Can an informative video about the anesthesia technique be an effective tool to treat preoperative anxiety in patients undergoing minor, elective, outpatient hand surgery procedures?

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Research article

Keywords: Perioperative anxiety, Pre-anesthetic assessment, Educational video, Regional anesthesia, Ambulatory surgery

Posted Date: April 2nd, 2019

DOI: <https://doi.org/10.21203/rs.2.1747/v1>

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Abstract

Background Preoperative anxiety is a common problem with an impact on surgical outcome, anesthetic drug amount and patient's satisfaction. An important component of preoperative anxiety is worries related to anesthesia. Suitable patients information has been shown to reduce preoperative anxiety level and this can be effectively achieved through a video. **Objectives** To assess the impact of an informative video about regional intra-venous anesthesia technique on patient's preoperative anxiety levels before minor ambulatory hand surgery procedures. **Study design** retrospective, single-centre, case-control clinical trial. **Methods** To assess the impact of an educational video illustrating all the passages of intravenous regional anesthesia on preoperative anxiety level and overall patients' satisfaction. **Results** Anxiety level measured after admission in the day hospital clinic did not differ between the two groups, however overall patients' satisfaction levels were higher when patients were shown the video. **Conclusions** Informative videos does not seem to significantly reduce preoperative anxiety but have the potential to increase patients' satisfaction in the ambulatory setting.

Background

Preoperative anxiety is a common disorder, with a prevalence reported to reach up to 60-80%¹⁻⁷ of surgical patients. Perioperative anxiety is affected by clinical consequences: it's associated with hemodynamic effects (like arterial hypertension and arrhythmias), with an increase in anesthetics amount⁸⁻¹⁰ and an amplified post-operative pain perception, leading to a considerable quantity of analgesics prescription and to a substantial increase of post-operative days of hospitalization^{3,11-13}. These consequences potentially get worse global surgical outcome. Moreover, perioperative anxiety can reduce patient's overall satisfaction about quality of perioperative care¹⁴⁻¹⁷. Patient's satisfaction is largely based on patients' expectations and it has practical consequences: satisfied patients are more likely to maintain good relationships with their surgeon, to abstain from the so-called "doctor shopping", to avoid malpractice proceedings, to have a better compliance regarding postoperative prescriptions¹⁸ and to attend regularly to follow-up appointments¹⁹.

It has been shown how one of the main sources of preoperative anxiety is anesthesia rather than surgery itself²⁰; this has been related to a lack of information about anesthetic procedure²¹. These fears are largely underestimated in the ambulatory setting, where elective minor surgical procedures are often wrongly supposed not to be a cause of a significant preoperative anxiety. Even if in the outpatient setting the so-called *major complications* are surgery-related²², patients' anxiety is independently associated to a poor surgical outcome²³. The risk is to not properly address this problem in the situation that would demand optimal patients' compliance.

It's known that a better information about surgery reduces anxiety level and patient's apprehension²⁴; however, to reduce preoperative anxiety levels, how to systematically identify patients who will likely benefit the most from more information about their anesthesia is an important question that remains actually unsolved. Some strategies have been developed in order to reduce pre-operative stress: information delivered by physicians has proven to relieve patients' anxiety²⁵⁻²⁷, but also written information utility has been acknowledged^{28,29}; however not all patients have shown the same level of health literacy required to understand these texts.

Multimedia information is generally easier to understand and some trials have shown a certain anxiolytic effect of informational videos^{7,25,30,31}, but data are conflicting^{32,33} given a significant heterogeneity in methodologies and patients' selection. Aim of this study is to assess the impact of an informative video on preoperative anxiety and overall satisfaction levels, illustrating the perioperative management and the anesthesia technique of patients undergoing minor elective ambulatory hand surgery procedures.

