

## The Effect of Quran Therapy on Sedative Requirements and Hemodynamic Parameters in Patients subjected to Spinal Anesthesia

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Submitted: 10 Oct 2016; Accepted: 18 Nov 2016; Published: 22 Nov 2016

### Abstract

**Background:** “We reveal from the Quran that which is healing and a mercy for the believers” Holly Quran (surah al Israa 17:82).

Quran therapy has been shown to modulate the stress response in different life situations. This study designed to determine the effects of Quran therapy on intraoperative sedative requirements and whether it can achieve similar degree of sedation by monitoring Hemodynamic parameters in patients undergoing lower limb surgery under spinal anesthesia.

**Methods:** In this study 50 cases of ASA Grade I and II between 20-60 years of age from both sexes, undergoing lower extremity surgery under spinal anesthesia, were randomized into Group Q (those who listened to Quran) and Group M (those who didn't listen to Quran and took midazolam as a sedative). After the induction of spinal anesthesia, and achieving the desired effects and levels of spinal block, headphones were applied to all the patients and Quran was started in group Q. The intraoperative vital parameters and total sedative requirements were recorded and compared in both the groups.

**Results:** The total midazolam requirements were significantly lower in patients who listened to Quran intraoperatively ( $2.17 \pm 0.53$  mg versus  $3.25 \pm 0.77$  mg;  $P=0.02$ ), for achieving similar degree of sedation (Ramsay grade 3). The mean pulse rate was significantly lower in group Q as compared to group M (from 68-76 versus 86-98;  $P<0.05$ ) at 30-120 minutes intervals intraoperatively. Systolic and diastolic blood pressure were comparable in both the groups, with insignificant difference at all times ( $P>0.05$ ), though the patients in group Q reported a higher sense of satisfaction and well-being postoperatively.

**Conclusions:** Our findings suggest an important role of Quran in per anesthetic patient care. We conclude that Quran is a non-pharmacological alternative which is suitable for decreasing intraoperative sedative requirements in patients under spinal anesthesia.

### Introduction

Regional anesthesia is popular and offers several benefits to the patient such as staying awake, early family contact, and early food intake. For the anesthetist, cardiovascular and respiratory stability, rapid postoperative recovery, and preservation of protective airway reflexes are the most important advantages of regional anesthesia.

Surgical procedures performed using regional anesthesia techniques present a special challenge to anesthesiologists because patients are awake and exposed to multiple anxiety provoking visual and auditory stimuli [1].

Therefore, sedative and anxiolytic drugs are regularly administered before and during surgery, for the purpose of calming patients, but at the cost of dose dependent central nervous system and cardio-respiratory system depression [2,3]. Different drugs have

been tried in the past to achieve sedation, the most prominent among them being diazepam, propofol, midazolam and ketamine. Non-pharmacological alternatives like acupuncture, hypnosis, therapeutic suggestions and music have also been tried in the past, with varying results, to avoid the complications from the overdose of the sedative drugs [4]. Auditory input is a known modulator of the human response to stress [5]. Listening to Quran recitation was selected as a non-pharmacological intervention to reduce stress [6].

There was no previous studies have compared the efficacy of intra-operative Quran therapy in decreasing sedative or analgesic requirements. This study aimed to observe the role of Quran therapy in the modulation of Hemodynamic variables such as heart rate and mean blood pressure and on the intraoperative requirement of sedatives for achieving similar degrees of sedation.

## Materials and Methods

After obtaining approval from the institutional ethics committee, 50 cases of ASA Grade I and II, between 20-60 years of age from both sexes, undergoing lower extremity surgery under spinal anesthesia were enrolled for the study. The exclusion criteria were patients with any contraindication to spinal anesthesia, those with refusal for procedures or Quran therapy and those with hearing disorders. After the pre-anesthetic checkup and routine investigations, the patients were explained about the procedure of spinal anesthesia and their informed consent was taken.

