Original Article

Effect of preoperative multimedia based video information on perioperative anxiety and hemodynamic stability in patients undergoing surgery under spinal anesthesia

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Abstract

Background and Aims: Pre-anesthesia checkup (PAC) gives unique opportunity for providing necessary information, patient education and allaying anxiety. Our objective was to measure the effect of preoperative multimedia video information (self made short video of 12 minutes) on patient's anxiety and hemodynamic parameters during surgery under spinal anesthesia. **Methods:** This prospective randomized study was conducted in 80 patients of either sex with ASA physical status I and II posted for lower limb surgery under spinal anesthesia. Patents were randomized to control or test group. At the end of preoperative visit, patients in test group watched the film and patient in control group did not watch any video. Verbal briefing by the attending anesthesiologist on the day of surgery was given to all patients of both the groups. Anxiety using Amsterdam Preoperative Anxiety and Information Scale (APAIS) and hemodynamic parameters (SBP, DBP and HR) at various time intervals (A1: Baseline, A2: post intervention, A3: just before surgery, A4: after surgery) were measured. **Results:** Baseline anxiety (A1) scores were severe in both the groups and showed no statistical significance (P = 0.436). Patients in test group (video) showed better/lower anxiety levels than the control group (non video) at A2 (P = 0.020) and A3 (P = 0.005) respectively, similarly hemodynamic parameters were better controlled and showed lesser deviation from baseline values in test group as compared to control group and showed statistical significant difference ($P < 0.001$) just before surgery. **Conclusion:** Combination of multimedia based video information at the time of PAC and short verbal briefing on the day of surgery by the attending anesthesiologist provides effective management of perioperative anxiety. It can be cost effective way of enhancing patient care and providing adequate information to people with reading and comprehension difficulties.

Keywords: Anxiety, multimedia video, patient education, preoperative care, regional anesthesia, spinal anesthesia

Introduction

Preoperative anxiety is a ubiquitous phenomenon in the field of anesthesia and perioperative medicine. Anxiety may be defined as a vague, uneasy feeling of discomfort and unpleasant emotions usually accompanied with high autonomic activity.[1]

Waiting before surgery, during the preoperative period may bring changes in both physiological and psychological parameters.[2] Increased levels of anxiety may lead to deranged hemodynamic parameters like hypertension and dysrhythmias, unwanted cancellation of surgeries and delayed recovery in the post-operative period. Reducing preoperative anxiety may improve surgical outcome, shorten hospital stay, and minimize lifestyle disruption.[3]

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Measurement of anxiety can be done either directly (measuring plasma cortisol and urinary catecholamine) or indirectly (measuring blood pressure and heart rate). Also several validated questionnaires[4] like Amsterdam Preoperative Anxiety Information Scale (APAIS), the State Trait Anxiety Inventory (STAI), Hospital Anxiety and Depression Scale (HADS), Visual Analogue Scale (VAS), Multiple Affect Adjective Check List (MAACL) are available to measure preoperative anxiety.

One of the major goals of anesthesia is to reduce the level of anxiety. Preoperative assessment gives a unique opportunity of reducing patient's anxiety by proper assessment of surgical risk factors and building a fine rapport with the patient. Providing specific information regarding surgery, anesthesia and post-operative pain in the form of pamphlets and reading material can be utilized to reduce the anxiety levels, but not all patients may under stand the given information. We hypothesized, that information regarding anesthesia and surgery given in the form multimedia based video (short video clip of 12 minutes) could reduce the anxiety levels in patients undergoing surgery under spinal anesthesia.

The objective of our study was to measure the effect of preoperative multimedia based video information (by a short video clip of 12 minutes) on patient's anxiety and hemodynamic parameters during surgery under spinal anesthesia.

Methods

This prospective randomized controlled study was conducted in the department of anesthesia and critical care at King George's Medical University, Lucknow, India. Patients were enrolled for the study after approval from the Institutional Ethics committee of King George's Medical University, Lucknow, India (Registration No.: Reg. No. ECR/262/Inst/UP/2013/RR-16, no. 812/Ethics/18, Exact date of ethical clearance is 14/11 2018). Written informed consent was obtained from all the participants of the study.

80 patients in the age group of 18–60 years of either sex with no hearing and visual impairments, belonging to the American Society of Anesthesiologists Physical Status (ASA PS) I and II, posted for routine elective surgery under spinal anesthesia were included for study.

Patient refusal, uncooperative patients, patients with psychiatric illness, and patients with expected surgical duration of more than 120 minutes were excluded from our study.