Methods

This is a retrospective, single centre, case-control, observational study, whose primary outcome is assessing the impact of a preoperative educational video about the regional anesthesia technique on perioperative levels of patients' anxiety and satisfaction. The video was previously produced by the Hospital Quality Service as an informational tool to easily explain what intravenous regional anesthesia consists of to patients undergoing elective outpatient hand surgery, as in our institution these patients normally do not meet an anesthesiologist before the day of surgery. A verbal informed consent was obtained from all patients prior to proceed about the use of anonymized data, according to our Ethical Board commission statement. A consecutive cohort of adult patients, scheduled for elective ambulatory hand surgery of less than one-hour duration with an intravenous regional anesthesia (IVRA) over a period of one month after the introduction of the informational video was retrospectively assessed with regard to their level of preoperative anxiety before and after the video and their vital parameters and compared to a consecutive cohort of patients undergoing the same procedures with the same regional anesthesia technique over the month before the introduction of the video. Inclusion criteria were patients older than 18 years of both sex, ASA I-III patients undergoing elective hand-surgery operation and patients anesthetized by IVRA. Exclusion criteria were, on-going anxiolytic or anti-depressive therapy, previous diagnosis of anxiety or psychiatric disorders, recent or regular use of anxiolytic drugs.

Participants and first evaluation

In our institution outpatient hand-surgery patients' treatment is standardized according to a detailed perioperative protocol. All the patients included in the study underwent a surgical pre-operative visit, during which they received detailed information about the surgical procedure but not the anesthetic

technique. Standard allocated time for each preoperative visit was 15 minutes. Patients were then admitted on the same day of surgery to the day-hospital clinic, 2-3 hours before the operation; vital parameters (non-invasive arterial blood pressure, heart rate and respiratory rate) were checked and patients were asked to evaluate their preoperative anxiety level on a visual analogue scale.

Patients of group I were shown the informative video about intravenous regional anesthesia. Patients assigned to the control group (group II) were not shown the video and underwent an otherwise identical preoperative preparation procedure.

After the end of the video and at least 30 minutes before the transfer to the operating room (OR), group I patients re-assessed their own anxiety level. As per every patient, non-invasive arterial blood pressure, cardiac and respiratory frequency were recorded on arrival in the OR and monitored continuously throughout the anesthetic and surgical procedure.

IVRA was performed by an anesthesiologist and a nurse in the induction room outside the OR using a standardized procedure. Two intravenous lines were placed on each hand; after tourniquet inflation, a total volume of 40 ml of chloroprocaine 0.5% was injected intravenously in the operated limb. The patient was then transferred to the OR and 10 minutes after local anesthetic injection, the surgeon tested loss of sensitivity with a pinprick test, after which surgery began.

Visual analogue scale:

The VAS score (Visual Analogue Scale) is a valid instrument used for measuring anxiety³³⁻³⁵. An adapted VAS score (VAS-A), a semi-quantitative visual scale (from 0 – no anxiety - to 5 – maximal anxiety) was used to measure patients' anxiety levels, asking each patient to subjectively quantify its own anxiety. Other validated scoring systems, like the STAI-score (*State Trait Anxiety Inventory* score) are not used in our institution due to their greater complexity³⁶.

Educational video:

Patients in the video group watched the video using a laptop and VAS score was repeated after the video. The video was shot by the Anesthesiology department team, in order to explain and show in a detailed and yet easy way the sequence of events that occurs between the arrival of patients in the OR and the performance of IVRA as well as all the steps IVRA consists of. The video began with an actress interpreting a patient scheduled for an elective outpatient hand surgery procedure attending the day hospital clinic. It showed the interaction between the patient and the nurses who explain in details what is going to happen next and lead her through the preparation routine. The camera then followed the patient as she is accompanied to the induction room and the video showed all the details of the checks made as the patient attends the operating room, the time-out and the preparation for the anesthetic procedure,

with the monitoring of the vital parameters. Then the IVRA procedure was shown in details as an anesthesiologist explains it step by step. The video concluded with the patient being brought to the operating room and staying awake and pain free as a simulated procedure begins.

Feedback questionnaire:

At the end of the surgical procedure all patients were transferred directly to the day-hospital clinic. Between 1 - 3 hours after the operation all patients completed a satisfaction questionnaire with close evaluation from 0 to 10 regarding these topics: environment, equipment, organization, waiting time, pharmacy, nurses, professionalism, information, dedicated time. Moreover, group I patients received a specific feedback questionnaire about the video, in which they were asked about personal satisfaction and video's education value ('Was the video a valuable source of information for you?').

