

Effect of Music on Intraoperative Haemodynamic Stability and Postoperative Pain Relief in Patients Undergoing Ceaserean Section under Sub-Arachnoid Block- A Randomised Study

Nidhi Sharma^{1*}, Anurag Atroliya²

¹Consultant Anaesthesiologist, G.R. Medical College, Gwalior, M.P., India

²Consultant Anaesthesiologist, G.R. Medical College, Gwalior, M.P., India

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*Corresponding author

Nidhi Sharma

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Abstract: Pain after surgery is extremely annoying and unbearable for the patient. All the techniques for multimodal analgesia have some or other side effects and thus they have to be used very cautiously in postoperative ceaserean section patient as they can adversely affect health of the baby also. Music could be an effective additive for alleviation of pain without side effects. Our hypothesis is that music therapy helps in maintaining hemodynamic stability and reduces postoperative pain in patients undergoing ceaserean section. This randomized control study was conducted on 90 patients of ASA grade 1 and 2 after taking ethics committee approval. Group A (n=30) patients heard routine operation theatre sound. Group B (n=30) patients heard relaxing music intraoperatively only. Group C (n=30) patients heard relaxing music both intraoperatively and postoperatively till two hours. Diastolic, systolic and mean blood pressure, heart rate were measured throughout the procedure till two hours after the procedure. Time of rescue analgesia was recorded postoperatively. Play of soothing music during perioperative period helps in stabilizing all hemodynamic parameters ($p < 0.05$). Mean duration of rescue analgesia in group A was 41.13 ± 38.51 that was significantly low ($p < 0.05$) in comparison to group B 135.46 ± 62.77 , and group c 182.13 ± 75.68 . Exposure of music during perioperative period helps in stabilizing all haemodynamic parameters (HR, SBP, DBP and MAP) and reduces postoperative pain in patients of ceaserean section under spinal anaesthesia.

Keywords: Analgesia, Caeserean section, Hemodynamic stability, Music, Spinal anaesthesia.

INTRODUCTION

Pain is the most uncomfortable and difficult to bear suffering during or after the surgery. Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage [1]. Untreated pain causes other changes like tachycardia, hypertension, myocardial infarction, angina, respiratory secretion retention because of painful coughing and less effective physical movements those further increases morbidities like deep vein thrombosis, atelectasis, pneumonia, poor and delayed wound healing, insomnia, longer stay in hospitals thus worsens quality of life [2, 3].

Music, by enhancing the release of endogenous opioids and other neuropeptides such as oxytocin [4] has effect on antistress system of the body. Music also results in increase in the number of mio-receptors [1]. Apart from the spinal anaesthesia, music has effect on physiological haemodynamics even during general anaesthesia because auditory evoked potentials

are found to be intact even in deeper plane of general anaesthesia [5, 6]. Music therapy, according to previous studies, reduces both preoperative and postoperative anxiety and decreases postoperative pain [3-7].

A pregnant female going to give birth to new born is a special case in medical science as two lives, mother and newborn are in need of special care and attention. Parturient must be provided medical care throughout her hospital stay and even after it that should be effective, comfortable and safe for both, mother and baby. Drugs must be used carefully as they can cross placental barrier or through breast milk get assess in baby's circulation that might be harmful for the baby.

Various methods like opioids, NSAIDS, acetaminophen, ketamine, gabapentin, pregabalin, continous epidural local anaesthesia, continous spinal, epidural etc. are used to provide analgesia. Opioids like morphine, pethidine and other drugs provide pain relief

but they also get secreted in breast milk and may cause adverse sedative effect in the newborn.

Music is free from side effects as it is non-pharmacological, non-invasive and non-chemical method and is cost effective too. Reduction of anxiety reduces perception of pain and thus decreases the dose of sedatives and opioids and hence their side effects. Music is not the sole agent to alleviate pain but it could be used with other pharmacological agents to reduce their dose and thus the side-effects associated with them.

MATERIALS AND METHODS

After obtaining approval from the ethics committee and well written informed consent from the patients, study was carried out on 90 female patients of ASA grade I and II, aged 20-35 years, undergoing cesarean section lasting 1-1.5 hours requiring spinal anaesthesia. Patients were allocated randomly using envelope technique in three groups of 30 patients in each. In group A- Patients heard routine operation

theatre sounds, group B- Patients heard relaxing music intraoperatively only and in group C- Patients heard relaxing music both intraoperatively and till two hours in the post operative period. Exclusion criteria were ASA grade III and above, severe PIH, eclamptic patients, language barrier, hearing defect, psychiatric illness or memory disorders, known addiction like alcohol consumption and drug abuse and patients on antihypertensives, antiarrhythmic, adenoceptor agonist or antagonist.

