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## Music increases satisfaction in elderly outpatients undergoing cataract surgery

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**Purpose:** Music has long been known to reduce anxiety, minimize the need for sedatives, and make patients feel more at ease. The purpose of the study was to evaluate the effect of music in elderly outpatients undergoing elective cataract surgery with retrobulbar block and monitored anaesthetic care using fentanyl or alfentanil and midazolam.

**Methods:** One hundred and twenty one patients were prospectively and randomly assigned to hear: relaxing suggestions, white noise, operating room noise or relaxing music via audio-cassette headphones. Vital signs were documented before and after retrobulbar block and every 15 min thereafter. Anxiety was assessed using the State-Trait Anxiety Inventory (STAI) before and after surgery. Visual analogue scales (VAS) were used to assess anxiety and patient satisfaction postoperatively with a standardized questionnaire. Between group comparisons were made using Chi-Square, or ANOVA, where appropriate.

**Results:** There were no differences between groups in STAI or anxiety VAS scores at any time. Differences were noted in systolic blood pressure, but not in other vital signs. Patients' ratings of the whole operative experience, satisfaction with the tape played, general level of relaxation and preference for the chosen tape for subsequent surgery were different (music > relaxing suggestions > white noise and OR noise,  $P < 0.05$ ).

**Conclusions:** Elderly patients undergoing cataract surgery under retrobulbar block were more satisfied with their experience if they heard relaxing music, rather than relaxing suggestions or white noise or OR noise. The type of auditory stimuli to which the patients were exposed did not influence the level of anxiety.

**Objectif :** On sait depuis longtemps que la musique réduit l'anxiété, diminue le besoin de sédatifs, et procure du confort au patient. L'objectif de cette étude était d'évaluer l'influence de la musique chez des patients âgés opérés pour une cataracte en chirurgie ambulatoire réglée sous bloc rétrobulbaire associé à du fentanyl ou de l'alfentanil avec midazolam et sous surveillance anesthésique.

**Méthodes :** Cent vingt et un patients étaient prospectivement et aléatoirement assignés à entendre avec des écouteurs une vidéocassette qui transmettait un langage relaxant, le silence, les bruits d'une salle d'opération ou une musique reposante. Les signes vitaux étaient enregistrés avant et après le bloc rétrobulbaire et à toutes les 15 min par la suite. L'anxiété était évaluée sur l'inventaire des traits d'anxiété (STAI) avant et après la chirurgie. Une échelle visuelle analogue (EVA) servait à évaluer l'anxiété alors que le degré de satisfaction postopératoire était estimé sur un questionnaire standard. Les groupes étaient comparés avec le chi-carré ou l'ANOVA selon le cas.

**Résultats :** Il n'a jamais eu de différences entre les groupes pour le STAI et à l'EVA. Quant aux signes vitaux, on n'a observé des différences que pour la pression artérielle systolique. L'évaluation de l'expérience chirurgicale par le patient, sa satisfaction de la bande magnétique écoutée, son degré de relaxation et sa préférence pour la bande qu'il choisirait pour une chirurgie à venir étaient différents (musique > langage relaxant > silence et bruits de la salle d'opération,  $P < 0,05$ ).

**Conclusion :** Des patients âgés soumis à une chirurgie pour cataracte sous bloc rétrobulbaire ont été plus satisfaits de leur expérience s'ils entendaient de la musique reposante plutôt qu'un langage relaxant, le silence ou les bruits d'une salle d'opération.

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**T**HE surgical experience is an anxiety-provoking event. Anaesthetists use various means to reduce this anxiety, including the preoperative interview,<sup>1</sup> anxiolytic premedication,<sup>2</sup> and the use of intraoperative sedatives and hypnotics to supplement local or regional anaesthesia for surgical procedures.<sup>3</sup>

Music reduces anxiety and discomfort. At the same time, there has been increasing concern over the use of music in the operating room, since it may contribute to the overall level of background noise and impair effective communication among members of the surgical team.<sup>4</sup> Several studies attest to the usefulness of music in the surgical experience at allaying anxiety.<sup>5-9</sup>

The effect of music has not been assessed in the elderly patient undergoing cataract surgery. Since this is the commonest procedure performed in North America,<sup>10</sup> it would be useful to ascertain whether this non-medicinal mode of anxiolysis is of benefit, especially since elderly patients do not tolerate sedatives as well as their younger counterparts,<sup>11</sup> elderly patients are often prescribed numerous medications, and they are more susceptible to potentially adverse drug interactions.<sup>12</sup> It would be valuable to know if music reduced the need for sedatives in this patient population.