Outcomes:

The **primary outcome** was the difference in preoperative anxiety levels and overall satisfaction levels between two groups measured on a visual analogue scale (VAS-A). **Secondary outcomes** were differences in in perioperative vital parameters that are usually affected by anxiety (like arterial blood pressure [mmHg], respiratory rate [breath per minute] and heart rate [beat per minute]). All these outcomes were further analysed in subgroups of specific categories of patients, like subjectively anxious patients, objectively anxious patients (with a VAS-score more than 3), patients at their first surgical experience and finally patients objectively anxious at their first surgical experience.

Statistic

A power analysis was conducted. According to Ayril et al³⁷, as well according to estimated clinically relevance of diminution for anxiety, assuming a reduction of at least 50% in preoperative anxiety level as clinically significant, 45 patients per group were necessary (allowing for drop-outs) to reach a 95% level of significance with a power of 90%. We conducted a statistical frequency analysis regarding common vitals parameters and anxiety level according to VAS-scale at arrival in the hospital, before to go to the pre-operative room and at arrival at the pre-operative room, performing a statistical frequency analysis comparing all these three steps and all subgroup according to secondary outcomes. All data were registered and stored in a specific and protected archive in Anesthesia Department, accessible only by the investigators; they were then anonymously transcribed into a database in order to be analysed.

Results

446 consecutive patients who saw the informative video were retrospectively examined with regard to their anxiety levels and vital parameters. (group I) and compared to other 47 patients who did not see the video (group II). 59 patients were excluded from the subsequent analysis due to their use of anxiolytics medications. (Figure 1).. Population characteristics did not differ in age, gender and level of anxiety on admission (details are summarized in Table 1). Anxiety level measured on admission in the day-hospital clinic did not differ between the two groups (1.22 vs 1.02, p 0.417) and the *Patient Education Video* did not significantly change this level when the second assessment was performed (1.22 vs 1.29, p 0.774). Systolic arterial pressure measured on admission in the day-hospital clinic was significantly higher in the video group (140 mmHg vs 129 mmHg, p 0.016), while other measured parameters like diastolic blood pressure (82 mmHg vs 78 mmHg, p 0.139), cardiac rate (75 bpm vs 72 bpm, p 0.132) and respiratory rate (15 breath/min vs 14 breath/min, p 0.093) did not differ between the two groups (Figure 2).

In the video group, after the video was shown and patients were transferred to the OR, systolic and diastolic blood pressure as well as respiratory rate did not change significantly (Figure 3a), while heart rate did significantly increase and was significantly higher than in the control group at the same moment (from 75 to 90 bpm, p < 0.001). In the control group, measuring all parameters before and after the anesthesia all parameters did not change significantly (systolic blood pressure 129 mmHg vs 132 mmHg, p 0.401; diastolic blood pressure 78 mmHg vs 76 mmHg, p 0.373; heart rate 72 bpm vs 68 bpm, p 0.125; respiratory rate 14 breath/min vs 13 breath/min, p 0.119). Other parameters did not diverge significantly between two groups (Figure 3b). Finally, mean rating for each point of the satisfaction questionnaire did not differ significantly in video group compared to control group, as shown in Table 2.

Subgroup analysis

When a **subgroup analysis** was performed (Table 3) about all patients self-evaluated as “anxious person” (N=26), some differences were highlighted in patients to whom the video was shown (Figure 4): systolic arterial blood pressure measured at induction point was significantly lower in patients after they watched the video (150 mmHg vs 129 mmHg, p 0.04). Satisfaction degree was significantly higher with regard to the questions concerning perioperative process organization (9.6 vs 8.8, p 0.031), pharmacy (10 vs 9; p 0.023) and time dedicated to patients (9.9 vs 8.6, p 0.03). In this population however, educational video did not significantly decrease anxiety level as measured by VAS (1.93 vs 1.86, p 0.891).

Another subgroup analysis was performed on patients who scored **higher anxiety assessment result** (3 or more on the 5 point scale, N=29). In this population, video was proved to be ineffective in reducing anxiety level (2.5 vs 2.5, p 1.000). Moreover, no significant difference was highlighted in the two groups in

terms of satisfaction by the specific questionnaire (Table 3). The only significant difference was a higher cardiac rate for video group patients while in the OR (from 80 to 73 bpm, $p = 0.014$).