On the day of the surgery, the patients were randomly allocated by using closed envelop method to two groups one who would listen to Quran through headphones Group Q, and those in whom headphones would be applied but would not listen to Quran were allocated to Group M. In the operation theatre, standard ASA monitors were attached and the baseline parameters were recorded. Spinal anesthesia was administered by using bupivacaine (0.5% heavy) in the doses of 3.5 cc and the T10 level was achieved.

Thereafter, occlusive headphones rooted to a compact disc player (Discman, Sony Corp. Ltd, China) were applied to all the patients. In group Q, the patients were asked about the Quran sound that they would prefer to listen intraoperative. Quran was started in accordance with the patient's choice and the volume was adjusted according to the patient's comfort. In Group M, occlusive headphones were applied to eliminate ambient noise, but no Quran was started. It is important to note that with this type of intervention, the subjects and investigators are difficult to be blinded to group assignment.

The intraoperative vital parameters, sedative requirements and the sedation scores were recorded. Intravenous midazolam was given in a bolus dose of (1.5-2 mg), followed by incremental doses of 1mg after every half hourly assessment of the sedation score, to achieve the Ramsay Sedation Score of 3 in both the groups (Table1).

Clinical Status	Status
Pt. anxious, agitated or restless	1
Pt. cooperative, oriented and tranquil	2
Pt. asleep, responds to verbal commands	3
Pt. asleep, responds to gentle shaking, light , Glabeller tap or loud auditory stimuli	4
Pt. asleep, responds to noxious stimuli as firm nail bed pressure	5
Pt. asleep has no response to any noxious stimuli	6

**Table 1:** Ramsay Sedation score to assess intraoperative sedation.

### Interpretation of sedation score

**Score 1:** Inadequate sedation; **Score 2-4:** Acceptable sedation; **Score 5-6:** Excess Sedation.

Appropriate intravenous fluids were given as per the individual's requirements. Hemodynamic variables were recorded every 15

minutes and the total midazolam requirements were calculated at the end of the surgery.

### Statistical Analysis

The data was analyzed by using statistical software SPSS, version 17.0 (SPSS Inc., Chicago, IL). The categorical data was analyzed by using the Chi-square test. The continuous variables were analyzed by using the Student's t-test. The data was expressed as median (range) and mean  $\pm$  standard deviation for continuous variables. A P value  $<0.05$  was considered as statistically significant and P values  $<.001$  were considered to be highly significant.

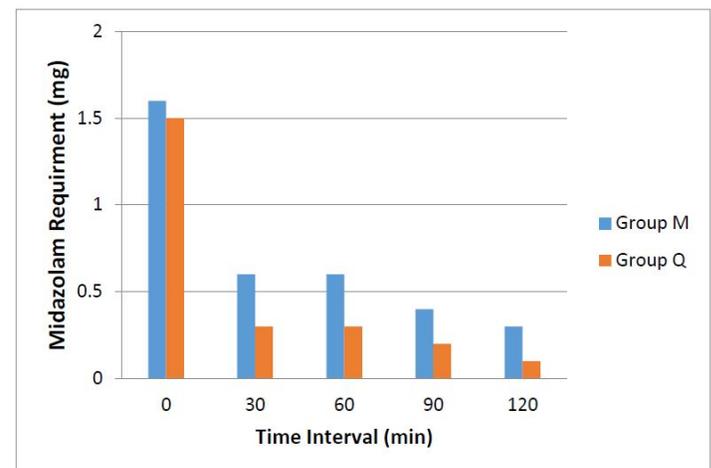
### Results

The demographical data was comparable in both the groups, with no significant difference in age, weight, gender and the duration of surgery (Table2).

