

REGIONAL ANAESTHESIA

Effect of preoperative multimedia information on perioperative anxiety in patients undergoing procedures under regional anaesthesia

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Background. Provision of preoperative information can alleviate patients' anxiety. However, the ideal method of delivering this information is unknown. Video information has been shown to reduce patients' anxiety, although little is known regarding the effect of preoperative multimedia information on anxiety in patients undergoing regional anaesthesia.

Methods. We randomized 110 patients undergoing upper or lower limb surgery under regional anaesthesia into the study and control groups. The study group watched a short film (created by the authors) depicting the patient's in-hospital journey including either a spinal anaesthetic or a brachial plexus block. Patients' anxiety was assessed before and after the film and 1 h before and within 8 h after their operation, using the Spielberger state trait anxiety inventory and a visual analogue scale.

Results. There was no difference in state and trait anxiety between the two groups at enrolment. Women had higher baseline state and trait anxiety than men ($P=0.02$). Patients in the control group experienced an increase in state anxiety immediately before surgery ($P<0.001$), and patients in the film group were less anxious before operation than those in the control group ($P=0.04$). After operation, there was a decrease in state anxiety from baseline in both groups, but patients in the film group were less anxious than the control group ($P=0.005$).

Conclusions. Preoperative multimedia information reduces the anxiety of patients undergoing surgery under regional anaesthesia. This type of information is easily delivered and can benefit many patients.

Br J Anaesth 2010; **104**: 369–74

Keywords: anaesthetic techniques, regional; equipment, videos; stress; surgery, preoperative period

Accepted for publication: January 4, 2010

Many patients experience substantial anxiety before operation,^{1–7} and this is reported to affect 60–80% of surgical patients.^{6, 8} Increased anxiety before surgery is associated with pathophysiological responses such as hypertension and dysrhythmias⁹ and may cause patients to refuse planned surgery.¹⁰ Anxiety also increases the requirement of anaesthetic drugs to produce unconsciousness^{9, 11} and therefore may indirectly increase the risk of awareness. Anxiety may also worsen patients' perception of pain and increase requirements for postoperative analgesia.^{3, 12} Anxiety may decrease patients' overall satisfaction with perioperative care.¹³ Reducing preoperative anxiety may

improve surgical outcome, shorten hospital stay, and minimize lifestyle disruption.¹⁴

Provision of preoperative information can alleviate patients' anxiety.^{15–17} The ideal method of delivering this information is unknown. Written information has been used as an effective way for delivering information to patients,^{18, 19} but not all patients are literate enough to read and understand an information sheet; in addition, patients will retain information to a variable extent. Multimedia information (in the form of a video) has been the subject of randomized controlled studies, and the value of this form of information in decreasing patients' anxiety before

surgery has been demonstrated,^{7 15 20 21} although these effects were small and not supported by other studies.^{22 23} Conflicting results may have arisen because of differences in methodology, multimedia format, measurement tools, and variability in study populations. No study has addressed the patient population undergoing surgery under regional anaesthesia. Therefore, we developed a short film depicting the patient journey through hospital (including regional anaesthesia) and examined the effect of this film on patients' perioperative anxiety.

Methods

Approval for the study was provided by the local research ethics committee. One hundred and ten consecutive patients undergoing upper limb (hand) or lower limb (knee and ankle) elective surgery at the Queen's Medical Centre (Nottingham) from November 2007 to July 2008 were invited on the day of their preoperative assessment visit (2 weeks before surgery) to take part in the study. Invitation letters along with the study information sheet had been sent to the patients before this appointment. Inclusion criteria were: adults aged 18–80 yr, ASA I and II, and undergoing elective surgery under regional anaesthesia. Anaesthesia was established under brachial plexus peripheral nerve block (PNB) for hand surgery or spinal anaesthesia (SA) for knee or ankle surgery. Exclusion criteria included the inability to read and understand English, significantly impaired eyesight or hearing, and an existing psychiatric disorder. The primary outcome measure was anxiety assessed immediately before operation by a self-reported psychological instrument, the Spielberger state trait anxiety inventory (STAI). Patients were randomly allocated to a film group (watching the film) or a control group (not watching the film), using computerized randomization. The group allocations were sealed in serially numbered opaque envelopes (according to the generated sequence) prepared by a member of staff not involved in the study. Researchers and patients were blinded to group allocation until after the completion of baseline anxiety scoring. Staff members working in all study settings were unaware of patients' group allocations. The anaesthetists who carried out the blocks were blinded to the patient group allocation.