Sample size of 40 patients in each group was calculated with an alpha error of 5% (confidence interval of 95%) and power of study at 90%. Patients were randomly allocated using computer generated randomization table into two groups of 40 patients each. The Consolidated Standards of Reporting Trials (CONSORT) flow diagram was used for patient enrollment and allocation [Figure 1].

Allocation concealment was provided using sequentially numbered, opaque, sealed envelopes (SNOSE) prepared by a staff not involved in the study.

Test group: (40 patients) underwent routine preoperative consultation in Pre-anesthesia checkup (PAC) clinic and watched the multimedia video of 12 minutes duration.

Control group: (40 patients) underwent routine preoperative consultation at PAC clinic but did not watch the video.

On arrival for the routine preoperative visit to the PAC clinic, baseline anxiety (A1) was assessed in all patients using the questionnaire based Amsterdam pre-operative anxiety and information scale APAIS scale [Table 1].[5] For the purpose of evaluation, information desire questions were separated (questions 3 and 6) from the anxiety questions (question 1,2,4 and 5). Combined anxiety was calculated (sum of questions 1,2,4 and 5), and no segregation of anesthesia anxiety (question 1 and 2) and surgical anxiety (question 4 and 5) was done. Patients with a score of 4 were graded as mild, 5-10 as moderate and 11-20 to be severely anxious.

During the preoperative visit, all the patients were interrogated about detailed medical and surgical history, general and systemic examination and evaluation of lab investigations. Baseline hemodynamic parameters like systolic blood pressure (SBP), diastolic blood pressure (DBP) and heart rate (HR) were also recorded at the same time.

At the end of the pre- anesthesia checkup, patients of test group were shown a short video (using and I-pad with headphones, or smartphones of the patients itself) depicting the general information on spinal anesthesia and the procedure itself along with explanation on common myths of surgery and anesthesia. The video used for the present study was filmed and produced by the Department of Anesthesiology and Critical care at King George's Medical University. Video was later uploaded on YouTube for general public view and can be assessed by using the below link:- https://youtu.be/R6LTDEi_jng

While in control group patients were explained the same content of the video by the attending physician in the form of verbal briefing for the same duration, without any exposure to the video itself.

A2 (Post intervention) anxiety assessment was done again using the APAIS in all patients of both the groups. SBP, DBP and HR were again recorded at the same time (post intervention)

Patient in both the groups were advised fasting for 8 hours for solids and 2 hours for clear fluids by mouth and tablet alprazolam 0.5 mg was prescribed at bedtime a night before surgery. On the morning of surgery, 10 minutes before the scheduled surgery all patients received a verbal briefing from the attending anesthesiologist and patient anxiety A3 (immediate