CONSENT

Details of procedure were explained to all the patients during preanaesthetic assessment and an informed and written consent was obtained.

PATIENTS' GROUPING

90 female patients of ASA grade I & II scheduled for cesarean section under spinal anaesthesia were divided into 3 groups (n=30 each) randomly using envelope technique as below:

1.Group 'A' (n=30)	Patients heard routine operation theatre sounds.
2.Group 'B' (n=30)	Patients heard relaxing music intraoperatively only.
3.Group 'C' (n=30)	Patients heard relaxing music both intraoperatively and postoperatively till two hours.

Preparation of the patient

Preoperative assessment

A thorough preoperative evaluation was done including history, general physical examination, systemic examination, airway and spine. Counseling was done and informed consent was taken.

Pre medication

Intradermal sensitivity test for bupivacaine was performed

- Uniform premedication of inj. Glycopyrrolate 0.2 mg I.M was given 30 minutes before induction of anaesthesia, inj. ranitidine 50mg, inj. Ondansetron 4mg, inj metoclopramide 10mg.
- Preloading with Ringer Lactate in a dose of 10ml/kg BW with 18 G cannula ½ an hour before start of anaesthesia.

Anaesthesia technique

- Noninvasive sphygno-manometer, ECG monitors and pulse oximeter were placed
- After careful aseptic cleaning and draping, a midline subarachnoid block was performed at L2/3 or L3/4 intervertebral space with the patients in the lateral decubitus position using a 25- gauge Quincke spinal needle. After free flow of CSF inj. Bupivacaine 0.5% 2 ml was injected intrathecally. Thereafter the patients were placed in the supine position for surgery. Patients in group A were exposed to routine operation theatre sounds. In group B, patients were exposed to soothing music by ear phone throughout the surgery while in group C, music was given till two hours after completion

of surgery along with advice about breastfeeding from specialists.

Monitoring

Baseline observations were recorded before spinal anaesthesia. Pulse rate, electrocardiogram, systolic and diastolic blood pressure, respiratory rate and SPO2 were monitored perioperatively. Data monitoring performed continuously but for statistical analysis, data were recorded at 0,5,10, 20, 30, 45, 60, 90,120 minutes after intrathecal injection up to 2 hours in postoperative period.

Analgesia

- Duration of analgesia i.e. the time taken from the onset of sensory block to the first request for supplemental analgesia.
- Intensity of pain and VAS score at the time of first analgesia request:

Assessment of pain was done by Visual Analogue Scale (VAS) which is a 10 cm scale with 100 divisions drawn on white paper representing pain. The top of the scale at 100 represents very severe pain while the baseline value-0 represents no pain.

Side effects and complications

Patients were closely observed in the intraoperative and postoperative period for complications like nausea, vomiting, dyspnoea, respiratory depression, chest pain, shivering, dysrhythmia, bradycardia, hypotension and any other.

The observations were recorded and subjected to statistical analysis using student's "t" test and for qualitative variables chi square test was used. The observations recorded in all the three groups were tabulated and statistical analysis was carried out by using SPSS version 17 statistical software. For intergroup comparison, $p > 0.05$ and $p < 0.05$ were

considered as insignificant & significant respectively. $p < 0.01$ was considered as highly significant.