A third subgroup analysis took into account patients for whom the operation was their **first surgical experience**, thus excluding subjects whose previous experiences could have influenced their level of anxiety ($N=42$). In this population, the questionnaire revealed no impact of the video on patients' apprehension (1.54 vs 1.66, $p = 0.704$), even if the level of anxiety on admission was higher in video group than in the control group (1.54 vs 0.84, $p = 0.032$). Cardiac rate in the OR was significantly higher after the video was shown (from 76 to 88 bpm, $p < 0.001$). Overall satisfaction level was not affected (Table 3).

Finally a **further subgroup analysis** was performed on patients who matched two potential confounding factors: a high level of anxiety on admission (defined as a score of 3 or higher on VAS) and no previous interventions. Also in this subgroup, educational video did not show any impact on anxiety levels, nor on satisfaction scores (Table 3).

A total of 43 feedback questionnaires (93%) were returned, with 36 positive answers about the educational value of the video. In four cases, patients would have preferred to watch the video in the presence of the anesthesiologist to eventually obtain further clarifications.

Discussion

The effect of video-based patient anxiety integrating clinician interview has already been debated in the literature; some studies showed positive effects in reducing anxiety and improving satisfaction in patients undergoing different surgical procedures^{7,37-44} while some others denied this effect⁴⁵⁻⁴⁷. To the best of our knowledge, this is the first randomized, case-control trial addressing this particular topic in local anesthesia before minor hand surgery.

Our results did not confirm the hypothesis of a positive effect of *Patient Education Videos* on patient's preoperative anxiety: in fact, patients who watched the *Patient Education Video* did not significantly differ in their anxiety levels from those in the control group. On the other hand, the video did not increase patient discomfort and anxiety as shown by Pager¹⁸. This variability among results from different studies can be due to various factors, such as difference in the health literacy levels of the population studied, determining a certain inter-individual variability in the way of coping with stress or a variability in the information conveyed by the video or in its style.

In our study the absence of an anxiolytic effect of the video can be explained by the fact that, as in the study of Sorlie⁴⁸, patients had met their surgeon before admission, being already informed about the

procedure and other aspects of their perioperative management. This could have had mitigated the effect of the further information conveyed by the video. However, even if the surgeon mentioned the type of anesthesia for the procedure (intravenous regional anesthesia), he did not go into details and, at the time of the surgical assessment, patients were not informed about what the anesthetic technique consists of.

Patients who were shown the video had a subsequent significant increase in heart rate. This does not correlate with a change or the absolute score of their anxiety VAS scores. A subconscious increase in their anxiety however cannot be excluded. If this was the explanation of this finding, then the video would have had a counterproductive effect. However, many confounding factors could have determined this result and the absence of statistically significant differences in all other vital parameters monitored tends to exclude this hypothesis.

As found by Yellen⁴⁷, the global satisfaction levels of our patients were not affected by the video, with the exception of the self-reported anxious patients. In this specific group of patients who defined them as having an anxious attitude, the video was particularly appreciated and contributed to significantly increase satisfaction levels. In this particular subgroup of patients, informative videos can thus be useful to integrate the preoperative educational process in order to increase patient satisfaction.

This study has several limitations. There is currently no clear consensus on the clinical impact neither of preoperative anxiety, nor on a standardized method to measure it and on what actually can be defined as a significant change in the anxiety level. In order to effectively measure anxiety levels with a simple and reproducible method, we adopted the VAS score: this method can be less subtle in detecting minimal changes in anxiety level in comparison with other scores³⁶, but allows for an effective and clear measurement of preoperative subjective anxiety, even in patients with reading or comprehension difficulties³⁴. Moreover, the type of surgery has been shown to influence anxiety levels, with patients undergoing cardiac surgery having on average a higher level of anxiety⁴⁹. Our study population exclusively consisted of ambulatory patients undergoing minor hand surgery procedures and thus likely to have lower starting level of anxiety. Finally, the statistic power of this retrospective study was not too strong and further prospective studies will be necessary to confirm or confute these results.

We did not find a significant effect of the video on patient anxiety levels even after subgroup analysis; however, since the study was not adequately powered to assess statistical significance of these secondary outcomes, further studies are needed to specifically investigate the issue in these particular populations.

