ± 0.56	-4.654	0.0001
10 min	63.61 ± 0.49	66.29 ± 0.57	-3.554	0.001
15 min	63.03 ± 0.48	66.45 ± 0.59	-4.510	0.0001
30 min	63.74 ± 0.50	67.19 ± 0.60	-4.421	0.0001
At stoppage of drug	66.42 ± 0.53	67.45 ± 0.38	-1.587	0.118
5 min after stoppage of drug	69.84 ± 0.62	77.52 ± 0.77	-7.779	0.0001



Mean Arterial Pressure (MAP) was significantly lower in Dexmedetomidine group throughout the intraoperative period (p value < 0.05) except during the stoppage of drug.

Table B5: Intraoperative SpO_2(%)

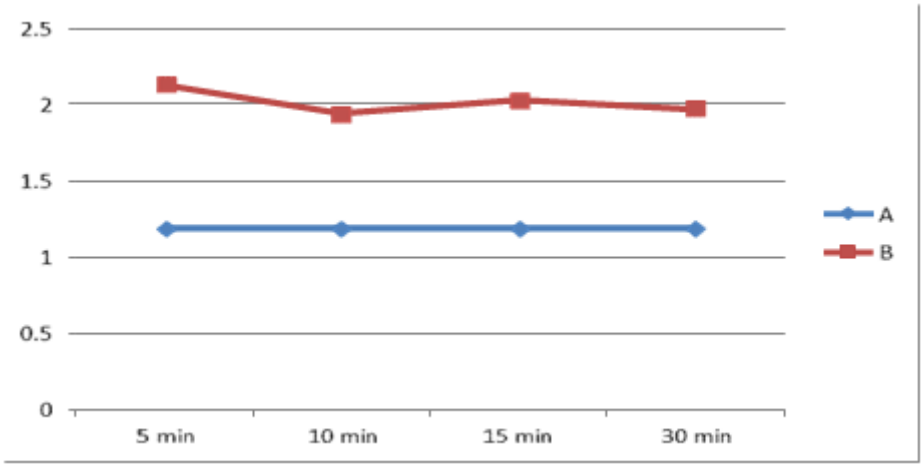
Intra Operative SpO_2	**A**	**B**	**T test**	**P value**
Base line	98.87 ± 0.20	99.19 ± 0.17	-1.246	0.218
Post Induction	99.87 ± 0.06	99.87 ± 0.06	0.000	1.000
5 min	100.00 ± 0.00	100.00 ± 0.00	-	-
10 min	100.00 ± 0.00	100.00 ± 0.00	-	-
15 min	100.00 ± 0.00	100.00 ± 0.00	-	-
30 min	100.00 ± 0.00	100.00 ± 0.00	-	-
At stoppage of drug	100.00 ± 0.00	100.00 ± 0.00	-	-
5 min after stoppage of drug	100.00 ± 0.00	100.00 ± 0.00	-	-



Intraoperative saturation of oxygen (SpO_2) remains comparable in both the groups and there was no significant difference between them.

C: AVERAGE CATEGORY SCORE

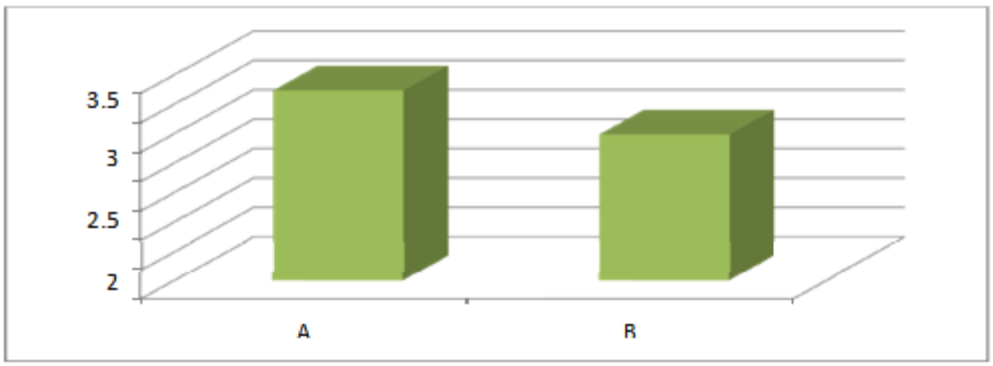
Time	A	B	T test	P value
5 min	1.19 ± 0.12	2.13 ± 0.17	-4.493	**0.0001**
10 min	1.19 ± 0.13	1.94 ± 0.17	-3.462	**0.001**
15 min	1.19 ± 0.12	2.03 ± 0.18	-3.956	**0.0001**
30 min	**1.19 ± 0.11**	**1.97 ± 0.18**	**-3.742**	**0.0001**



