

Preparing for Successful Surgery: An Implementation Study

By Manuel Diaz, MD
Brad Larsen, CRNA

Abstract

Objectives: To evaluate the implementation of a mind-body program for surgical patients in a community hospital, assessing patient participation, patient perception, and program impact on anxiety, pain, and quality of sleep during the perioperative period.

Methods: Two hundred thirty patients having total hip replacement, total knee replacement, hysterectomy, or colectomy participated in this investigation. One hundred fifteen patients were assigned to the control group before the start of the mind-body program and received routine care. The subsequent 115 patients were assigned to the intervention group and were given an audio CD (containing guided imagery, affirmations, and relaxation music) and a brochure three to seven days before surgery. The brochure recommended that patients listen to the CD twice a day before and after surgery. Anxiety, pain at rest, pain with movement, quality of sleep, and program participation were assessed for the first two postoperative days, and patient perception of the program was assessed at the end of the two days.

Results: Anxiety scores were lower in the intervention group on the evening of surgery. Despite a trend toward lower pain scores in the intervention group, no difference between the intervention and control groups reached statistical significance, including quality of sleep. Of patients in the intervention group, 74% listened to the CD at least once after surgery, and 37% listened to the program three or more times. Most patients who used the CD at least once rated it as helpful, and 87% said they would use it for future operations.

Conclusions: Patient response to a perioperative mind-body program was favorable. Most patients listened to the program CD at least once, and a third used the CD repeatedly, as recommended. The majority of patients who used the CD felt it had been helpful and would use it again. Program participants experienced less anxiety on the night of surgery.

and after surgery in improving surgery outcomes as measured by decreased anxiety, decreased pain, reduced need for pain medication, and shortened hospital stays.

Bennett and Disbrow² showed that autonomic behavior is subject to direct suggestion. After receiving only five minutes of suggestions and specific instructions for the early return of gastrointestinal activity, intraabdominal surgery patients experienced the return of intestinal motility in 2.6 days vs 4.1 days for control patients. Time to discharge was 6.5 vs 8.1 days with an average savings of \$1200 per patient. Ashton, et al³ found that CABG patients who were taught self-hypnosis relaxation techniques were significantly more relaxed postoperatively and required significantly less pain medication. Tusek, et al⁴ studied the effectiveness of using a guided imagery tape for three days before surgery and for the first six postoperative days in 130 patients having colorectal surgery. Before surgery, anxiety increased in the control group but decreased in the guided imagery group. Median worst pain score was 72.5 (0-100 scale) for the control group but only 42.5 for the guided imagery

A provocative body of literature,¹ including numerous prospective randomized studies, demonstrates the effectiveness of simple mind-body techniques utilized before and after surgery in improving surgery outcomes ...

Introduction

Many patients experience anxiety before surgery as well as pain and sleeplessness afterward. Pain and anxiety are frequently managed by pharmacologic means, such as opioids and benzodiazepines, but even

so, pain and anxiety frequently accompany surgery.

A provocative body of literature,¹ including numerous prospective randomized studies, demonstrates the effectiveness of simple mind-body techniques utilized before

Manuel Diaz, MD, (left) has practiced Anesthesiology at the KP Santa Rosa Medical Center since its opening in 1990. E-mail: manuel.diaz@kp.org.
Brad Larsen, CRNA, (right) has served as a staff anesthetist at KP Santa Rosa Medical Center since 1993. He is expanding the mind-body program to include all hospitalized and Emergency Department patients. E-mail: brad.larsen@kp.org.



group. The control group used a median of 326 mg of morphine, whereas the guided imagery group used a median of 185 mg. More recently, Laurion and Fetzer⁵ looked at the effect of guided imagery or music on the immediate postoperative experience of patients having gynecologic laparoscopic surgery. Both the imagery and the music groups experienced reduced pain at PACU discharge to home compared with control group patients.

Published pain management guidelines also recognize the role of mind-body techniques in the management of postoperative pain. For example, the Agency for Health Care Policy and Research clinical practice guideline, *Acute Pain Management in Adults*,⁶ states that as part of preoperative preparation, one should “[p]rovide the patient with education and information about pain control, including training in nonpharmacologic options such as relaxation.”

It is not clear, however, from previously published studies to what extent the potential benefits of mind-body techniques would be realized if such programs were incorporated into routine clinical practice. Because mind-body techniques require the active participation of patients, they can only be effective if patients are receptive to such techniques and choose to actually use them. Published randomized controlled studies report high rates of patient participation, but in the context of a randomized study, patients generally agree to use the study modalities before enrolling and subsequently receive various kinds of encouragement and support. Given patients’ general lack of familiarity with mind-body techniques, one cannot assume that similar rates of participation would be seen once such techniques

were offered in the context of usual clinical practice.