It must be said that anesthesia, though considered one of the patients' main concerns before surgery, is just one of the possible factors affecting the global level of preoperative anxiety. With this study we have chosen to focus on the role of anesthesia and we did not explore the effects of other potential sources of anxiety, such as surgical techniques, success rate of the operation, specific surgery complication rate, information provided by the surgeon about the procedure, surgeon-patient relationship, cultural milieu, etc. Finally, this study does not evaluate the personality traits of the patients in relationship with their

level of anxiety and the analysis of anxiety and satisfaction levels is limited in time to the short day-hospital clinic stay. A follow-up to assess long-term impact on satisfaction was not performed and could be the topic for another study.

Conclusions

This is the first case-control study investigating the impact of video-conveyed anesthesia information on the levels of preoperative anxiety and global satisfaction in patients undergoing ambulatory hand surgery procedures under intravenous regional anesthesia. A preoperative informative video seems not to be an effective method to reduce preoperative anxiety and global satisfaction in this population. However a subgroup analysis of patients with basal high levels of anxiety, showed a positive effect on their overall satisfaction; this finding needs to be confirmed by further adequately powered studies.

Abbreviations

Not applicable

Declarations

Ethic approval and consent to participate:

A verbal informed consent was obtained from all patients about use of their anonymized data. We previously contacted our **local Ethic Committee** ("Comitato Etico Cantonale", Via Orico 4, 6500 Bellinzona). Due to the nature of this retrospective study, about a video already approved by local Hospital Quality Service, local Ethic Committee ruled out no formal ethics approval in this particular case. All study complies with national guidelines, in this case SwissEthic (https://www.swissethics.ch/gesetzrichtl_f.html).

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Consent to publish:

All Authors give their consents to publish this study. Corresponding author attests that the manuscript submitted and all related materials are, unless noted, original and have not been published elsewhere. Furthermore, the corresponding author attests that the submission is not under consideration for publication elsewhere, in whole or in any significant part. No substantial part of a paper may have been published elsewhere, except as a scientific abstract.

Availability of data and material:

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

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Competing interest:

All Authors deny having any personal financial gain, consultancy/board activity, or any commercial interest related to this study.

Funding:

No funding was obtained for this study.

Authors' contribution:

Study design/planning: C.F., A.S.

Data analysis and interpretation: S.C., M.M., A.S.

Writing paper: S.C., B.M, A.S.

All Authors have read and approved the manuscript.

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Acknowledgement:

Not applicable.

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Tables

Due to technical limitations, the tables have been placed in the Supplementary Files section.

Table legends are provided below:

TABLE 1. Baseline patients’ characteristics. Data are expressed as “means (SD)”. SAP: systolic arterial pressure; DAP: diastolic arterial pressure; HR: heart rate; RR: respiratory rate. Chronicity is referred to patients with chronic diseases, like arterial hypertension, diabetes, COPD or any other chronic conditions.

TABLE 2. Satisfaction questionnaire results. All items were rated on a 0 to 10 numeric scale (0 worse, 10 best). Data are expressed as “means (SD)”. As discussed in the text, globally there was no significant difference between two groups.

TABLE 3: Subgroup analysis according to pre-established categorizations, like self-assessment as anxious person, VAS score greater than 3 points, first experience with surgery and a combination of first experience with anxious person. sAP: systolic arterial pressure, dAP: diastolic arterial pressure, HR: heart rate, RR: respiratory rate.

Figures

Figure 1

Flowchart showing the distribution of patients during the entire clinical study, according to CONSORT statement.

Figure 2

Anxiety values measured in all patients, according with the VAS-A scale, at baseline level and post-video, further stratified in the video group and in the control group.

3A

3B

Figure 3

Comparative analysis between the two study groups before (Figure 3a) and after (Figure 3b) regional anesthesia. Both groups show no statistically significant difference, except for an increase in post-anesthesia heart rate in the patient video group. For more detailed analysis and discussion please refer to the text.

Figure 4

Comparative analysis of heart rate in pre/post-anesthesia patients between the two groups. Please note that in the video group there is a significant reduction in heart rate compared to the control group, where there is no significant change.

Supplementary Files

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