RESULTS

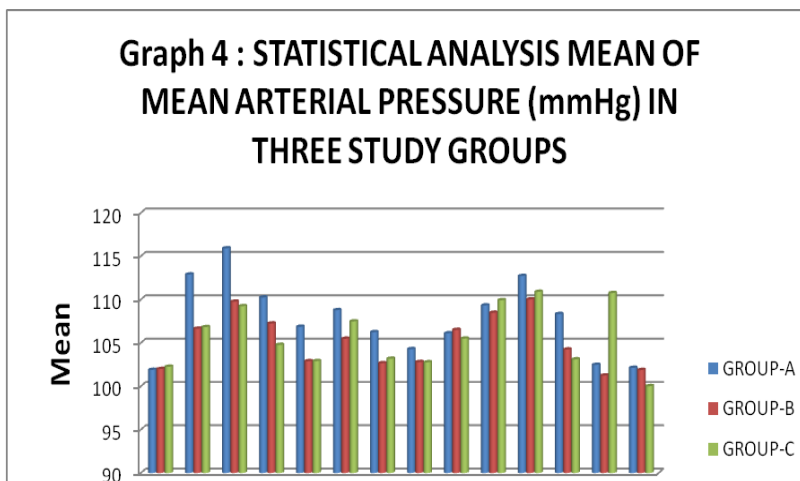
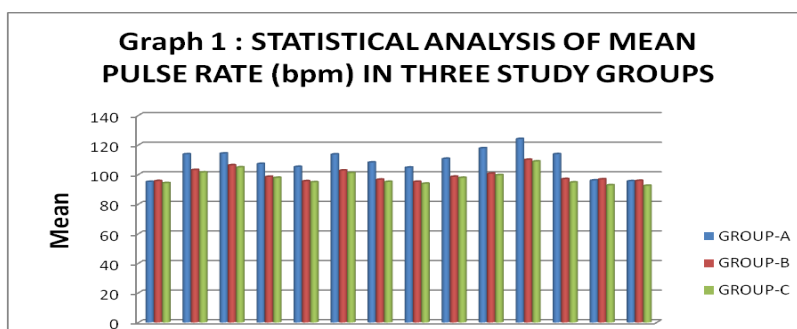
Data obtained from the patients involved in study were analyzed. The mean age, weight, height, sex, type of surgery and duration of anaesthesia were comparable in all study groups as shown in table 1.

Table-1: Showing demographic variables of in two groups

Demographic data	Group a	Group b	Group c
Age(yrs)	25.47±4.65	26.0±5.071	26.8±6.02
Weight(kg)	57.6±5.31	58.2±5.1	56.9±4.42
Sex (female)	100%	100%	100%
Height(cms)	151.7±3.21	150.73±3.16	152±4.11
Duration of surgery(min)	45.66±8.87	48.3±10.26	47.36±9.62

Intraoperatively, vitals like heart rate, SBP, DBP and MAP were measured at various time intervals

with the mean of heart rate and MAP shown in the graph 1 and 2 respectively.



According to analysis of observations, heart rate and blood pressures were maintained significantly better in group B and group C when compared to group

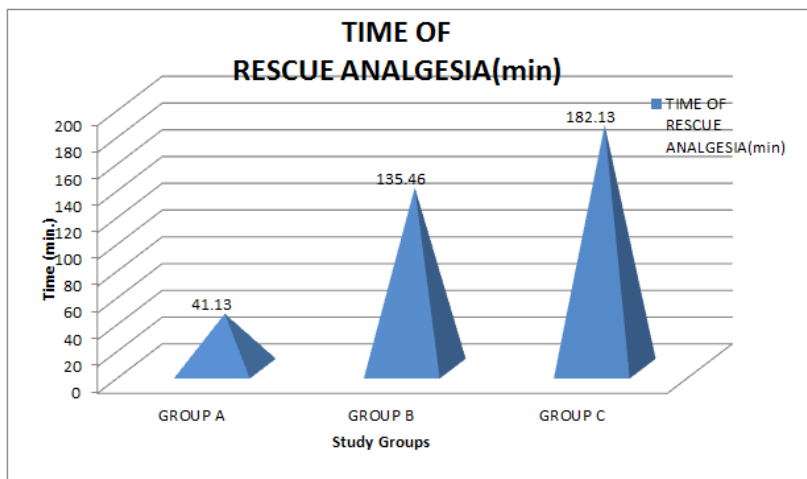
A. Also Group C showed significantly better control of haemodynamic parameters than group B ($p < 0.05$).

Table-2: Showing time of rescue analgesia in all three groups

Time of rescue analgesia(min)	Group a	Group b	Group c
Mean±SD	41.13±38.51	135.46±62.77	182.13±75.68

Time of rescue analgesia was significantly increased in B and C as compared to group A. Also the time of rescue analgesia in group C was increased

significantly than group B as shown in table-2 and graph below:



Postoperative complications like nausea, vomiting, sedation, bradycardia, tachycardia, hypotension, shivering and urinary retention were not significant in all the three groups.

DISCUSSION

The present study entitled “Effect of music on intraoperative haemodynamic stability and

postoperative pain relief in patients undergoing cesarean section under sub-arachnoid block- a randomised study” was conducted to assess haemodynamic stability and duration of analgesia in three groups. A total of 90 pregnant women (ASA grade I and II) posted for caesarean section under spinal anesthesia were randomly divided into three groups according to exposure of music as shown below:

1.Group 'A' (n=30)	Patients heard routine operation theatre sounds.
2.Group 'B' (n=30)	Patients heard relaxing music intraoperatively only.
3.Group 'C' (n=30)	Patients heard relaxing music both intraoperatively and postoperatively till two hours.