Our facility decided to implement a mind-body program—called *Preparing for Successful Surgery*—to help patients manage the stress and discomfort of surgery. The program used a CD, (entitled *Preparing for Successful Surgery* created by Belleruth Naparstek), which contains guided imagery, affirmations, and relaxation music. This CD was chosen because its imagery had been used effectively in prior published studies.^{1,4} The purpose of our study was to evaluate patient acceptance and determine clinical effectiveness of a mind-body program, incorporating several techniques previously shown effective in randomized trials, when implemented under real-life conditions in a community hospital.

Methods

Intervention

The *Preparing for Successful Surgery* program consists of a CD containing guided imagery (to help prepare for surgery and for healing after surgery), affirmations, and relaxation music. The CD is accompanied by a brochure describing mind-body medicine and introducing guided imagery and affirmations. Medical assistants or receptionists distribute program CDs and brochures during the preoperative clinic visit with the surgeon three to seven days before surgery. The brochure recommends that patients listen to the CD twice a day during the period leading up to surgery and twice a day after surgery until anxiety and discomfort resolve. With the exception of patients having cataract surgery, all adult patients scheduled for surgery at our 117-bed community hospital are given the CD.

On the day of surgery, at admission to the preoperative area, patients are offered a portable CD

player to listen to the program CD. Outpatients return the audio equipment at discharge, whereas patients admitted to the hospital take the CD players to the hospital room and are allowed to keep them for the duration of the hospital stay. Throughout the perioperative period, listening to the guided imagery CD is entirely voluntary and is determined only by each patient’s interest.

Study Population

Two hundred thirty patients having total hip replacement, total knee replacement, hysterectomy, or colectomy surgery participated in this investigation. Of this group, 115 (50.0%) were assigned to the control group before the start of the *Preparing for Successful Surgery* program and did not receive the CD. The remaining 115 (50.0%) were assigned to the intervention group and were given the CD during program implementation.

Study Tools and Measures

During the control and intervention periods, study participants had baseline anxiety measured by questionnaire using a ten-point visual analog scale administered at the preoperative nurse clinic visit, usually on the same day they received the CD. Anxiety was again measured at admission to the preoperative area on the day of surgery. During the intervention period, the operating room admission assessment also asked how many times patients had listened to the CD. Patients were subsequently administered a questionnaire by nurse anesthetists the night of surgery and three times a day (morning, afternoon, evening) for the first two postoperative days. The postoperative questionnaire asked patients to report their level of anxiety, pain at rest, and pain during movement on a ten-point

Because mind-body techniques require the active participation of patients, they can only be effective if patients are receptive to such techniques ...

visual analog scale. The morning assessment asked patients to rate the quality of their sleep, and during the intervention period, the evening assessment asked patients to record the number of times they had listened to the program CD that day. During the intervention period at the final evening assessment, patients completed a program evaluation, which included questions about frequency of CD use, program effect on preparing for surgery, anxiety, pain, sleep, and speed of recovery, intention to use the program during a future surgery, and intention to recommend the program to others as well as a space for written comments.

Statistics

The study used a controlled experimental design. Allocation to the intervention and control groups was sequential. Rates in the intervention and control groups were compared using statistical tests (χ^2 , Fisher exact, and Wilcoxon sign rank) as appropriate. Responses within the intervention and control groups and for the sample as a whole were compared between different time periods (eg, preoperative vs postoperative day one) using the Wilcoxon matched-pairs signed rank test.

Results

The study was conducted from July 2002 to November 2003. Before initiation of the *Preparing for Successful Surgery* program, 115 patients were enrolled in the control group. After starting the program, 115 patients were enrolled in the intervention group. The control group consisted of 37 total knee, 31 total hip, 27 hysterectomy, and 20 colectomy procedures, whereas the intervention group consisted of 44 total knee, 34 total hip, 23 hysterectomy, and 14 colectomy procedures. No new pain management

Table 1. Median reported anxiety

Time	Control group median (n)	Study group median (n)	Statistical significance ^a
Preoperative	5.0 (36)	5.0 (33)	p = .59, NS
ASU	5.0 (71)	3.0 (79)	p = .09, NS
7 pm operative day	3.0 (97)	1.0 (88)	p = .046
9 am POD 1	2.0 (106)	2.0 (107)	p = .06
2 pm POD 1	2.0 (109)	2.0 (108)	p = .78
7 pm POD 1	2.0 (95)	2.0 (105)	p = .53
9 am POD 2	2.0 (102)	2.0 (102)	p = .30
2 pm POD 2	2.0 (98)	2.0 (104)	p = .97
7 PM POD 2	2.0 (97)	1.0 (88)	p = .10

POD = postoperative day.

