Hypnosis Reduces Preoperative Anxiety in Adult Patients

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In this study we examined the effect of hypnosis on preoperative anxiety. Subjects were randomized into 3 groups, a hypnosis group ($n = 26$) who received suggestions of well-being; an attention-control group ($n = 26$) who received attentive listening and support without any specific hypnotic suggestions and a "standard of care" control group ($n = 24$). Anxiety was measured pre- and postintervention as well as on entrance to the operating rooms. We found that patients in the hypnosis group were significantly less anxious postintervention as compared with patients in the attention-control group and the control group (31 ± 8 versus 37 ± 9 versus 41 ± 11, analysis of variance, $P = 0.008$). Moreover, on entrance to the operating rooms, the hypnosis group reported a significant decrease of 56% in their anxiety level whereas the attention-control group reported an increase of 10% in anxiety and the control group reported an increase of 47% in their anxiety ($P = 0.001$). In conclusion, we found that hypnosis significantly alleviates preoperative anxiety. Future studies are indicated to examine the effects of preoperative hypnosis on postoperative outcomes.

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Several studies have indicated that many adult patients who are undergoing anesthesia and surgery experience untreated anxiety and distress on the morning of surgery (1–3). Currently, millions of Americans routinely use complementary and alternative therapies such as acupuncture, herbs, and hypnosis (4). Hypnosis is defined as a state of focused attention with heightened receptivity for acceptable suggestions. In this state, a person's critical or skeptical nature is bypassed, which allows them to accept suggestions. A hypnosis procedure consists of an induction, which gets the patient into the trance state, and then the delivery of acceptable suggestions, which are delivered to the patient to help achieve the goals of the session. Given the increasing popularity of complementary and alternative medicine and the need for the development of new anxiolytic preoperative interventions, we performed a randomized attention-controlled trial to evaluate the efficacy of hypnosis as a treatment modality for management of preoperative anxiety. The reader should note that the study was aimed only at measuring the impact of hypnosis on anxiety before surgery and not at the effects of hypnosis on anesthetic requirements or postoperative outcomes.

Methods

Subjects undergoing ambulatory surgical procedures who were between the ages of 18–65 yr old and ASA physical status I–III were enrolled in the study. All subjects who were taking any psychotropic medications, had used hypnosis in the past, or had a history of affective disorders were excluded from this randomized controlled trial. The Yale human investigation committee approved the study, and all patients provided informed written consent.

Based on a computer generated, random number table, all subjects were randomized into three groups: hypnosis, attention-control, or control.

In the hypnosis group, the hypnotic state was induced using a permissive approach as described previously by Erickson (5,6). Briefly, the hypnotherapist instructed the subjects to focus their attention on an object or memory. The suggestion phase was characterized by introduction of specific positive goals of anxiety, fear reduction, and relaxation. Subjects were told during the suggestion phase that they would

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continue to feel relaxed and calm during the perioperative period. At the end of the suggestion phase, the hypnotherapist instructed the subject to re-establish contact with their surroundings. This last action is intended so that the subject can restore a conscious state within several seconds. The hypnotic intervention lasted 30 min.

For the attention-control group, the attention protocol for our study was adapted from a protocol that was published in *The Lancet* (7) and consisted of matching the patients' behavioral communication patterns, reflective listening, and providing of perception of control of the perioperative situation. Also, the research assistant who provided the attention-control intervention provided encouragement to the patients and avoided any negative suggestions. Conversation between the research assistant who provided the intervention followed the lead of the patient. The attention-control intervention lasted 30 min.

The control group received the "standard of care" of our institution with no additional interventions. That is, subjects were allowed to read, watch television, converse with their family, or undertake any other activity of their choice.