Variable	Group Q (n=25)	Group M (n=25)	P-Value
Age (yrs)	34 $\pm$ 16.6	32 $\pm$ 17.8	0.46
Weight (kg)	56 $\pm$ 17.42	59 $\pm$ 16.34	0.32
Male/female (n)	13/12	14/11	0.76
Duration of surgery (min)	65 $\pm$ 38.8	60 $\pm$ 33.6	0.63
Total Midazolam requirement (mg)	2.17 $\pm$ 0.53	3.25 $\pm$ 0.77	0.02*
Midazolam per hour (mg/hr)	1.31 (1-2.5)	2.18 (1.5-4.5)	0.02*

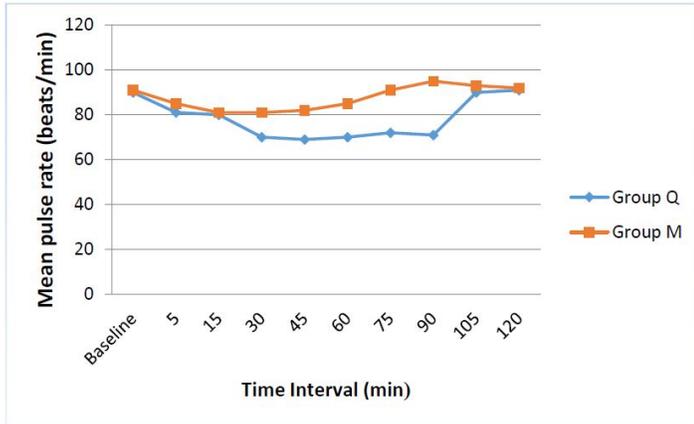
**Table 2:** Patient's characteristics in both groups. \*P-value:  $< 0.05$  (significant).

The mean sedation scores were comparable with non-significant differences in both the groups at all-time intervals ( $P>0.05$  at baseline, 30, 60, 90 and 120 min intervals). The average requirements of midazolam were similar in both the groups at the start of surgery (1.5 mg vs.1.67 mg in group Q and group M respectively; ( $P=0.82$ ). Thereafter, at half hourly intervals, the requirements of midazolam were observed to be low in group M for achieving similar degrees of sedation (Figure 1).



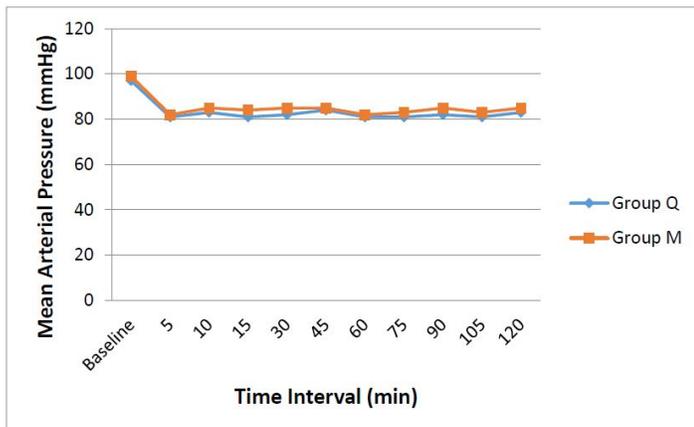
**Figure 1:** Mean Requirements of midazolam in both groups at different time intervals intraoperative.

The total intraoperative requirements of midazolam were significantly lower in Group Q ( $2.17 \pm 0.53$  mg) as compared to Group M ( $3.25 \pm 0.77$  mg) ( $P=0.02$ ) to achieve the Ramsay sedation grade 3 levels of sedation. The values of the mean pulse rate in group Q showed statistically significant differences ( $P=0.04, 0.036, 0.015, 0.02, 0.012$ ) at 30, 45, 60, 75 and 90 minutes time interval respectively (Figure 2).



**Figure 2:** Mean pulse rate in both groups at different time intervals intraoperative.

The mean arterial pressures were comparable in both the groups at various time intervals and showed no significant differences throughout the procedure (Figure 3).



**Figure 3:** Mean arterial pressure in both groups at regular time intervals intraoperative.

## Discussion

### “With the remembrance of Allah do hearts find rest” Holly Quran (Surah Al Ra’d 13:28).

Listening to Quran has been shown to reduce stress effect on the various organs of the body and modulate the mood and behavior of the patient into a better condition. It has been shown to reduce the state of anxiety which will have a favorable impact on Hemodynamic variables [6]. The physiologic effects of the Quran are achieved through two mechanisms, one is through the meaning of the Quran for those who understand it even if it is conveyed through a translation to those who do not understand the Arabic

text, the other mechanism is through the sound of the Arabic Quran words, even in those who do not understand their meaning, it could function as sound therapy [7]. However, no established work has been done to study the effect of Quran verses recitation on Patients under Spinal Anesthesia and their stress problems.