Therefore, we assessed the effects of music on anxiety and satisfaction in elderly outpatients undergoing cataract surgery using monitored anaesthetic care and retrobulbar block.

## Methods

Institutional Ethics approval was obtained from the Research on Human Subjects Committee of the Toronto Hospital. Patients scheduled for elective cataract extraction in the Ambulatory Surgery Unit at the Toronto Western Division of the Toronto Hospital were studied after informed consent was obtained. Those patients who were taking sedative or psychotropic drugs, or who suffered hearing impairment, were excluded.

Randomization was by patients selecting from a bag one of four different tapes in a blinded fashion. The tapes were played via headphones and an audio-cassette player:

Group 1: Relaxing Suggestions: relaxing, calming suggestions repeated at regular intervals of one to two minutes. Suggestions were simple phrases "Operation is going well. Everything is going smoothly."

Group 2: White Noise: Level of normal noise in a quiet environment.

Group 3: OR noise: A tape which contained the playback of a previously recorded cataract operation.

Group 4: Relaxing Music: Classical music accompanied by soothing sounds of nature.

No overhead music was allowed in the operating room during the study. Following the application of standard monitors, ECG and non-invasive arterial blood pressure cuff, and the establishment of an *iv* catheter, the headphones were adjusted to comfort and a satisfactory volume level of the tape by the research assistant. Patients were sedated by the anaesthetist blinded to the tape randomization. Intravenous 1-2  $\mu\text{g}\cdot\text{kg}^{-1}$  fentanyl or 5-10  $\mu\text{g}\cdot\text{kg}^{-1}$  alfentanil and 7-15  $\mu\text{g}\cdot\text{kg}^{-1}$  midazolam were used. Two or three minutes after *iv* sedation, retrobulbar block was performed by the ophthalmologist. To assess recall during the time of insertion of the retrobulbar block, patients were shown a picture prior to the retrobulbar block, and asked to recall it later.

Vital signs (systolic blood pressure [SBP], diastolic blood pressure [DBP], heart rate [HR], and respiratory rate [RR]) were recorded before and after the retrobulbar block, and at 15 min intervals thereafter until completion of the procedure by the research assistant. Anxiety was assessed using the State-Trait Anxiety Inventory (STAI) (13), which was conducted preoperatively and postoperatively, and by a visual analogue scale (VAS) postoperatively by the research assistant. The State-Trait Anxiety Inventory Test provided two measures: one for trait anxiety and one for state anxiety. The same test was used to obtain two different anxiety measures, the trait anxiety was not expected to vary with time and the state anxiety was expected to vary with time.

Patient satisfaction was evaluated using a postoperative questionnaire using Yes/No responses (Appendix). Questions asking patients about satisfaction with the operative experience, whether they were nervous during the surgery, satisfaction with the tape, whether the tape relaxed them, whether the noise in the operating room bothered them and whether they would want the tape again were used (Appendix). The ophthalmologists who were blinded to the tape randomization were asked whether they were satisfied with the anaesthetic technique using VAS, 0 mm extremely dissatisfied, 100 mm extremely satisfied.

Data were entered into database III plus program and analyzed using SAS statistical package (version 6.08 for windows). Between group differences were assessed using ANOVA for continuous variables or Chi-Square test for categorical variables, where appropriate. Where the analysis of variance detected significance, Tukey's procedure for multiple comparisons was used to identify differences between pairs. Differences within and between groups over time



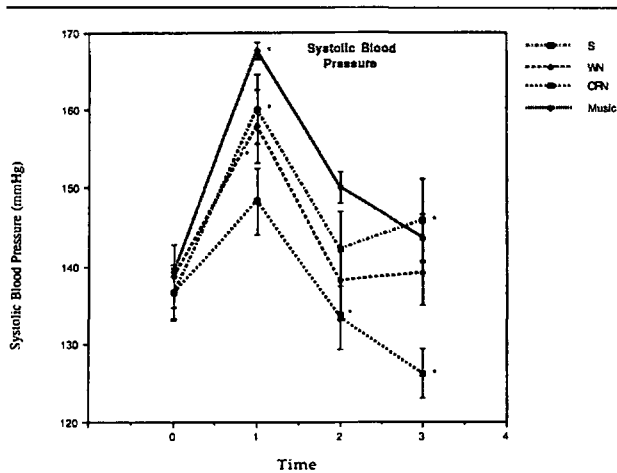


FIGURE 1 Systolic blood pressure *vs* time 0 (pre-retrobulbar block), time 1 (immediately post retrobulbar block), time 2 (15 min post retrobulbar block), time 3 (30 min post retrobulbar block), for all patients. Data are mean $\pm$ SEM. Asterisks (\*) indicate a within group difference compared with time 0 ( $P < 0.05$ ). RS=relaxing suggestions. WN=white noise. ORN=OR noise. RM=relaxing music.

