

Effect of Music Played During Perioperative Period on Stress Reduction in Patients Undergoing Ceaserean Section under Sub-Arachnoid Block- A Randomised Study

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Abstract: Pain after surgery is an evitable event but if remain untreated, it give rise to so many other complication those in total deteriorates patients quality of life. 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 can be used along with traditional pharmacological agents to reduce pain and dose of these agents. This study says that music played during surgery helps in reducing postoperative stress 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. Blood sugar was measured thrice i.e. preoperatively, immediately postoperatively and two hours later in postoperative period as an indicator of stress response. Play of soothing music during perioperative period helps in stabilizing stress occurring due to surgery and anaesthesia. Mean of blood sugar was significantly low ($p < 0.05$) in group C and group B in comparison of group A suggesting less stress in patients exposed to music. Exposure of music during perioperative period helps in reducing postoperative stress in patients of ceaserean section under spinal anaesthesia.

Keywords: Blood sugar, Caeserean section, Music, Postoperative stress, Spinal anaesthesia.

INTRODUCTION

A patient going for surgery is in stress due to many factors like pain, anxiety, post-operative recovery, post-operative nausea and vomiting etc. Unrelieved post-operative pain may cause other changes like inability to cough and less effective movements those further increases morbidities like deep vein thrombosis, atelectasis, myocardial infarction, pneumonia, poor and delayed wound healing, insomnia, longer stay in hospitals thus worsens quality of life [1, 2]. Likely unrelieved postoperative anxiety may led to nausea, vomiting or post-traumatic stress disorder in extreme case.

In normal day to day life, people use to hear music to make them free of stress and to feel fresh as music has characteristic psychological and physiological effects on human being [3]. Music could

be used during surgeries also to increase comfort of the patient during and after the surgery.

Music therapy, according to previous studies, reduces both preoperative and postoperative anxiety and decreases postoperative pain [4-6] by acting on antistress system of the body. It acts by enhancing the release of endogenous opioids and other neuropeptides such as oxytocin [4] and increase in the number of mio-receptors have also been reported [1].

Pregnancy is a complete process during which pregnant women passes through so many chances both physiological and psychological. Stress and anxiety of pregnant female is more at the time of delivery because of so many reasons like increased intensity of labour pains, about the coming baby's care, about the surgery and pain associated with it.

Stress in pregnant patients has to be reduced right from the preoperative period till she needs it. Various methods like opioids, NSAIDs, acetaminophen, ketamine, gabapentin, pregabalin, continuous epidural local anaesthesia, continuous spinal, epidural etc. are used to provide analgesia. Anxiolytics like midazolam, lorazepam, phenargen etc are used to reduce anxiety. Opioids like morphine, pethidine, anxiolytics and other drugs provide pain relief and reduce anxiety 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.

Effect on stress reduction or elevation can be assessed by many ways like by measuring serum cortisol level, blood sugar level, and serum adrenaline and noradrenaline measurement. In present study, we have taken blood sugar level measurement as the criteria for assessment of stress reduction.

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.

MATERIALS AND METHODS

After obtaining approval from the ethics committee and well written informed consent from the patients, study was carried out on 90 pregnant 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 each: 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 postoperative period. Exclusion criteria were ASA grade III and above, diabetic 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:

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. Patients in Group B and Group C were applied with headphones such that no sound from the operation theatre was allowed to leak in the ears while patients in Group A were applied with headphones and blank tape was played and kept exposed to the routine operation theatre sound after being comfortable on the operation table before induction.

Patients, anaesthesiologists, surgeons and nurses were blinded to tape selection. Each tape was set on autoreverse mode and was played continuously

starting after recording baseline values of pulse oximeter, pulse rate, noninvasive blood pressure recording, capnography to see the effect of allaying preoperative anxiety till the closure of skin incision in Group B and for further two hours in the postoperative period in patients under Group C. Data monitoring performed continuously but for statistical analysis, data were recorded at 0,5,10, 20, 30, 45, 60, 90 and after intrathecal injection and then at 10,20,30,60 and 120 minutes in post-operative period.

Blood sugar level was measured three times in all the study groups as: preoperatively, just after completion of surgery and then two hours thereafter as an indicator of stress response to the surgery.

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 the 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)	26.47±5.65	26.0±5.071	25.8±4.72
Weight(kg)	55.18±4.31	57.90±5.01	56.4±4.04
Sex (female)	100%	100%	100%
Height(cms)	151.0±3.61	150.73±3.16	152.22±4.10
Duration of surgery(min)	50.66±10.87	49.02±10.26	51.36±11.62

Intraoperatively, vitals like heart rate, SBP, DBP and MAP were measured at various time intervals with statistically significant difference ($p < 0.05$). According to analysis of observations, heart rate and

