Original Research Article

Impact of music medicine on anxiety & stress response in surgeries under spinal anesthesia :A prospective study

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Abstract

Anxiety and pain are common responses to surgery and can adversely affect patient's outcome. Music is increasingly being used as a non-pharmacological intervention perioperatively to improve patient outcome and to decrease Anaesthetic drug doses.**Aims:** The aim of this study was to evaluate the impact of intra operative music on the anaesthetic requirement and stress response preoperatively. **Study design:** Prospective randomised, double blinded study. **Materials and methods:** After approval of the hospital ethical committee,60ASA I & II patients were randomly divided into music (M) and control(C) group.The patients in group 'M 'were made to listen to Raag Neelambari music, which was played 5 minutes (min) after spinal anaesthesia and continued till surgical closure. In the control group occlusive headsets were given but no music was played. Hemodynamic data was recorded & perioperative outcome was compared.**Results:** There was statistically significant difference in the preoperative outcome of the patients of the 2 groups. These was decrease incidence of nausea & vomiting with decreased VAS score was seen in music group. **Conclusion:** On the basis of present study we concluded that music therapy is simple, inexpensive and noninvasive intervention that achieves lesser perioperative complication like decreased incidence of nausea , vomiting and lesser need of analgesics Use.

Keywords: Spinal Anaesthesia, music therapy, stress response

Introduction

It is a well-known fact that perioperative period is both physically and mentally traumatic rather is a source of significant fear and anxiety for the patient. Anxiety of going under the knife is tomophobia which translates to fear of surgery. with the help of anaesthesia , surgery and post operative period has become less miserable but still man y patients suffers from anxiety which hinders the desired therapeutic goal[1,2]. Surgical procedures performed under regional anaesthesia present a special challenge to anaesthesiologist,as the patients are awake & are exposed to multiple anxiety provoking visual & auditory stimuli[3]. Hence various drugs may need to be administered in the perioperative period, for the purpose of calming the patient but it is done at the cost of dose dependent CNS &cardiorespiratory system depression[4]. Since no medication has been widely accepted especially during spinal & other regional anaesthesia, anaesthesiologist should manage anxiety during surgery using non pharmacological technique that is inexpensine, noninvasive & has no side effects. On the basis of preliminary experimental studies, music & relaxation have been recommended in acute pain management guidelines[5].

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The scientific basis of the effects of music therapy was the subject of several neurophysiology studies; the results of which established some evidence particularly effect of music on the hormonal secretions and nociceptive reflexes [6,7].There is a distinction between two terms that are commonly misused: "music medicine" and "music therapy." Music medicine is defined as the passive listening of prerecorded music which may be offered by medical personnel. Headphones are commonly used when listening to music, and it may involve patient choice when selecting the type of music. In contrast, music therapy involves the "clinical and evidence-based use of music interventions to accomplish individualised goals within a therapeutic relationship by a credentialed professional who has completed an approved music therapy program[8]

Materials and methods

In this study, raga neelambari was chosen as a music. The raga nelambari in the classical Indian Karnatic system of music is said to be able to induce sleep and also have some sleep promoting qualities. The anecdotal references to the quality of sleep promoting effects of neelambari probably reflect a conditioned response . We aimed to observe the role of music therapy in the modulation of Haemodynamic variables such as heart rate and mean blood pressure, patient satisfaction and on the intraoperative requirement of sedatives for achieving similar degrees of sedation.

After approval of the hospital ethical committee and written informed consent from every patient, 60 ASA I, II patients, aged 18–50 years age scheduled for Lower limb surgeries under spinal

anaesthesia, were enrolled for this prospective, single blinded study which was performed at a tertiary centre of Madhya Pradesh, from Jan 2019 to December 2019

1. Patients with hearing impairment
2. Mental retardation
3. hormonal dysfunction
4. history of steroid use
5.History psychiatric disorder
6. Patchy spinal anaesthesia/inadequate effect of regional anaesthesia
7. Patient is Claustrophobic
8. Surgery more than 60 minutes
9. Patients not able to communicate and understand properly
10. History of any previous surgery/anaesthesia