Instruments

State trait anxiety inventory

The STAI is a validated and widely used instrument to measure patients' anxiety.²⁴ The STAI-state (STAI-S) form consists of 20 statements, and the answers to these are used to determine a patient's current anxiety level; the STAI-trait (STAI-T) form consists of a different set of 20 statements, and the answers to these are used to determine a patient's underlying (ongoing/personality) anxiety level. Each statement in the STAI-S is rated on a four-point scale for the subject's agreement with that statement (not

at all, somewhat, moderately so, and very much so). This form was used at all time points of the study for both groups. Statements in the STAI-T are also rated on a four-point scale (almost never, sometimes, often, and almost always). This form was used twice for each participant: on entering the study and on exiting the study. The overall (total) score for STAI ranges from a minimum of 20 to a maximum of 80; STAI scores are commonly classified as 'no or low anxiety' (20–37), 'moderate anxiety' (38–44), and 'high anxiety' (45–80).²⁵

Visual analogue scale

The visual analogue scale (VAS) has also been validated as an instrument for measuring anxiety.²⁶ In our study, a scale of 0–100 mm was used to measure the anxiety level of participants by asking them to quantify their anxiety by putting a mark on a VAS scale, which they felt represented the degree of their anxiety at that moment. One end of the scale was labelled as 'no anxiety' and the other end as 'maximum anxiety imaginable'. This was used at all time points for both groups.

Feedback questionnaire

This is a non-validated questionnaire designed for this study; it consisted of a series of closed statements answered 'Yes' or 'No'. This was administered after watching the information film. Patients were asked directly if they found the film to be an informative and valuable source of information and scored their satisfaction with the film. We also asked them if they felt watching the film made them calmer or more anxious.

Pre-anaesthetic film

Film 1 (PNB)

A 9 min film was made of a 55-yr-old man who was undergoing hand surgery under regional block. The film begins with a ward-based preoperative consultation with the anaesthetist; this was taken from an interview of an actual patient before surgery. The discussion included: a description of the PNB process and the risks involved, specifically the risk of nerve injury (1:5000–10 000) and block failure (5%) possibly requiring conversion to general anaesthesia. Discussion also included postoperative advice (wearing off of the block and analgesic requirements). The next scene shows the patient entering the anaesthetic room and the entire brachial plexus block procedure. The patient is then moved into the operating theatre and shown talking with the anaesthetist next to him while the surgeons are carrying out the procedure. The last scene shows the patient being transferred to the recovery room.

Film 2 (SA)

A 7 min film was made of a 77-yr-old woman who was undergoing a left knee arthroplasty under SA. The film begins with a ward-based preoperative consultation. The

discussion included a description of the SA and the risks involved, specifically the risk of nerve injury (1:5000–10 000), block failure (5%) possibly requiring conversion to general anaesthesia, headache (1:100), itching and nausea (very rare), urinary retention (very rare), and necessity of having a urinary catheter. Discussion also included postoperative advice (wearing off of the block and analgesic requirements). The next scene shows the SA placement. The last scene shows the patient being transferred to the recovery room and having a drink.

The same person filmed and edited both films. The same anaesthetist appeared in both films. In both films, the anaesthetist provides the patient with information about the risks, benefits, alternatives, and technical details of the regional anaesthesia procedure. The same investigator showed the films to the participants and oversaw questionnaire completion.