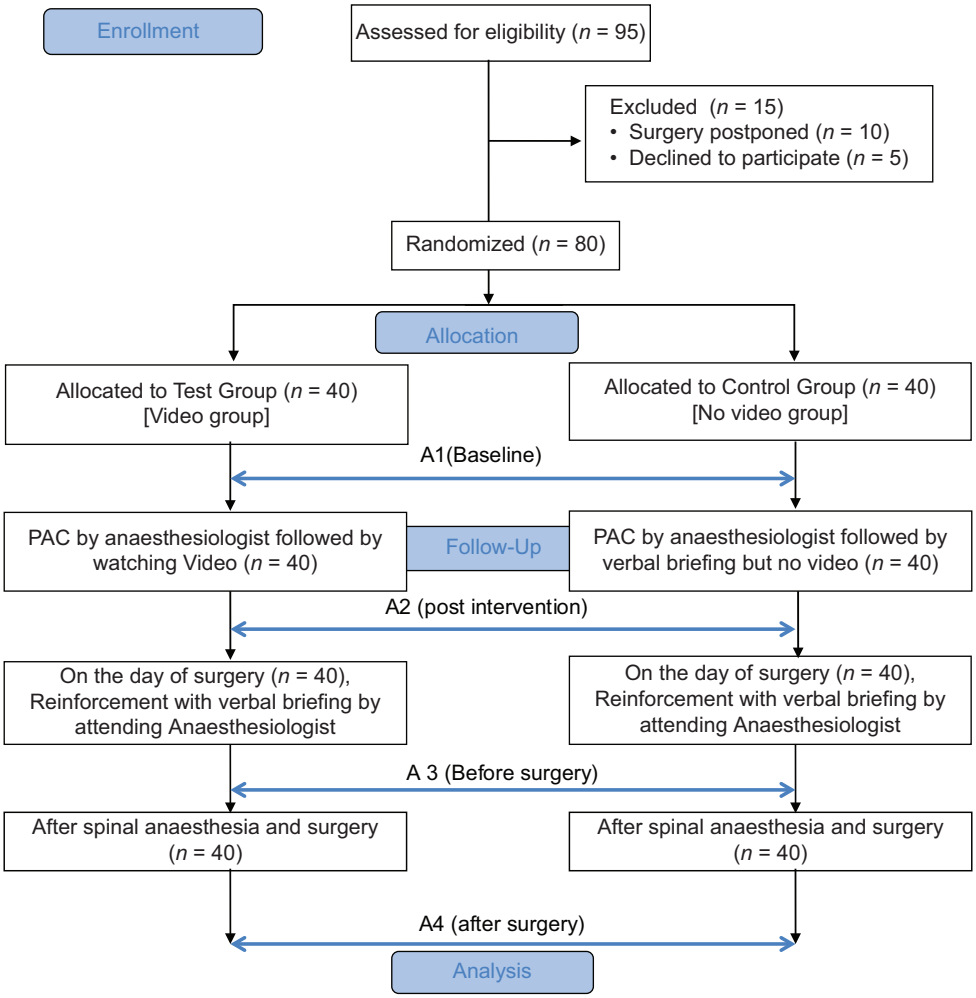

Figure 1: Consort flow diagram

Table 1: Questionnaire based on the Amsterdam Preoperative Anxiety and Information Scale (APAIS)

Item	Survey title	Grade				
		1	2	3	4	5
1	I am worried about the anesthetic					
2	The anesthetic is on my mind continually					
3	I would like to know as much as possible about the anesthesia					
4	I am worried about the procedure					
5	The procedure is on my mind continually					
6	I would like to know as much as possible about the procedure					

The measure of agreement with these statements should be graded on a five-point Likert scale from 1=not at all to 5=extremely. The anxiety scale consists of four questions (1,2,4 and 5), each of which could be scored from 1-5. The actual score of anxiety scale would be the sum of these four questions ranging from 4-20

pre-operative) was assessed again using the APAIS along with SBP, DBP and HR in the preoperative room. On arrival to operating room 5 lead electro cardiogram (ECG), Non invasive blood pressure (NIBP), pulse-oximetry (SPO2) were applied to all patients and sub-arachnoid anesthesia (spinal anesthesia) was performed by injecting 3.0 ml of hyperbaric bupivacaine 0.5% intrathecally using a 25G pencil-point spinal needle under strict aseptic precautions in sitting position. Any patient having undesired sensory and motor block characteristics was excluded from the study. Hemodynamic parameters including SBP, DBP, Spo2 and ECG were continuously required through out the surgery and were also evaluated at time of measuring anxiety at various time intervals. After the surgery, patients were shifted to recovery room where A4 (post-operative) anxiety assessment was done using the APAIS and SBP, DBP and HR were again recorded. Other parameters like nausea; vomiting, total fluid intake, and use of vasopressors were assessed on the first postoperative day. Operating room nurse or technician not involved in study collected data.

Continuous data were summarized as Mean ± SD (standard deviation) while discrete (categorical) in number and %.

Continuous groups were compared by independent Student's 't' test. Categorical groups were compared by chi- 2 square (χ) test. SPSS software (version 23.0) was used for analysis.

Results

Patient characteristics inclusive of age, sex, body mass index (BMI), educational level, ASA PS, employment status, any previous surgical anesthesia exposure, baseline anxiety and hemodynamic parameters (SBP, DBP and HR) are listed in Table 2. Both the groups were comparable and showed no statistical significant difference.

Mean baseline anxiety (A1) levels showed that patients in both the groups were severely anxious at the time of first presentation for preoperative assessment and the level of anxiety was comparable in between the groups and showed no statistical difference ($P = 0.436$).

Table 3 depicts the anxiety scores using APAIS in between the groups at various time intervals. Post intervention, patients of both groups showed a decline in anxiety levels at A2 and A3, but the patients in test group (video) showed better/lower anxiety levels than the control group (non video) at A2 (P = 0.020) and A3 (P = 0.005) respectively, which was also statistically significant. The declining trend of anxiety continued in post-operative period also at A4 but both the groups were comparable and showed no statistical difference ($P = 0.999$).

Hemodynamic parameters inclusive of SBP, DBP and HR are being shown in Figure 2, in between the groups at different time intervals (baseline at preoperative assesment, after the intervention, immediate preoperative period, and postoperatively).