Exclusion criteria for study

Patients were randomly assigned to two groups of 30 patients each, using a computer-generated random list (Epi info software, Centre for Disease Control and Prevention (CDC) in Atlanta, Georgia, USA, version7.1.14): the music group (M) and the no-music group(NM). Procedure to be done was explained to patients at the time of pre-anaesthesia checkup. On arrival to the OT, standard monitors such as ECG, NIBP, pulseoximetry were attached, and baseline values were noted. . All patients were given occlusive headsets connected to mobile phone . The patients in group M were made to listen to raagneelambari music, which was played 5 min after spinal anaesthesia(bupivacaine 0.5% heavy 2 ml)and continued till surgical closure, whereas patients in group NM were not played any music but still occlusive headsets were given to them .The music player was covered for observer blinding. The haemodynamic parameters, were recorded at following times: T1, immediately after spinal anaesthesia; T2, 15 min after Spinal anaesthesia; T3, 30 min after spinal anesthesia T4, 45 min after spinal anaesthesia T5, 60 min at skin closure; and T6, 90 min 30 min after arrival to the recovery room. Mean arterial pressure and heart rate were also recorded, patient satisfaction by EVAN-G score[9]postoperative pain by visual analogue scale, sedation by assessing VAS, incidence of nausea vomiting. At the end of surgical closure, the music was stopped and the headset was removed.

Statistical analysis: The sample size was estimated from the data of previous studies, using an "*a"* level of 0.05 and "b" level of 0.90to establish a desired power of 0.80. Statistical analysis was performed using Primer of Biostatistics Statistical Software (McGraw Hill Global Education Holdings,LLC). The parameters were presented as mean ± SD and the unpaired t-test was used for comparing the demographic and clinical data. For the comparisons, *P* value of 0.05 or less was considered as statistically significant. The sample size was calculated using the a priori power analysis, setting a to 0.05 and power to 0.8.

Results

In this study, 60 patients were included and assigned into two groups of 30 patients each. The comparison between the two groups regarding demographic characteristics and surgical interventions were not found to be statistically significant differences (Table 1). The chosen music for our patients was neelambari music. There was no statistically significant difference between the two groups with respect to demographic profile,baseline haemodynamic parameters, and duration of surgery. There was no statistically significant difference in the intraoperative haemodynamic parameters between the two groups. The BIS value, end-tidal isoflurane concentration, and fentanyl requirement were comparable in the two groups. However, there was significant difference in patient satisfaction score, incidence of nausea vomiting ,postoperative pain (Table 2). The incidence of nausea-vomiting was found to be less in group M (43.35%). The average VAS score for pain was lower in the intervention group (53.34 versus 29.98 $p < 10^{-3}$). The satisfaction rate was significantly higher in group M (83.35% versus 53.34; $p < 10^{-3}$). The incidence of intraoperative sedation score was higher in group C (8 cases versus 3 cases) but the difference was not statistically significant (Table 2).

Table 1: Comparison of group M and group C based on demographic parameters and surgical interventions Group M: music intervention; group C: control group

Characteristics	Group M	Group C	P value
Average age (years)	51.7 ± 13.58	51.2 ± 12.5	0.80
BMI	22.9 ±2.12	23.0 ±1.98	0.79
ASA			0.86
-I	12	13	
II	18	17	
Surgical interventions	14	13	0.96
	9	10	
Average duration (min)			
of surgery	79.1 ± 43.6	82.6 ± 36.6	0.61
of anaesthesia	95.6 ± 45.6	101.1 ± 39.0	0.44

Table 2: Effects of music therapy on recovery quality, VAS during recovery, patient satisfaction and intraoperative sedation.

Studied parameters	Group M	Group C	P value
Incidence of Nausea and vomiting:	43.35%	79.98%	10^{-3}
VAS during recovery			
<4	53.34%	29.98%	
4–6	40.02%	53.34%	0.01
>6	6.66%	16.66%	
Patient satisfaction	83.35%	53.34%	$<10^{-3}$
Intraoperative sedation	6.67%	13.34%	0.10