^aIntergroup comparisons at each measurement time calculated with the Wilcoxon rank sum test.

approaches were introduced during the study period.

Upon admission to the preoperative area, study participants during the intervention period were asked how many times they had listened to the CD in preparation for surgery. Of the 79 patients who responded to this question, 53.2% reported listening to the CD at least once (35.4% listened one time, and 17.7% listened two or more times). Postoperatively, 74% of patients reported listening to the CD at least once, and 37% reported listening three or more times.

The mean anxiety levels and number of respondents at each measurement time are presented in Table 1 for each group. The results show highest anxiety levels during the preoperative interview and immediately

preoperatively. Anxiety levels diminished dramatically after surgery. Anxiety scores were lower in the intervention group immediately preoperatively and on the evening of surgery, but the difference is only statistically significant on the evening of surgery.

Respondents were asked at 9:00 am on postoperative days one and two about the quality of sleep the night before (1 = poor, 2 = fair, 3 = good). Within the control group, the median sleep quality was 1.5 on postoperative day one and was 2.0 on postoperative day two. Within the intervention group, the median sleep quality was 1.0 on postoperative day one and was 2.0 on postoperative day two. No intergroup differences were statistically significant.

Postoperative median pain scores

Anxiety scores were lower in the intervention group immediately preoperatively and on the evening of surgery ...

Table 2. Postoperative pain at rest (median)

Measurement time	Control group	Study group	Statistical significance ^a
7 pm operative day	4.0	4.0	p = .79, NS
9 am POD1	5.0	4.0	p = .058, NS
2 pm POD1	4.0	3.0	p = .33, NS
7 pm POD1	3.0	3.0	p = .57, NS
9 am POD2	3.0	2.0	p = .25, NS
2 pm POD2	3.0	2.0	p = .15, NS
7 pm POD2	3.0	2.0	p = .46, NS

POD = postoperative day.

^aIntergroup comparisons at each measurement time calculated with the Wilcoxon rank sum test.

Table 3. Postoperative pain with activity (median)

Measurement time	Control group	Study group	Statistical significance ^a
7 pm operative day	7.0	7.0	p = .68, NS
9 am POD1	8.0	7.0	p = .15, NS
2 pm POD1	7.0	7.0	p = .35, NS
7 pm POD1	7.5	7.5	p = .65, NS
9 am POD2	7.0	5.5	p = .21, NS
2 pm POD2	6.0	6.0	p = .53, NS
7 pm POD2	6.0	6.0	p = .75, NS

POD = postoperative day.

^a Intergroup comparisons at each measurement time calculated with the Wilcoxon rank sum test.

at rest for each group are shown in Table 2. A trend toward lower pain scores was observed in the intervention group, but none of the differences reached statistical significance. Table 3 shows median pain scores with activity, and again there were no statistically significant differences between groups.

In the questionnaire completed at the final evening assessment, 80.5% of patients who had used the CD indicated that they felt that listening to the CD had helped reduce anxiety, 48% felt it had helped reduce pain, 60% felt it improved sleep, and 61.8% felt it sped recovery. In addition, 87% of patients who had used the CD stated they would use it for future operations, and 93.2% stated that they would recommend it to a friend.

Discussion

The results of this study indicate that most inpatients undergoing major surgery offered a CD containing guided imagery, affirmations, and music will use it at least once preoperatively and postoperatively (53% and 74% respectively). Postoperatively, about 37% will use it repeatedly, as recommended. We consider this significant in view of

the fact that most patients were introduced to the program via a brochure and brief comments by a medical assistant. It is likely that higher rates of participation and compliance would have been achieved had the program been discussed with the patient by physicians or other providers.