Pain is the most feared component associated with any surgical procedure. A good anaesthesia is that when it makes patient free of complications especially pain free throughout the surgery and in the post operative period too.

Since ancient times, music has been in use to enjoy and make people happy and stress free as it has characteristic psychological and physiological effects on human being [8]. Music therapy, according to previous studies, reduces both preoperative and postoperative anxiety and decreases postoperative pain.

A pregnant female going to give birth to new born is a special case in medical science as two lives, mother and newborn are in need of special care and attention. Music is free from side effects as it is non-pharmacological, non-invasive and non-chemical method and is cost effective too. Reduction of anxiety reduces perception of pain and thus decreases the dose of sedatives and opioids and hence their side effects. Music is not the sole agent to alleviate pain but it could be used with other pharmacological agents to reduce their dose and thus the side-effects associated with them.

In present study, selected groups were comparable for the demographic variables like age, height, weight and sex parameters, type and duration of

surgery and with $P > 0.05$. Preoperative Heart rate, SBP, DBP and MAP were comparable in all the study groups. Intraoperative and post-operative heart rate, SBP, DBP and MAP was better controlled in group B and C when compared to group A ($p < 0.05$). Among group B and C, group C showed better hemodynamic stability then group B ($p < 0.05$).

As shown in table 2, the mean (\pm SD) duration of analgesia in group A, B and C was 41.13 ± 38.51 , 135.46 ± 62.77 and 182.13 ± 75.68 min respectively. On comparison and application of statistical analysis there was significant prolongation in duration of analgesia in group B and C when compared to group A. Also time of rescue analgesia was significantly prolonged in group C when compared to group B.

Migneault *et al.* [9] conducted a prospective randomized double blind study and concluded that music may be used as a simple and effective mean in decreasing postoperative pain. U. Nilsson *et al.* [10] suggests that patients listened to music during intraoperative period may experience decreased postoperative pain, and that postoperative music therapy may reduce anxiety, pain and morphine consumption.

Eliseth Ribeiro Leao *et al.* [11] found that listening to music and mental images evoked through it

have significant effect on the reduction of pain intensity. Kwo-Chen Lee *et al.* [12] observed that music reduces anxiety and heart rate which is in accordance with our study.

Rohit S. Loomba *et al.* [13] found that music decreases heart rate, systolic blood pressure, diastolic blood pressure which is similar to our results. Valeria Calcaterra *et al.* [14] conducted a study to evaluate effect of music on post operative distress and pain in pediatric day care surgery. They concluded that music reduces systolic blood pressure and diastolic blood pressure significantly.

Pamela G. Binns Turner *et al.* [15] concluded with their study that application of music perioperatively, reduce mean arterial pressure (MAP), anxiety and pain in patients undergoing mastectomy. Elaheh Mottahedian *et al.* [16] found that music is effective in reducing anxiety and improving the hemodynamic status of patients under spinal anaesthesia. Manish Jha *et al.* [17], found that music in combination with therapeutic suggestion during surgery under general anaesthesia have a beneficial effect on postoperative rescue analgesic doses.

Carlton Evans *et al.* [18] found that therapeutic suggestions during anaesthesia may significantly reduce the duration of recovery and improves the quality of recovery from hysterectomy surgery. Masoumeh Forooghi *et al.* [19] concluded that music alleviates patient's anxiety during coronary angioplasty.

T T C McLintock *et al.* [20] concluded from the results that positive intra-operative suggestions played during surgery can have a beneficial effect on patients undergoing hysterectomy by reducing postoperative pain and thus the analgesic consumption.

It is suggested that music has central projections to the bilateral temporal lobes that might be involved in the decrement of stress response and thus the stress related factors. Music, by enhancing the release of endogenous opioids and other neuropeptides such as oxytocin [5] has effect on antistress system of the body. Music also results in increase in the number of mio-receptors [1].

CONCLUSION

This study was carried out to compare the effect of music on intraoperative haemodynamic stability and postoperative pain relief in patients undergoing caesarean section under spinal anaesthesia. We found that exposure of music during perioperative period helps in stabilizing all haemodynamic parameters (HR, SBP, DBP and MAP) during caesarean section under spinal anaesthesia. Music also helps in reducing postoperative pain as measured from time of rescue analgesia. No untoward effects and or complications were observed during the study.

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