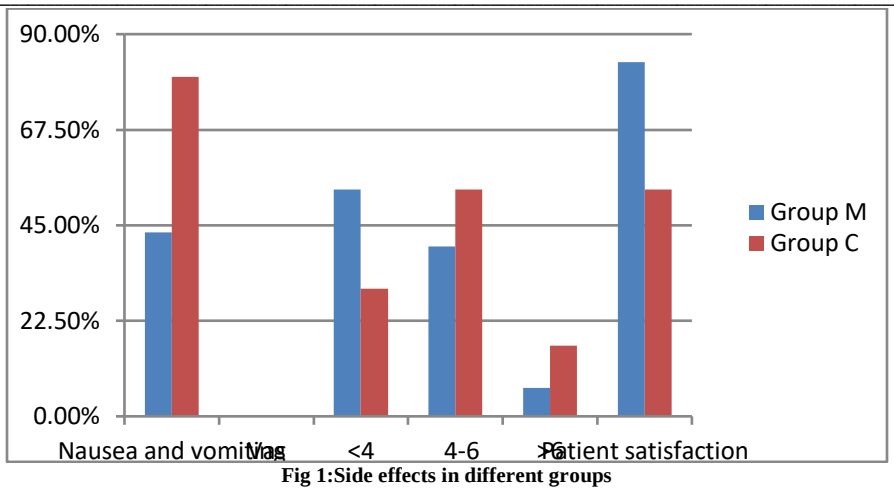

Fig 1:Side effects in different groups

Discussion

Music has been shown to modulate the mood, behaviour and the psychology of the patient into a 'more positive frame of mind'. Music is known to affect the limbic system, which regulates deep emotions and many autonomic parameters. It evokes conditioned relaxation and aids in reducing stress levels. Listening to music causes release of endorphins, thus altering the pain perception. Endogenous endorphin release has also been implicated as a mechanism in decreasing pain and analgesic requirements in some studies[10,11].The neural interconnections of the auditory pathway and the limbic system modulate emotional responses that are associated with the listening of music. Auditory interconnections with the hypothalamus, hippocampus, and the reticular activating system are presumed to attenuate the release of excitatory neurotransmitters, thus providing relaxation and the sedative effects of music[12]. A study conducted by Nilsson et al on patients undergoing hysterectomy under general anaesthesia demonstrated that intraoperative music and music in combination with therapeutic suggestions may have beneficial effects on postoperative recovery.

Music has found its application during various out-patient or minor procedures, ICU stay, in cancer wards, labour rooms, or other hospital settings and has been seen to reduce stress and anxiety levels in patients. Several experimental studies have evaluated the effects of music therapy in improving the quality of perioperative care[13-15]

Music listening has been consistently reported to bring down anxiety in patients through stress reducing effects[16-18]and more specifically in cardiac patients as per the latest Consistent review of patients with coronary heart disease[19].The results of our study is in consonance with these findings. Another mechanism put-forth for music listening to bring down anxiety is that music can help people focus their attention away from distressing situations and generate positive moods and emotions which in turn reduces the anxiety levels [20].Both the reduction of anxiety and the regularisation of the physiological responses could also be attributed to the music listening intervention suppressing the sympathetic activity leading to reduced adrenergic activity and regulation of the autonomic cardiovascular rhythms[21,22].We tried in this study to evaluate effects of music under spinal anaesthesia on these parameters patient satisfaction, intraoperative sedation, incidence of nausea vomiting, and the intensity of pain during recovery from lower limb surgery Our results show a significant improvement in patient satisfaction in group M. Palmer et al. evaluated patient satisfaction with a five-item score. Although there was no significant difference for each item taken separately, the overall score was significantly higher in the intervention group than in the control group[23].Dubois et al. in a study published in CHEST in 1995 assessed the general anaesthetic effect of music on the satisfaction of patients scheduled for bronchoscopy. An intervention group(21 patients) was compared to a control group (28patients). Satisfaction was significantly greater in the intervention group ($p = 0.02$)[24].Similar results were found by Bechtold et al. in a study enrolling patients intended for colonoscopy under general anaesthesia (85 patients treatment group versus 81 patients control group). The frequency of patients claiming music in subsequent colonoscopy was significantly higher in the intervention group (96.3% versus 56.1%; $p < 0.0001$)[24]. Jayaraman et al. also confirmed the beneficial effects of music therapy on patient satisfaction.Music therapy improves satisfaction directly by its relaxing effect, and indirectly through its effects on other dissatisfaction factors such as perioperative pain and stress and postoperative nausea and vomiting. This effect is seen essentially when the music used is chosen by the patient.Our study also reaffirms the study done by Ajmera S et al, combination of music and yoga therapies on the psycho physiological parameters of cardiac patients posted for angiography. Ajmera S et al found that music therapy alone can bring down the anxiety levels and reduce the physiological disturbances and improve the deep breathing pattern for patients posted for angiography.In future we would like to study effect of music with help of new gadgets like virtual box so The person is busy in playing mobile game or seeing movies and measure the depth of anaesthesia using BIS etc so still many prospects are untouched how one can sleep with open eyes.

Conclusion

In this prospective,randomised, double blinded study,we demonstrated beneficial effects of intraoperative music as a non-pharmacological intervention for patients under spinal anaesthesia as they had decreased incidence of nausea and vomiting , had less VAS score and more patient satisfaction.

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