The Average Category Score to assess the quality of surgical field in terms of bleeding during intraoperative period shows that Dexmedetomidine group provides better quality of surgical field when compared to Magnesium Sulphate group (p value <0.05).

D: SURGEON SATISFACTION SCORE

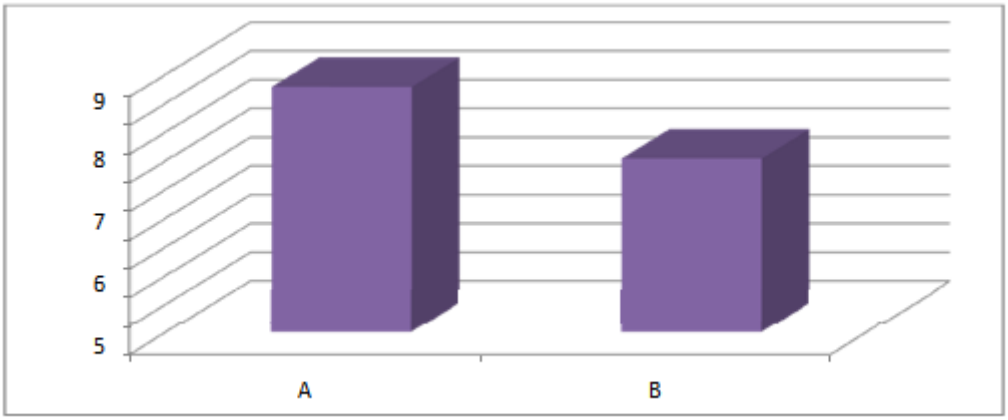
Group	**Surgeon satisfaction score**		**T value**	**P value**
	Mean	SE		
A	3.23	0.09		
B	2.48	0.09	5.811	0.0001



Surgeon satisfaction score was measured in termsofbad, moderate, good and excellent and it was observed that surgeon had an excellent operating condition and satisfaction in Dexmedetomidine group when compared toMagnesium Sulphate group (3.23±0.09 vs 2.28±0.09,p value- 0.0001).

E: EMERGENCE TIME

Group	Emergence time (minutes)		T value	P value
	Mean	SE		
A	8.55	0.17	9.985	0.0001
B	6.06	0.19		

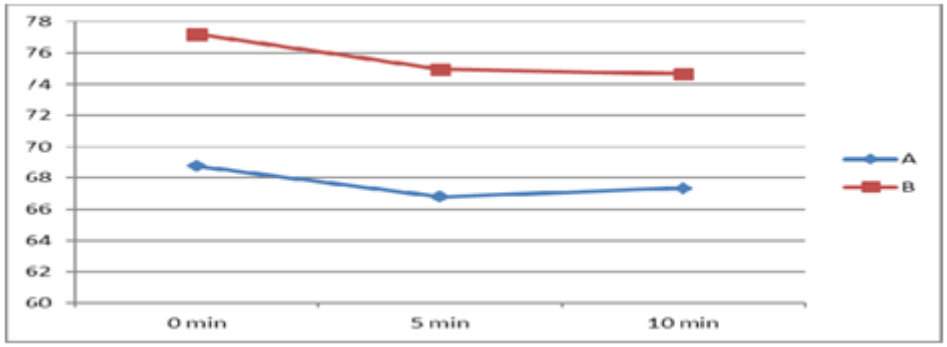


Emergence time was significantly increased in Dexmedetomidine group when compared to Magnesium Sulphate group (8.55±0.17 vs 6.06±0.19, p value- 0.0001).