On recruitment, subjects were brought into a private room; arterial blood pressure (BP) and heart rate (HR) were measured. Subjects provided basic demographic information, and completed a baseline Visual Analog Scale (VAS) on a scale of 0–10 for anxiety and a baseline State-Trait Anxiety Inventory (STAI) questionnaire (8). The STAI is a self-report anxiety instrument that contains 2 20-item subscales measuring trait anxiety, which is described as relatively stable individual differences in the tendency to experience anxiety, and state anxiety, which is described as situational or transitory feelings of apprehension, tension, and worry. The appropriate intervention took place over a period of 30 min. Next, all subjects completed the second series of VAS and the STAI. In addition, BP and HR were measured and documented. Once patients entered the operating room, they were asked to complete a third anxiety VAS before receiving any medications. None of the patients received any benzodiazepines.

The research assistant who administered the various anxiety tests and measured the BP and HR was blinded as to group assignment. Also, the hypnotherapist delivered the intervention to the hypnosis group only and was not involved in the interventions of other groups or in any other operational aspect of the study.

Considering a STAI control score of 44 ± 12 (9), an effect size of 0.2, power of 85%, and an α of 0.05, 24 patients were needed in each group. Data were analyzed with the use of SPSS version 13.0 (SPSS Inc., Chicago, IL). Normally distributed data are presented as mean ± SD. Skewed data are presented as median and interquartile range (25%–75%) and analyzed using parametric tests. VAS, BP, HR, and STAI data were normalized by considering the preintervention measurement as 100%. Two-way analysis of variance with repeated measures was used to analyze the changes in behavioral (STAI) and physiological (HR, systolic BP, diastolic BP) anxiety levels across time. A P value of <0.05 was considered significant.

Results

We found no significant age differences among the 3 study groups (42 ± 10 yr versus 39 ± 10 yr versus 43 ± 10 yr) and no gender differences (females/males, 70%/30% versus 82%/18% versus 80%/20%). Also, STAI baseline state anxiety did not differ significantly among the 3 groups (46 ± 10 versus 44 ± 11 versus 42 ± 13).

Analyzing anxiety levels (STAI) using a two-way repeated-measures analysis of variance demonstrated a significant group effect [F = 40, $P = 0.001$] and time by group interaction [F = 14, $P = 0.001$]. *Post hoc* analysis using one-way analysis of variance demonstrated that patients in the hypnosis group were significantly less anxious post-intervention as compared with patients in the attention group and control group (31 ± 8 versus 37 ± 9 versus 41 ± 11; $P = 0.008$) (Table 1).

Compared with baseline anxiety, on entrance to the operating rooms the hypnosis group reported a decrease of 56% in anxiety level whereas the attention-control group reported an increase of 10% in anxiety and the control group reported an increase of 47% in anxiety ($P = 0.001$) (Fig. 1). Finally, as can be seen in Table 1, there were no significant differences in systolic BP, diastolic BP, and HR among the 3 study groups (P = not significant).

Discussion

Under the conditions of this study, we found that hypnosis dramatically reduces the anxiety of patients undergoing ambulatory surgery. A number of previous reports have described the use of hypnosis in the perioperative environment (10,11).[1] However, the majority of previous studies are invalid because of issues related to selection bias, lack of randomization, lack of standardized intervention, small sample size, lack of objective outcomes, and lack of an attention-control control group.

This present study considered the limitations of the previous studies. That is, we have calculated an *a priori* sample size using an appropriate alpha and power, used a randomized controlled trial design, blinded the investigators who recruited the patients

Table 1. Outcome Variables

	Hypnosis Group (n = 26)	Attention Group (n = 26)	Control Group (n = 24)
Systolic blood pressure (mm Hg)			
Before	119 ± 8	115 ± 15	120 ± 17
After	115 ± 12	116 ± 16	120 ± 18
Diastolic blood pressure (mm Hg)			
Before	75 ± 8	71 ± 13	78 ± 10
After	73 ± 7	73 ± 9	76 ± 12
Heart rate (bpm)			
Before	73 ± 10	71 ± 10	71 ± 12
After	68 ± 9	63 ± 6	71 ± 12
Self-report anxiety score (STAI)			
Before	46 ± 10***	44 ± 11	42 ± 13
After	31 ± 8	37 ± 9	41 ± 11

STAI = state trait anxiety inventory.
* Two-way repeated measures analysis of variance, $P = 0.001$.
**Post hoc analysis, $P = 0.008$.