SBP, DBP and HR showed an uprising trend from baseline to immediate preoperative period in both the groups, but they were better controlled and showed lesser deviation from baseline values in test group (video) as compared to control group. The mean SBP at immediate preoperative period increased to 18.3% from baseline values in control group as compared 5% in test group and the difference was statistically significant ($P < 0.001$), mean DBP at immediate preoperative period increased to 11.8% from baseline values in control group as compared 3% in test group and the difference was statistically significant ($P < 0.001$) and the mean HR at immediate preoperative period increased to 13% from baseline values in control group as compared to 3.5% in test group and again the difference was statistically significant ($P = 0.031$).

Operative variables in terms of vomiting, intraoperative fluid intake and use of vasopressors were comparable in between the groups and showed no statistical significant difference as shown in Table 4.

Discussion

This prospective study demonstrated that preoperative anxiety is an apparent feature at the time of preoperative assessment and higher baseline anxiety levels (mean values of > 11) were observed in both the groups. Various studies have reported high incidence of preoperative anxiety ranging from 60-80%[4,6,7] around the world, which is similar to our findings.

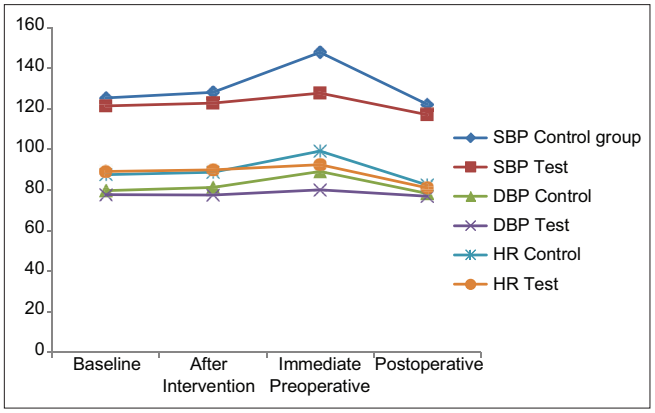

Figure 2: Comparison of hemodynamic parameters in terms of mean SBP (systolic blood pressure), DBP (diastolic blood pressure), HR (heart rate)

Table 2: Characteristics of the study population

Parameters	Control group (*n*=40)	Test Group (*n*=40)	*P*
Age (years)	40.28±11.87	36.83±12.42	0.208
Gender (male/female)	17/23	19/21	0.653
BMI (kg/m^2)	22.31±1.37	22.28±1.34	0.902
ASA PS (I/II)	37/3	34/6	0.288
Educational level (till 8th standard/9th standard- intermediate/Graduate and above)	19/10/11	11/13/16	0.555
Employment status (employed/unemployed)	28/12	24/16	0.348
Previous surgical exposure (yes/No)	4/36	4/36	0.999
Previous subarachnoid anesthesia exposure (yes/no)	4/36	4/36	0.999
Baseline Anxiety (A1) using APAIS	11.23±3.00	11.73±2.71	0.436
Baseline SBP (mm Hg)	125.35±14.33	121.35±12.61	0.189
Baseline DBP (mm Hg)	79.60±8.88	77.45±8.59	0.321
Baseline HR (beats/min)	87.58±15.22	89.20±14.48	0.626

The values are mean±SD or number of patients. *P*<0.05 is statistically significant. ASA PS: American Society of Anesthesiologists Physical Status, SBP: systolic blood pressure, DBP: diastolic blood pressure, HR: Heart rate, BMI: Body mass index, SD: Standard deviation

An ideal anxiety assessment tool should be short and easy to use in perioperative setting to give quick validated results and also questionnaire based assessment tool produce better results than the physician's rough estimates of patient's anxiety. Although STAI is considered the gold standard,[4] the brief time required to complete APAIS and VAS make them practical tools to measure anxiety in the preoperative period.[8] We utilized APAIS over VAS because of it being a questionnaire based validated tool and also because of the 'central tendency bias' observed in VAS scoring when patients are unsure of answers and may avoid extremes of scores.[9] The cut off values of 11 by APAIS have been previously found suitable for finding anxious patients in study by Moerman *et al*.[5]

In our study, anxiety levels in the test group were found better/lower than the control group at A2 (post-intervention) and were also statistically significant ($P = 0.020$), highlighting the effect of multimedia based video information on anxiety reduction. Our results were similar to studies by Lin *et al*.[10] and Jlala *et al*.[11]