F: POST OPERATIVE HEMODYNAMIC PARAMETERS

TableF1:Post-Operative Pulse Rate (Beats /min)

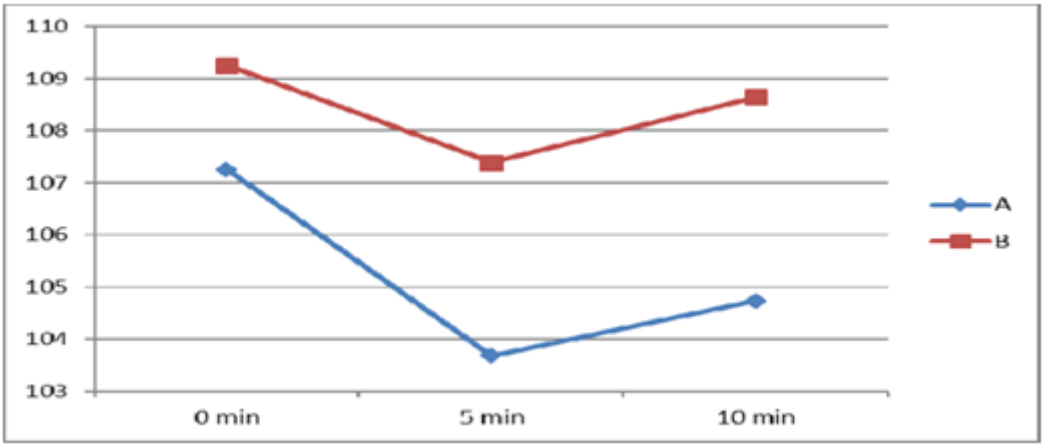
Post Extubation Pulse Rate	A	B	T test	P value
0 min	68.77 ± 0.94	77.19 ± 0.99	-6.176	**0.0001**
5 min	66.81 ± 0.96	74.94 ± 0.82	-6.447	**0.0001**
10 min	**67.35 ± 0.95**	**74.65 ± 0.81**	**-5.834**	**0.0001**



The Pulse Rate were significantly higher in the Magnesium Sulphate group during the postoperative period, compared to the Dexmedetomidine group (p value-0.0001).

Table F2: Post-Operative Systolic Blood Pressure (mmHg)

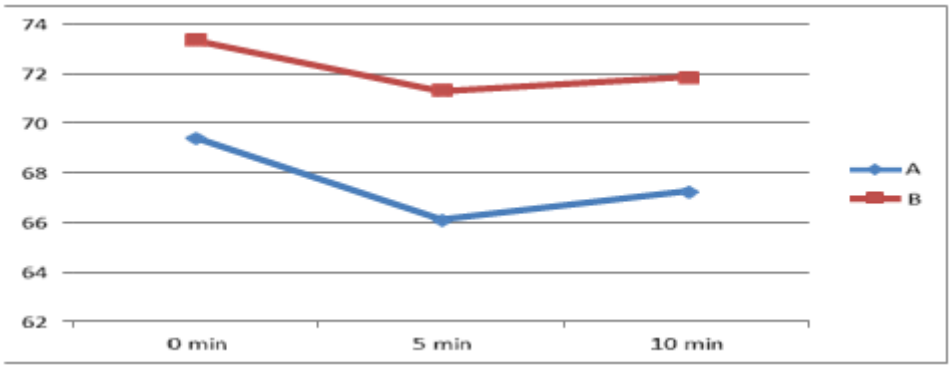
Post Extubation Systolic BP	A	B	T test	P value
0 min	107.26 ± 1.12	109.26 ± 0.86	-1.416	0.162
5 min	103.68 ± 1.05	107.39 ± 0.88	-2.721	0.008
10 min	104.74 ± 1.08	108.65 ± 0.93	-2.743	0.008



Post extubation Systolic Blood Pressure was significantly lower in Dexmedetomidine group when compared to MagnesiumSulphate group (p value-0.008).