Similar to the use of music therapy, Quran recitation is also expected to have a positive impact on decreasing sedative or analgesic requirements. As a healing medium, Quran therapy is also expected to have a better result as compared to other conventional sound therapy since its content could be psychotherapeutic.

The neural interconnections of the auditory pathway and the limbic system modulate emotional responses. 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 which are associated with the listening of music [8]. This is also the case when listening to Quran. We hypothesized that the calming effect of Quran is potent enough to decrease the sedative and analgesic needs of a group of awake patients undergoing surgical procedures. We found that this hypothesis is true. The explanation for this, from a psychological perspective, may involve issues of control and distraction [9].

The factors that add to heightened stress, such as uncomfortable or unfamiliar environment, and fear of disfigurement, all may be attenuated by the distracting and calming effects of Quran. This study evaluated these effects of Quran therapy by recording the vital parameters such as pulse rate, and mean arterial pressure, the increase of which is an indirect indicator of anxiety.

We observed a significant drop in the mean heart rate intraoperatively in the Quran therapy group as compared to the midazolam group, which correlates with the observations made by Nilsson U, et al. concerning music effect [10]. We did not observe any significant reduction in the blood pressure in the Quran group as compared to the midazolam group, which is in agreement with the results of most recent studies for the effect of music [10,11].

Other than the objective parameters like decrease in the dose of midazolam or decrease in pulse rate which can be taken as signs of sympathetic activity, the subjective observations made during our study were noteworthy. Patients who had listened to Quran during their first surgery actually demanded for Quran in subsequent orthopedic surgery corrections. Those patients who had been operated previously under regional anesthesia, found the intraoperative period with Quran this time much better, less stressful and more relaxing (YouTube video) [18].

The study group showed a strong believe and practice on reciting al-Quran as a way to alleviate stress which reflects that the patient’s choice of Quran is strongly associated with their cultural background. As compared to other conventional sound therapy similar findings have been reported by Ovayolu et al. where Turkish classical music decreased sedative requirements during

colonoscopy [12]. A study done by Chan et al. using Chinese and Western classical music with slow beats on patients undergoing a C-clamp procedure, found significant reduction in heart rate, respiratory rate, and pain scores in the intervention group [10]. These few studies demonstrate the role of cultural and patient-selected music in coping with the stress and anxiety of the unfamiliar hospital environment [13,14].

As patients are exposed to multiple anxiety-provoking visual and auditory stimuli under regional anesthesia, concerns are also rising over the use of melodious Quran recitation which is rooted through wall speakers contribute to the overall level of background noise; it impairs effective communication among staff members and makes the patients' choice secondary [15]. The application of headphones is therefore a preferable solution to all these problems in operating room settings [16].

It is well-known that intraoperative used sedatives delay the recovery of patients and are liable to cause adverse effects like over sedation and respiratory depression in the postoperative phase [17]. Our results showed that intraoperative Quran provided a consistent decrease in the sedative requirements in Quran therapy group as compared to patients in the midazolam group. The average midazolam requirement to achieve an equal sedation score was significantly less in the Quran group [1.31 (1–2.5) mg/hr] as compared to the control group [2.18 (1.5–4.5) mg/hr.] By decreasing sedative requirements, Quran can aid in faster recovery whilst preventing the adverse effects of sedative drugs.

Moreover, extending Quran therapy to the preoperative and postoperative period could have helped us in evaluating the analgesic sparing efficacy of Quran therapy.

## Conclusion

This study shows that Quran is an effective adjuvant to sedative drugs for alleviating anxiety and distress which is suffered by patients undergoing surgeries under regional anesthesia. We recommend the incorporation of this low-cost intervention in routine anesthesia practice because of its beneficial effect on hemodynamic parameters and also because of its enhancing effect on the sedatives doses used in regional anesthesia.

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