Intervention

Written informed consent was obtained in the preoperative assessment clinic. On enrolment and before the patients' formal preoperative consultation with the nurse and surgeon, anxiety was assessed using STAI-S, STAI-T, and VAS. We did not aim to separate anxiety related to anaesthesia and surgery; therefore, we gave clear instructions to the patients on how to rate their overall level of anxiety using both tests. Patients in the film group then watched the film using a laptop computer equipped with headphones. STAI-S and VAS were then repeated after the film. Any volunteered feedback regarding the video was recorded. Patients in both groups then underwent routine consultations with the admitting nurse and surgeon but not the anaesthetist; as per our normal practice, patients met their anaesthetist on the day of surgery. The patients in both study arms received our standard care at this point (an interview with an anaesthetist before surgery on the day of operation). Three consultant anaesthetists performed all the preoperative, routine visits; they were not told specifically how to explain procedures before operation, as we wished to replicate our standard practice for risk disclosure and make the study applicable to real practice. Patients were not specifically informed of the risk of rare complications (e.g. paraplegia, death). On the day of surgery, patients arrived ~2–3 h before their surgery. All patients completed STAI-S and VAS 1 h before surgery. Routine preoperative visits by the patient's anaesthetist were completed before STAI-S and VAS measurement. Between 2 and 8 h after operation, patients completed our last set of STAI and VAS.

Statistics

Data from a pilot study involving 20 patients were used to perform an *a priori* power analysis to estimate the required sample size. We calculated that 52 subjects were required in each group to detect a clinically significant difference in patients' anxiety scores between groups of >5 points

($\alpha=0.05$, power=0.80, $SD=8.9$). Data are presented as median and inter-quartile range (IQR). Baseline characteristics were analysed with Student's *t*-test for continuous data and χ^2 test for categorical variables. STAI data were lumped and tested for normality of distribution (Kolmogorov–Smirnov); the data demonstrated good approximation to normal distribution, so two-way repeated-measures analysis of variance was used to analyse the significance of changes in anxiety scores over time between groups (group *vs* time interaction). Statistical analysis was performed using SPSS 16.0 (SPSS Inc., Chicago, IL, USA).

Results

Of 187 patients approached, 12 returned incomplete questionnaires and 42 patients declined or were not suitable for participation (12 patients because they feared viewing the film would be distressing; 10 patients, who had had the same operation in the past, did not think it would add any information; 20 patients were undergoing general anaesthesia). Twenty-three patients were excluded for other reasons (e.g. converted to general anaesthesia, changes to theatre schedule, cancelled operations). In total, 110 patients completed all questionnaires and were included in our analysis. Random allocation resulted in 55 patients assigned to the film group and 55 to the control group.

The two groups did not differ in age, gender, weight, anaesthetic techniques, history and type of previous anaesthesia, and time from enrolment to surgery (Table 1).

There was no difference in state or trait anxiety scores between the two groups at enrolment. The control group experienced an increase in state anxiety score from baseline immediately before surgery ($P<0.001$), whereas the film group showed a non-significant increase in anxiety (Fig. 1). Patients in the film group were significantly less anxious before operation than those in the control group ($P=0.04$; Fig. 1). After operation, there was a significant decrease in state anxiety compared with baseline in both groups; again patients in the film group were less anxious than those in the control group ($P=0.005$). Anxiety levels in the film group immediately after watching the film were reduced compared with the baseline anxiety scores, but this did not reach statistical significance ($P=0.07$; Fig. 1).

Table 1 Baseline characteristics. *Time from baseline measurement to day of surgery. Where appropriate, data are presented as median (IQR)

	Film group (<i>n</i> =55)	Control (<i>n</i> =55)
Age (yr)	58 (40, 63)	59 (42, 69)
Gender (F:M)	21:34	27:28
Weight (kg)	78 (67, 90)	77 (70, 88)
Baseline* to surgery (days)	15 (8, 21)	15 (8, 30)
Anaesthetic technique (SA:PNB)	26:29	31:24
History of anaesthesia (Yes:No)	37:18	45:10
Previous anaesthesia (GA:RA)	29:8	32:13
Trait anxiety (STAI-T)	34 (26, 42)	34 (26, 43)

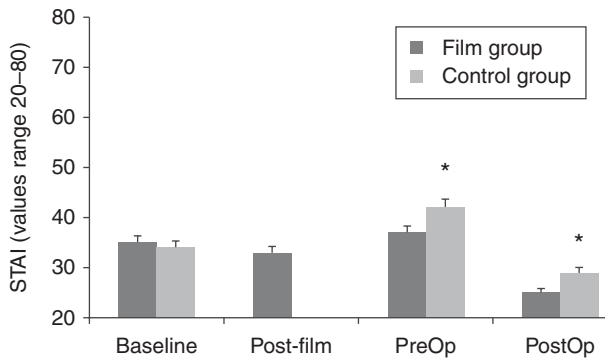


Fig 1 State anxiety scores (STAI). Op, operative. * $P < 0.05$ between the groups. Error bars represent the standard error of mean (SEM). Note: Twenty is the lowest possible value of STAI.