Table F3: Post-Operative Diastolic Blood Pressure (mm Hg)

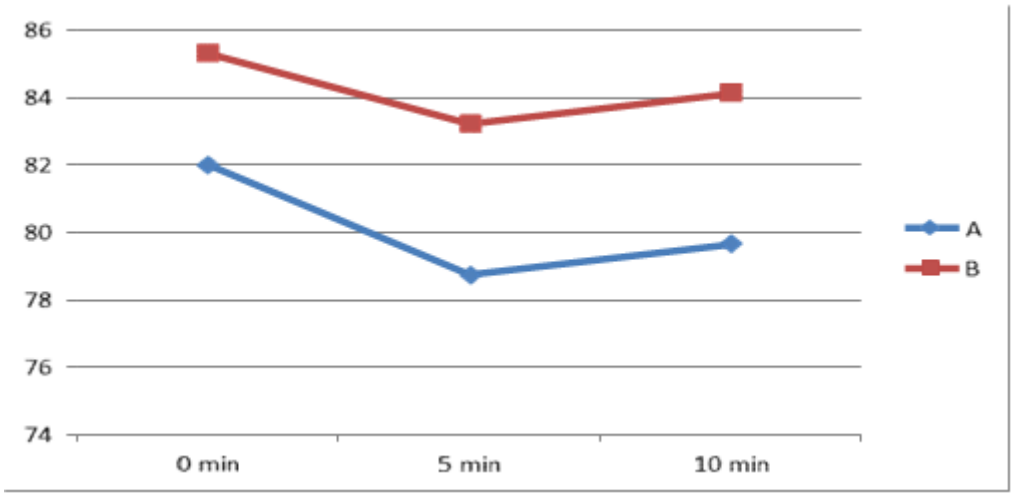
Post Extubation Diastolic BP	A	B	T test	P value
0 min	69.42 ± 0.81	73.32 ± 0.89	-3.244	0.002
5 min	66.10 ± 0.77	71.29 ± 0.91	-4.354	0.0001
10 min	67.26 ± 0.81	71.84 ± 0.98	-3.604	0.001



The post-operative Diastolic Blood Pressures were significantly lower in the Dexmedetomidine group compared to the Magnesium Sulphate group (p value <0.05).

Table F4: Post-Operative Mean Arterial Pressure (MAP in mmHg)

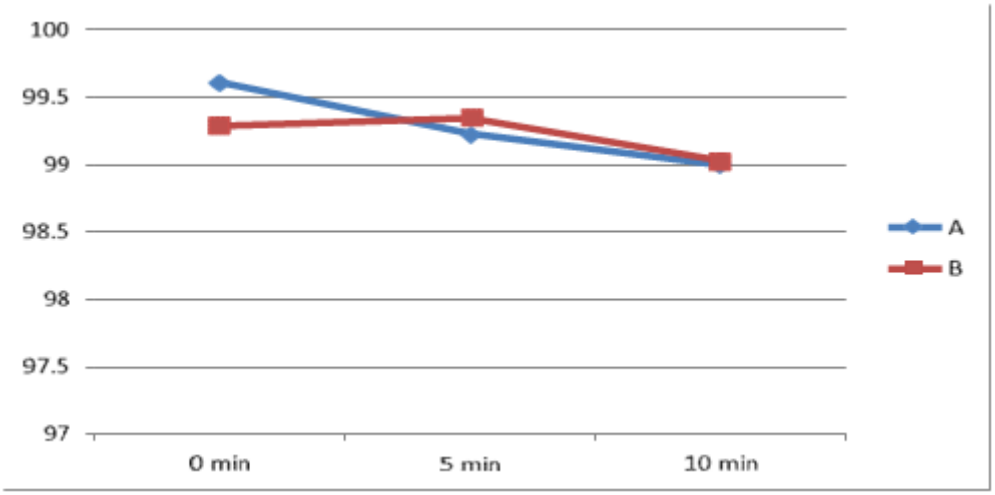
Post Extubation Mean Arterial Pressure	A	B	T test	P value
0 min	82.03 ± 0.81	85.32 ± 0.80	-2.887	0.005
5 min	78.74 ± 0.74	83.23 ± 0.82	-4.083	0.0001
10 min	79.65 ± 0.79	84.13 ± 0.91	-3.713	0.0001



The Mean Arterial Pressure in the post-operative period were significantly lower in the Dexmedetomidine group compared to Magnesium Sulphate group (p value <0.05).