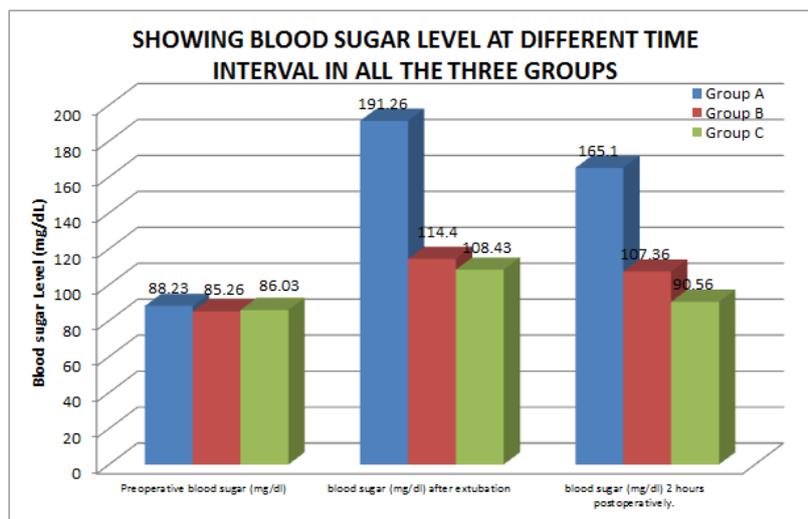
blood pressures were maintained significantly better in group B and group C when compared to group A. Also Group C showed significantly better control of haemodynamic parameters than group B ($p < 0.05$).

Table-2: Showing blood sugar level at different time interval in all the three groups

Blood sugar levels (mg/dl)	Group A	Group B	Group C
Mean±SD Preoperative blood sugar (mg/dl)	88.23±15.08	85.26±13.40	86.03±10.17
Mean±SD blood sugar (mg/dl) after extubation	191.26±30.06	114.40±20.41	108.43±13.01
Mean±SD blood sugar (mg/dl) 2 hours postoperatively.	165.10±25.55	107.36±15.64	90.56±9.28

Table-2 shows that post-operative blood sugar levels measured just after completion of surgery and two hours thereafter as an indicator of stress response to the surgery were significantly less in group B and C as

compared to group A and when compared between group B and C, group C showed better blood sugar control ($p < 0.05$).



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 played during perioperative period on stress reduction

in patients undergoing cesarean section under sub-arachnoid block- a randomised study” was conducted to assess effect of music on stress reduction in three study 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.

A patient going for surgery is in stress due to many factors like pain, anxiety, post-operative recovery, post-operative nausea and vomiting etc.

Music therapy, according to previous studies, reduces both preoperative and postoperative anxiety and decreases postoperative pain [3, 5, 6]. Pregnancy is a complete process during which pregnant women passes through so many chances both physiological and psychological. Stress and anxiety of pregnant female is more at the time of delivery because of so many reasons like increased intensity of labour pains, about the coming baby’s care, about the surgery and pain associated with it. Opioids like morphine, pethidine, anxiolytics and other drugs provide pain relief and reduce anxiety 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. Thus music can be used as an adjunct with pharmacological agents to reduce dose of the later and thus the side effects to mother and baby.

In present study, selected groups were comparable for the demographic variable 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 were 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 ($p < 0.05$).

Rise in postoperative blood sugar level was significantly less in group B and C when compared to group A and also sugar level two hours later in the postoperative ward was significantly lower in group C when compared with group A and group B.

Bringman H *et al.* [7] conducted a prospective randomized controlled study to evaluate the effect of relaxing music as pre-medication before surgery and they concluded that relaxing music decreases the level of anxiety in a pre-operative setting to a greater extent than orally administered midazolam.

ValariaCalcaterra *et al.* [8] 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.

Kwo-Chen Lee *et al.* [9] observed that music reduces anxiety and heart rate which is in accordance with our study. Carlton Evans *et al.* [10] found that therapeutic suggestions during anaesthesia may significantly reduce the duration of recovery and improvises the quality of recovery from hysterectomy surgery.

ElahehMottahedian *et al.* [11] found that music is effective in reducing anxiety and improving the hemodynamic status of patients under spinal anaesthesia.

Pamela G. Binns Turner *et al.* [12] concluded with their study that application of music perioperatively, reduce mean arterial pressure (MAP), anxiety and pain in patients undergoing mastectomy.

Dhrubajyoti Sarkar *et al.* [13] concluded that music could be used as non-pharmacological aid to tone down surgical stress, anxiety in patients undergoing orthopaedic surgery under spinal anaesthesia with an additional benefit of enhancing overall satisfaction of the patient.

T T C McLintock *et al.* [14] 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.

U. Nilsson *et al.* [15] 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.

Stefan Koelsch *et al.* [16] from their study showed that listening to music reduces sedative requirements to reach light sedation and that music has stress reducing effect during surgery under spinal anaesthesia as indicated by decreased cortisol level in patients listening to music.

Dhrubajyoti Sarkar *et al.* [17] conducted a prospective, randomized, double blind study to evaluate the effect of music on patients undergoing caesarean section under spinal anaesthesia. They found that music therapy as a non-pharmacological aid can be used on patients undergoing surgery under spinal anaesthesia, empowering the patient to develop own ability to gain control over the negative effects of the surgical stress.

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 have effect on antistress system of the body and also increases number of mio-receptors.

CONCLUSION

This study was carried out to compare the effect of music on surgery related stress relief in patients undergoing ceaserean section under spinal anaesthesia. We found that exposure of music during perioperative period helps in reducing surgery related stress as seen by measuring and comparing blood sugar level during ceaserean section under spinal anaesthesia. No untoward effects and or complications were observed during the study.

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