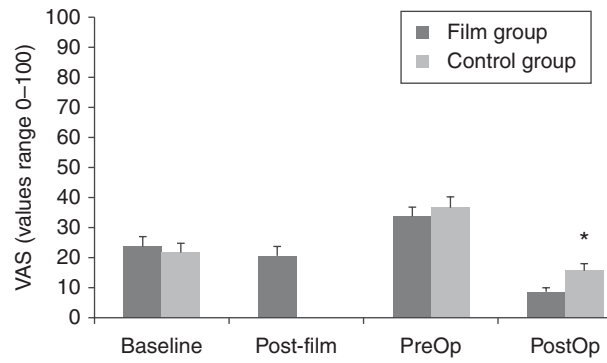


Fig 2 VAS scores. Op, operative. * $P < 0.05$ between the groups. Error bars represent the SEM.

Trait anxiety scores (STAI-T) were smaller after operation than at enrolment in both groups ($P < 0.05$), but no difference was found between the groups [median preop (IQR), median postop (IQR): film group 34 (26–42), 23 (21–29); control group 34 (26–43), 25 (21, 32)].

The prevalence of anxiety in our study population is summarized in Table 2. Women had higher baseline anxiety scores (median=36, IQR=27, 46) than men (median=32, IQR=24, 39; $P = 0.02$). The anxiety scores measured by VAS correlated positively with the STAI-S scores ($r = 0.52$, $P < 0.05$). VAS did not differ significantly between the film and the control groups before operation, but did after operation (Fig. 2). There was a significant correlation between anxiety scores 2 weeks before surgery and immediately before surgery ($r = 0.68$, $P < 0.001$).

Feedback from the film group indicated that 90% were satisfied with the film and felt it to be a valuable source of information. Approximately 70% reported feeling calmer immediately after the film when directly questioned (although STAI-S did not demonstrate a significant difference before and after the film). Before operation, patients voiced concerns over the pain of the anaesthetic procedure, urinary retention, nerve damage, and noises during surgery.

Discussion

In this prospective, randomized, controlled study, we have demonstrated that viewing a short information film before operation reduced the anxiety of patients undergoing elective surgery under regional anaesthesia. This effect was sustained into the postoperative period.

The prevalence of ‘high’ anxiety among patients having surgery under regional anaesthesia was 17% in the assessment clinic 2 weeks before surgery. Immediately before surgery, this increased to 27% among those who watched the film and 36% among those who did not. After operation, only 2% reported high anxiety in the film group compared with 5% among controls. These differences demonstrate the effectiveness of our intervention. Anxiety scores were generally higher in female patients awaiting surgery. In agreement with previous studies,^{2 3 23 27 28} this may suggest that more attention needs to be directed towards women to alleviate anxiety.

In this study, we found a significant, positive correlation between the two anxiety-measuring instruments (STAI and VAS), consistent with previous reports.^{26 29 30} Although VAS did not show a difference in anxiety between the groups in the preoperative period, it was sensitive enough to detect a significant change after operation, and showed a consistent pattern throughout the course of the study. This might be attributed to the ‘central tendency bias’, in which patients may avoid using extreme scores (due to unfamiliarity of this method) when they are not sure of how to respond.³¹ This may show the superiority of the Spielberger STAI in detecting more subtle changes in anxiety; VAS may retain some usefulness in assessing patients with reading or comprehension difficulties or in situations of extreme anxiety.