Table F5: Post-Operative SpO_2(%)

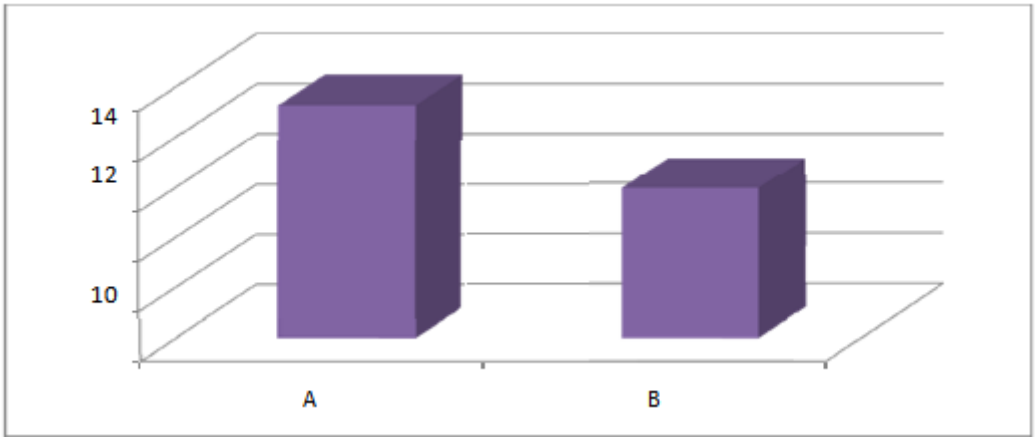
Post Extubation SpO2	**A**	**B**	**T test**	**P value**
0 min	99.61 ± 0.10	99.29 ± 0.14	1.868	0.067
5 min	99.23 ± 0.16	99.35 ± 0.14	-0.618	0.539
10 min	99.00 ± 0.18	99.03 ± 0.17	-0.130	0.897



Post-operative oxygen saturation was comparable between the two groups.

TABLEG: TIME TO ATTAIN MODIFIED ALDRETE SCORE ≤ 9

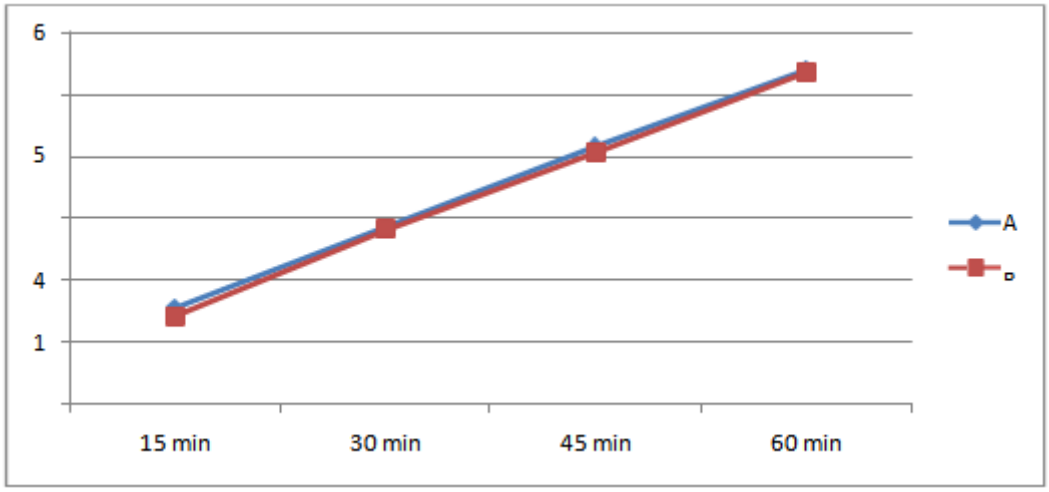
Group	**Modified Aldrete Score**		**T value**	**P value**
	Mean	SE		
A	13.29	0.21		
B	**9.97**	**0.22**	10.841	0.0001



The time to attain Modified Aldrete Score ≤ 9 is significantly lower in the Magnesium Sulphate group compared to Dexmedetomidine group (13.29±0.21 vs 9.97±0.22, p value- 0.0001).