Usually the anxiety levels tends to drop after the PAC visit, highlighting the effect of interaction and information received from the anesthesiologist, but this effect seems to be temporary[8] and the anxiety levels usually peak immediately before surgery as seen in study by Jlala *et al*.,[11] however this trend was not seen in our study and anxiety levels at A3 (Immediate preoperative period), were reduced further, and test group had better/lower levels than the control group ($P = 0.005$) which may be explained by the cumulative effect of multimedia based video information and verbal briefing reinforcement, as verbal briefing was given by the attending anesthesiologist in the immediate preoperative period to all patients in both the groups. Effective communications skills if implemented by the anesthesiologists can help in bringing anxiety levels down, reduce patient suffering and also promote faster recovery.[12]

Global population rise will lead to increased surgical workload by the year 2030,[13] resulting a need for adequate preoperative preparation. Primary care physicians many times are the first responders for the surgical patients and are involved in the preoperative and post operative care of the patients.[14] Moreover, often the patients have more faith on the Primary Care Physicians due to their long association as Family Physicians.[15] A basic knowledge about preoperative evaluation and anesthesia care can help primary care physicians in anesthesia risk identification and optimizing patient care[15] even in terms of preoperative anxiety.

Hemodynamic parameters were better controlled and showed less deviation from the baseline values in test group as compared to control group. Our results were similar to study by Dias *et al*.[16] and further validated that effective attenuation of anxiety can bring decreased activation of sympathetic nervous system.[17]

In our study we found reduced requirement of mean intravenous fluid and vasopressors requirement for avoiding hypotension (SBP <90 mm Hg) in test group as compared to control group but without any statistical significance. Similarly incidence of postoperative vomiting was similar and showed no statistical difference in between the groups. Reduced incidence of postoperative vomiting observed in our study may be due to use of regional anesthesia and avoidance of opioid in our study. Sinclair *et al*.[18] found the risk for post-operative vomiting was 9 times less among patients receiving regional anesthesia than those receiving general anesthesia. Also, anxiety has not been found predictive for post-operative nausea vomiting as per recent consensus guidelines.[19]

Limitation of our study could be the small sample size and inclusions of patients only for regional anesthesia. We plan to perform a similar study on patients undergoing general anesthesia with a much larger sample size. This study also paves path for conducting similar studies, comparing affect of drugs (pharmacological method) and multimedia based video (non pharmacological method) on patients anxiety.

Conclusion

Anxiety assessment is possible in the perioperative period and it needs to be adequately addressed for better patient management. Preoperative period gives a unique opportunity to provide information and patient education. Multimedia based video information at the time of PAC is a cost effective (no recurring costs involved), less time consuming and is extremely useful for population with reading and comprehension difficulties, specially from rural background.

Combination of multimedia based video information at the time of PAC and short verbal briefing on the day of surgery by the

Table 3: Intergroup comparison of anxiety levels at different time intervals

APAIS level	Control group (non-video) (n=40)	Test Group (video) (n=40)	P
A1 (baseline anxiety)	11.23±3.00	11.73±2.71	0.436
A2 (post intervention)	9.50±2.62	8.38±1.44	0.020
A3 (immediate pre-operative)	7.90±1.68	7.05±0.85	0.005
A4 (Post-operative)	6.00±0.00	6.00±0.00	0.999

The values are mean±SD or number of patients. P<0.05 is statistically significant

Table 4: Intergroup comparison of operative variables at different time intervals

	Control group (non-video) (n=40)	Test Group (video) (n=40)	P
Intraoperative fluid input (in ml)	1535.53±222.67	1482.50±141.22	0.211
Vasopressors (Mephentermine) in mg	1.89±3.15	1.35±2.54	0.402
Vomiting (No/Yes)	34/6	32/8	0.628*

*Chi-square test, P<0.05: Significant. The values are mean±SD or number of patients

attending anesthesiologist provides effective management of perioperative anxiety.

With campaigns like Digital India in our country, primary care physicians involved in patient evaluation and preparation before surgery can help achieve better management of perioperative anxiety by proper dissemination of anesthesia information using short audio-visual films.

Summary

- Perioperative anxiety is common feature before surgery and efforts should be made for its proper assessment and management.
- Patient education and information in the preoperative period using audio-visual films can be an attractive option for anxiety management.
- Increase in the surgical workload with expanding population may require multidisciplinary involvement (primary care physicians, nurses, anesthesiologists, surgeons) for adequate patient preparation before surgery.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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