Previous studies have shown that patients’ anxiety the day before surgery correlates with that immediately before operation.^{3 32} We found that anxiety 2 weeks before surgery was also correlated with that occurring

Table 2 Prevalence of state anxiety of regional anaesthesia

	Baseline		Preoperative		Postoperative	
	Film	Control	Film	Control	Film	Control
Low anxiety (STAI ≤ 37)	32 (58%)	35 (64%)	32 (58%)	21 (38%)	53 (96%)	49 (89%)
Moderate anxiety (STAI 38–44)	12 (22%)	13 (24%)	8 (15%)	14 (25%)	1 (2%)	3 (5%)
High anxiety (STAI ≥ 45)	11 (20%)	7 (13%)	15 (27%)	20 (36%)	1 (2%)	3 (5%)

immediately before surgery, indicating that high anxiety levels immediately before operation may be predicted at early preoperative assessment.

There is no consensus on what constitutes a clinically significant change in the anxiety scoring system; however, previous studies using the Spielberger STAI have quoted significant changes between 3 and 5 points,^{7 15 33} one study pointed out that an important clinical change in state anxiety levels is 10 points.¹⁴ We have shown a positive effect of our intervention. We think that our intervention (audio+visual) is a supplementary tool and not a substitute to other methods of providing anaesthetic information, for example, written information (leaflet), or verbal/spoken information (physician).

We agree that the reduction in anxiety could have been either due to a specific effect of the film or due to the larger amount of information received; in either case, our intention was to compare this process (of showing patients a video) with our current standard of care, which is a preoperative assessment visit during which the patient is assessed by a nurse and seen by the surgeon, but not by an anaesthetist. Therefore, the potential benefit of this type of intervention is a very efficient method of conferring information to patients, in addition to any visits made by an anaesthetist.

There were limitations to our study.

- (i) The pre-anaesthetic film was shown to participants in the preoperative assessment clinic 2 weeks before the day of surgery; we could not control information received by the patients in the interval leading up to surgery, which could have affected the results.
- (ii) Patients undergoing upper and lower limb surgery could differ in their anxiety responses and we chose to merge these two groups in order to provide a cross-section of patients undergoing regional anaesthesia, rather than one specific type. Despite these possible differences between the groups, we feel that this makes the study results more applicable to a general population of patients undergoing procedures under regional anaesthesia. We did not find a significant effect on patients' anxiety after splitting patients into the SA and PNB groups; however, as we had not powered the study to look for this difference, the negative finding is likely to reflect the small size of these subgroups. Further studies would be required to demonstrate any of these effects on anxiety.
- (iii) We wished to include all patients attending for surgery and thus we did not power the study to show the effect of previous surgical experience on anxiety; analysis of these sub-groups did not show a significant difference. Although previous studies have demonstrated variable effects of previous surgery on perioperative anxiety,^{3 23 26} we feel that these patients tend to be less anxious, which would tend to produce a larger difference in the groups.
- (iv) Viewing an educational video about anaesthesia can improve patients' knowledge and understanding;^{23 33-35} however, we did not examine how much information our study group retained. Such knowledge acquisition may have been a mechanism in reducing anxiety in our study group. This needs to be explored further in patients undergoing surgery under regional anaesthesia.
- (v) Anaesthesia is just one cause of anxiety; we did not explore the effect of other potential sources of anxiety such as surgical techniques, success of the operation, fear of any anticipated complications, or amount of information provided to patients.
- (vi) Twenty-two patients who were eligible for our study declined to participate; these patients may have been the most anxious and so our population may have been skewed during recruitment.

Approximately one-third of patients having surgery under regional anaesthesia are highly anxious before surgery, with a higher incidence in women. This anxiety can affect patients' understanding and recall of information, and their ability to give informed consent.³⁶⁻³⁸ Audiovisual information reduces pre- and postoperative anxiety and can be particularly useful to those with reading, comprehension difficulties, or both.^{39 40} Economic issues are a continual pressure on healthcare. An information film is an efficient and convenient way to inform patients and reduce their anxiety. This can easily be carried out in the preoperative assessment clinic, allowing adequate time for reflection before surgery, which might make the information received more effective.

Acknowledgements

We thank Professor C.D. Spielberger for his advice on use of the STAI tool. We would also like to thank Dr D.M. Levy for his contribution in filming and editing the films.

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