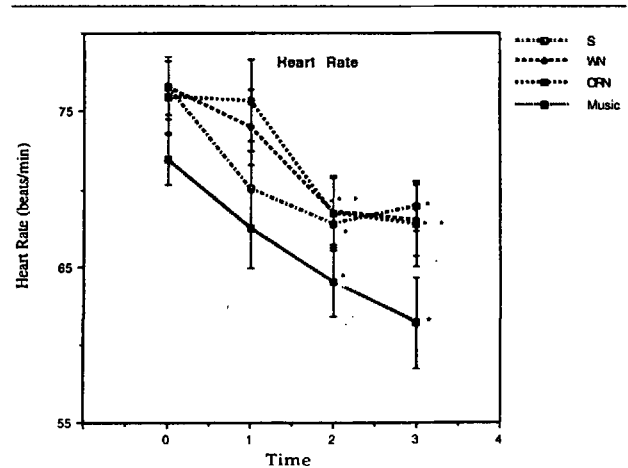


FIGURE 3 Heart rate *vs* time 0 (pre-retrobulbar block), time 1 (immediately post retrobulbar block), time 2 (15 min post retrobulbar block), time 3 (30 min post retrobulbar block), for all patients. Data are mean $\pm$ SEM. Asterisks (\*) indicate a within group difference compared with time 0 ( $P < 0.05$ ). RS=relaxing suggestions. WN=white noise. ORN=OR noise. RM=relaxing music.

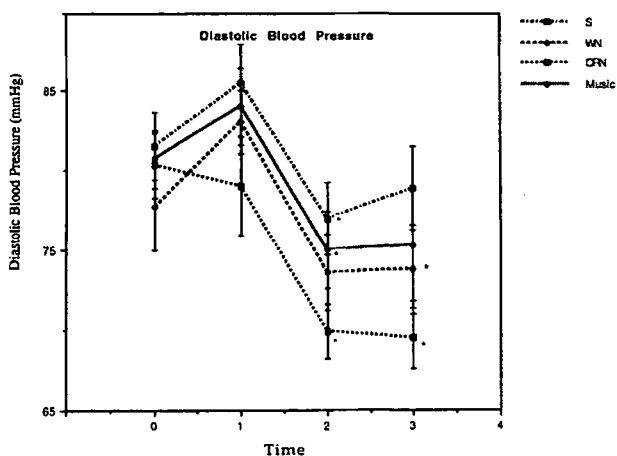


FIGURE 2 Diastolic blood pressure *vs* time 0 (pre-retrobulbar block), time 1 (immediately post retrobulbar block), time 2 (15 min post retrobulbar block), time 3 (30 min post retrobulbar block), for all patients. Data are mean $\pm$ SEM. Asterisks (\*) indicate a within group difference compared with time 0 ( $P < 0.05$ ). RS=relaxing suggestions. WN=white noise. ORN=OR noise. RM=relaxing music.

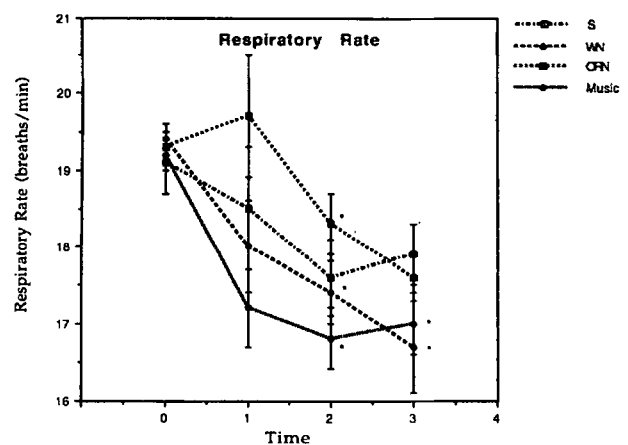


FIGURE 4 Respiratory rate *vs* time 0 (pre-retrobulbar block), time 1 (immediately post retrobulbar block), time 2 (15 min post retrobulbar block), time 3 (30 min post retrobulbar block), for all patients. Data are mean $\pm$ SEM. Asterisks (\*) indicate a within group difference compared with time 0 ( $P < 0.05$ ). RS=relaxing suggestions. WN=white noise. ORN=OR noise. RM=relaxing music.

more relaxed than patients in any of the other three groups (relaxing suggestions more than white noise or OR noise). Similarly, surgeons were more satisfied with patients in the music group than patients hearing the relaxing suggestions, white noise or OR noise.