In terms of measured outcomes, the most significant findings were in anxiety scores. Baseline anxiety scores, as measured on the preoperative clinic visit were identical in the two groups. On the day of surgery, anxiety scores were lower in the intervention group, both at admission (3.0 vs 5.0) and on the evening of surgery (1.0 vs 3.0). However, only the difference in evening anxiety assessment reached statistical significance. Anxiety scores beyond the day of surgery were the same in both groups. This finding is not surprising, however, given how low anxiety scores were after the day of surgery, leaving little room for improvement. One can speculate that anxiety is largely an anticipatory phenomenon (fear of death, loss of control, or complications) and thus leads to the high baseline scores observed in both groups and the high scores observed at admission to the operating room and on the night of surgery in the control group. As surgery receded into

the past, anxiety rapidly diminished in both groups. Sleep scores were no different between the two groups and pain scores were not significantly different between the two groups, although what differences did exist favored the intervention group.

These findings differ from those of earlier studies^{3,4} which showed much more dramatic improvement in postoperative pain with use of mind-body techniques. This disparity may have resulted from differences in study design. Previous studies utilized a prospective randomized design, according to which patients were asked to consent and agree to participate in a study, thus ensuring a high degree of compliance. Because our study was an implementation study, the CD was offered as part of routine care, and the decision whether to listen to it or not was left entirely up to the patient. As a result, a significant number of patients chose not to use the CD at all, and of those that did, many may not have listened to it frequently enough to obtain maximum benefit. Because our data were analyzed on an intent to treat basis, so as to avoid self-selection bias, it is possible that the beneficial effect experienced by those who used the CD as recommended was diluted by the lack of effect seen in those who did not. Unlike previous studies,^{3,4} the main purpose of the current study was to determine patient acceptance and to determine clinical effectiveness of a mind-body program when implemented under real-life conditions, as opposed to showing potential benefits of guided imagery, affirmations, or music *per se* in the context of a more rigorous experimental protocol.

Our findings indicate that patients' perception of the program was highly favorable. Most patients felt

... most inpatients undergoing major surgery offered a CD containing guided imagery, affirmations, and music will use it at least once preoperatively and postoperatively ...

that the program had helped them with anxiety, sleep, and/or pain. Almost all patients who tried it said they would use it again and would recommend it to a friend. These findings were reinforced by the highly favorable nature of the many written comments from the program evaluation.

Our program is but one of several approaches that can be employed to introduce guided imagery and other mind-body techniques to patients for use in the perioperative period. Other programs, for example, introduce these techniques in the context of a preoperative class. While this may result in patients using the techniques more frequently or more effectively, it also imposes a higher time commitment on the part of patients and may result in lower rates of participation. Facilities interested in implementing the *Preparing for Successful Surgery* program can ob-

tain copies of the CD, brochures, and helpful information on implementation from Regional Health Education (510-987-3216). ❖

Acknowledgments

The authors thank the nurse anesthetists of KP Santa Rosa for making this study possible: Maureen Bowman, CRNA; Susan Dastic, CRNA; Greg Groeneveld, CRNA; Helen Heath, CRNA; Natalie Humphreys, CRNA; Indra Johansson, CRNA; Linda Lorz, CRNA; Gale O'Connor, CRNA; Rhonda Provost, CRNA; and Ann Stevenson, CRNA.

References

1. Dreher H. Mind-body interventions for surgery: evidence and exigency. *Advances* 1998 Summer;14(3):207-22.
2. Disbrow EA, Bennett HL, Owings JT. Effect of preoperative suggestion on postoperative gastrointestinal motility. *West J Med* 1993 May;158(5):488-92.
3. Ashton C Jr, Whitworth GC, Seldomridge JA, et al. Self-hypnosis reduces anxiety following coronary artery bypass surgery. A prospective, randomized trial. *J Cardiovasc Surg (Torino)* 1997 Feb;38(1):69-75.
4. Tusek DL, Church JM, Strong SA, Grass JA, Fazio VW. Guided imagery: a significant advance in the care of patients undergoing elective colorectal surgery. *Dis Colon Rectum* 1997 Feb;40(2):172-8.
5. Laurion S, Fetzer SJ. The effect of two nursing interventions on the postoperative outcomes of gynecologic laparoscopic patients. *J Perianesth Nurs* 2003 Aug;18(4):254-61.
6. US Department of Health and Human Services, Agency for Health Care Policy and Research. Acute pain management in adults: operative procedures [monograph on the Internet]. [Washington (DC)]: Agency for Health Care Policy and Research; 1993 [cited 2004 Nov 8]. (AHCPR Publication No. 92-0019) Available from: www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=hstat6.chapter.32241

Our program is but one of several approaches that can be employed to introduce guided imagery and other mind-body techniques to patients ...

Heaven

Health is my expected heaven.

— John Keats, 1795-1821, *English Romantic poet*