Table H: Numeric Pain Rating Scale

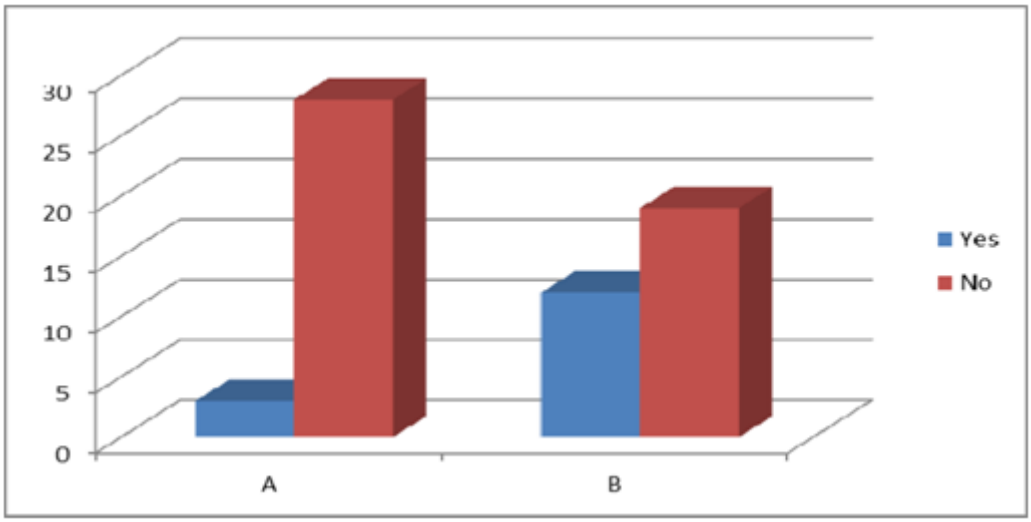
Numeric Pain Rating Scale	A	B	T test	P value
15 min	1.55 ± 0.15	1.42 ± 0.12	0.683	0.497
30 min	2.84 ± 0.15	2.81 ± 0.14	0.162	0.872
45 min	4.16 ± 0.13	4.06 ± 0.13	0.521	0.604
60 min	5.39 ± 0.12	5.35 ± 0.12	0.191	0.849



The Numeric Pain Rating Scale was comparable between two groups and there was no significant difference noted.

Table I: Nitroglycerine necessity

Group	**Nitroglycerine necessity**		**Chi square**	**P value**
	Yes	**No**		
A	3	28	7.123	0.008
B	12	19		



Nitroglycerine necessity during intra-operative period was significantly increased in Magnesium Sulphate group compared to Dexmedetomidine group (p value- 0.008).

IV. Discussion

Several studies have revealed that controlled hypotension is beneficial during Cortical Mastoidectomy surgeries in terms of improved surgical field visibility and thereby shorter duration of surgeryand better outcome.[7]Various drugs have been tried to induce hypotensionduring surgery. These include þ-blockers, vasodilators, calcium channel blockers, and anaesthetic drugs like propofol, opioids and inhalationalagents.[8]

Many studies were conducted comparing theseagents with regard to hemodynamic stability, patient tolerance, quality of surgical field etc. Many studies have been conducted regarding the efficacy of Dexmedetomidine as a hypotensive agent. Dexmedetomidine has the added advantages of analgesic and sedative and anesthetic sparing effects. Recently several studies were conducted regarding the analgesic and anesthetic sparing effects of Magnesium Sulphate in addition to its use as a hypotensive agent. In our study, Dexmedetomidine is compared with Magnesium Sulphate with regards to efficacy as a hypotensive agent, recovery profile and post-operative painrelief.[9]

In our study, we observed that there was a significant fall in heart rate and blood pressure following induction in both the groups. Both the drugs were effective in maintaining the intraoperative Mean Arterial Pressure (MAP) within the target pressure of 60 – 70 mm of Hg. Other additional drug of Nitroglycerine was needed to maintain the Mean Arterial Pressure (MAP) significantly in Magnesium Sulphate group (p value- 0.008).[10]

The hemodynamic parameters such as heart rate, systolic blood pressure, diastolic blood pressure and mean arterial pressure were significantly lower in the Dexmedetomidine group compared to Magnesium Sulphate group during the intraoperative period till the stoppage of the study drug.

V. Conclusion

We conclude that dexmedetomidine used in our study provided controlled hypotension in an effective and more stable way with better haemodynamic stability in patients under going Cortical Mastoidectomy Surgery, and also increased surgeon satisfaction by achieving better surgicalfield.

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