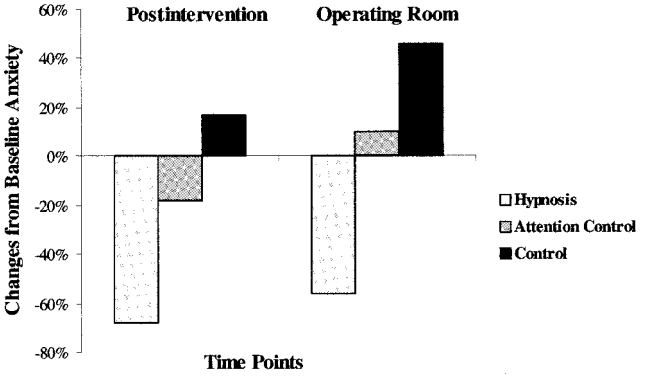

Figure 1. Changes in reported anxiety over the perioperative time period as measured by a visual analog scale. Please note that all values were normalized to baseline anxiety.

and assessed the outcomes, and used objective outcomes measures with good psychometric properties. Furthermore, we used an attention-control group that was administrated by a research assistant. The concept of an attention-control group, while not used frequently in anesthesia research, is strongly recommended when studying a behavioral intervention that may be moderated by a placebo effect. Indeed, Bootzin (12) indicated that the purpose of an attention-control group is "test the rival hypothesis that improvements in the dependent variable occur because of participant expectancy and the attention received during the course of the treatment rather than from the treatment itself." The literature indicates that at the present time we do not know what constitutes the construct of attention in an experimental situation. Is attention the physical presence of the research assistant, the experimenter's emotional availability, the mere act of having a conversation with a good listener, or some combination of these qualities?

In conclusion, we have shown that one preoperative hypnosis session is very efficient in reducing the anxiety and fear before surgery. Future studies are needed to determine the impact of hypnosis on variables such as intraoperative anesthetic requirements, postoperative pain, and nausea and vomiting.

References

1. Kain ZN, Mayes LC, Bell S, et al Premedication prior to surgery in the US. Anesth Analg 1997;84:427–33.
2. Kain ZN, Caldwell-Andrews AA, Krivutza DM, et al. Trends in the practice of parental presence during induction of anesthesia and the use of preoperative sedative premedication in the United States, 1995–2002: results of a follow-up study. Anesth Analg 2003;98:1252–9.
3. Billings A, Moos R. The role of coping responses and social resources at attenuating the stress of life events. J Behav Med 1981;4:139–57.
4. Eisenberg DM, Davis RB, Ettner SL, et al. Trends in alternative medical use in the Unites States, 1990–1997. JAMA 1998;280: 1569–75.
5. Erickson MH. Hypnosis, its renaissance as a treatment modality. Am J Clin Hypn 1970;13:71–82.
6. Zeig JK. Experiencing Erickson, an introduction to the man and his work.; the Ericksonian approach. London: Brunner/Mazel, Inc., 1985;31–49.
7. Lang EV, Benotsch EG, Fick LJ, et al Adjunctive non-pharmacological analgesia for invasive medical procedures: a randomized trial. Lancet 2000;355:1486–90.
8. Spielberger CD. Manual for the State-Trait Anxiety Inventory (STAI: Form Y). Palo Alto: Consulting Psychologists Press, 1983.
9. Kain ZN, Kosarussavadi B, Hernandez-Conte A, et al. Desire for perioperative information in adult patients: a cross-sectional study. J Clin Anesth 1997;9:467–72.
10. Mumford E, Schlesinger HJ, Glass GV. The effects of psychological intervention on recovery from surgery and heart attacks: an analysis of the literature. Am J Public Health 1982;72:141–51.
11. Surman OS, Hackett TP, Silverberg EL, Behrendt DM. Usefulness of psychiatric interventions in patients undergoing cardiac surgery. Arch Gen Psychiatry 1974;30:830–5.
12. Bootzin RR. The role of expectancy in behavior change. In White L, Turskey B, Schwartz G, eds. Placebo: theory, research, and mechanisms. New York: Guilford Press, 1985:196–210.