The majority of patients experiencing relaxing music indicated they would prefer this modality again (31:1), more so than patients hearing relaxing suggestions (20:10). Only 20.6% (6/29) in the white noise group and 23.3% (7/30) in the operating room noise group would prefer this modality again.

Only patients hearing white noise, compared with those receiving relaxing music, found their auditory choice bothersome ( $12.7 \pm 3$  [group 2] *vs*  $6.7 \pm 1$  [group 4], significant at 95%), and when specifically asked about nervousness, there were no differences in scores among any of the groups.

## Discussion

Our study showed that music and relaxing suggestions were consistently superior to white noise or operating room noise in improving patient and surgeon satisfac-

tion. We were unable to show objective evidence of reduction in anxiety in any of the groups of patients studied. There were no differences between or within groups over time in STAI or vital signs. Following the retrobulbar block, an unexpected increase in systolic blood pressure occurred in the relaxing suggestion, white noise and relaxing music groups, but not in the operating room noise group, in which the systolic blood pressure actually declined over time.

Opinion whether music is beneficial in the operating room is divided. Even noise levels of standard procedures, such as opening a package of rubber gloves, can be very loud, approaching 90 decibels, which is equivalent to the noise of a motorcycle at 8 metres.<sup>15</sup> There has been increasing concern over the use of loud music played in the OR, since it may contribute to the overall level of background noise and impair effective communication among members of the surgical team. In many cases, standards of electrical safety for portable music equipment are ignored.<sup>6</sup> Further, opinion varies on what kind of music is appropriate,<sup>7</sup> at what volume the music should be played, and for how long.<sup>18</sup>

Others argue that music is a useful tool for alleviating anxiety in patients before, during and after surgery, and in various other stressful clinical circumstances. In two recent studies of patients in coronary care units, music did not alter physiological variables such as heart rate, blood pressure or respiratory rate, nor did it reduce anxiety scores when compared with groups receiving either white noise or no music.<sup>19, 20</sup> In a study of 33 outpatient arthroscopic procedures, patients received sedative, music or no music. Only respiratory rate was reduced in the sedative group after 20 min, with both sedative and music groups showing a reduction in anxiety test scores.<sup>21</sup> Reductions in blood pressure were noted, with a shift in mood toward a more relaxed state in plastic surgery patients that listened to music.<sup>5</sup> Patients in the music group scored lower in state anxiety postoperatively, than did their preoperative values in patients undergoing arthroscopic surgery.<sup>6</sup>

In patients undergoing orthopaedic or plastic surgery with regional anaesthesia, patients listening to music had fewer preoperative and intraoperative demands for sedatives.<sup>7</sup> During Caesarean section under epidural anaesthesia in 126 parturients, 75% found music to be 'very beneficial.'<sup>9</sup> In patients undergoing laceration repair in an emergency department, pain scores were less in the group that received music, than in the control group. The anxiety scores were not different between groups after the procedure. Our results are similar to previous studies in that

there was a subjective improvement in anxiety with music but objective evidence from physiological changes or an anxiety score that was lacking.

In this study, a standardized dose of fentanyl or alfentanil and midazolam was given to the study patient. There was no attempt to determine the need for sedative medication as a function of the auditory stimuli presented. Therefore, the standardized anaesthetic may have obliterated the possible differences in anxiety among the four groups of patients. Although the anaesthetist giving the anaesthetic and the ophthalmologist were blinded to the type of auditory tape, the research assistant was not blinded to the type of auditory tape. This can introduce possible bias in the study.

In summary, elderly patients undergoing cataract surgery with retrobulbar block were more satisfied with their experience if they heard relaxing music rather than relaxing suggestions or white noise or operating room noise. The type of auditory stimuli to which the patients were exposed did not influence the level of anxiety. In an era where patient satisfaction seems to be a paramount goal,<sup>23</sup> it would appear that music plays a role in enhancing this satisfaction, and is a useful tool in outpatients undergoing peripheral procedures with monitored anaesthetic care.

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