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Therapeutic Suggestions during General Anesthesia*

Carlton Evans and P. H. Richardson

Patients who were given hypnotic suggestions during hysterectomy had fewer complications and a shorter hospital stay.

Trvidence increasingly suggests that oper-Lating theater sounds are probably registered in some areas of the cortex during general anesthesia and these sounds may influence recovery from surgery.1 Cortical auditory evoked responses are not abolished by inhalational anesthetic agents even at concentrations above those required for surgery² and, although very few patients can recall intraoperative events.³⁻ ⁶ a more sensitive assessment of learning found significant postoperative recognition of words presented during general anesthesia.7 Furthermore, patients who are unable to recall instructions made during surgery may still obey them postoperatively: 11 patients who were told during anesthesia to touch their ears during a subsequent interview did so significantly more frequently than control patients,8 a finding replicated in patients who had cardiac surgery.9 Patients may also respond to therapeutic suggestions made during surgery. Two uncontrolled studies reported that therapeutic suggestions during anesthesia improved recoverv from surgery,^{10,11} a conclusion supported by two double-blind randomized controlled

*Adapted with permission from *The Lancet*, August 27, 1988, pp. 491-93.

studies. Patients who heard tape-recorded therapeutic suggestions left the hospital significantly sooner than those played music or blank tapes, but the suggestion and control groups were not matched for type of surgery.¹² Others reported similar findings with patients who underwent cholecystectomy (removal of the gall bladder) but only in older people.¹³ We conducted a double-blind randomized controlled study to examine further the hypothesis that the quality and duration of recovery from surgery would be improved by therapeutic suggestions made during general anesthesia.

Patients and Methods

Every patient admitted to St. Thomas's Hospital for a total abdominal hysterectomy over a twelve-week period was invited to take part in the study, which was approved by the West Lambeth Health Authority ethics committee. Four patients declined, two failed to complete the questionnaires, and one was excluded because a second operation was needed. The characteristics of the remaining 39 subjects are summarized in Table 1.

Patients were randomly played a suggestion tape or a visually indistinguishable blank con-

Table 1. Potential Confounding Variables

	Control Group (20 subjects)	Suggestion Group (19 subjects)	
Age (yr)	43.80 (7.1)	41.79 (6.5)	
Preoperative anxiety (20-60)	43.95 (12.9)	41.00 (9.4)	
Intraoperative blood loss (ml)	309.17 (221.2)	314.80 (181.5)	
Duration of surgery (min)	66.31 (16.8)	70.63 (23.9)	
Ethnic origin of patient			
Caucasian	9	13	
Afro-Caribbean	11	6	
Anesthetist's experience			
Consultant	8	10	
Other	12	8	
Surgeon's experience			
Consultant	18	12	
SR/registrar	2 7		

Mean (SD)

trol tape; the one played to each patient was not known until the end of the study. A waterproof auto-reverse tape player (Sony WM F-63) was used in the operating theater with purpose-built headphones which made operating theater sounds inaudible to the patient and prevented the tape being overheard by the anesthetist. Twelve minutes of suggestions were repeated three times on each side of the suggestion tape; the major section described for nine minutes the normal postoperative procedures with advice on how best to cope with them¹² (for example, "How quickly you recover from your operation depends upon you-the more you relax, the more comfortable you will be"); then two minutes of direct therapeutic suggestions^{11,13} (for example, "You will not feel sick, you will not have any pain"); and one minute of third-person suggestions13 (for example, "The operation seems to be going very well and the patient is fine"). A complete transcript of the suggestion tape is available on request.

On the day before surgery each subject completed a questionnaire: a short form of the profile of mood states questionnaire^{14,15} which provides six individual mood scores (tension, depression, anger, fatigue, vigor, and confusion) and an overall negative mood score; the Spielberger state-trait anxiety inventory,¹⁶ and a 10cm visual analogue scale¹⁷ to assess how distressed the patient felt by admission to hospital. Each patient was randomly allocated to hear a suggestion or control tape, which was played from the time of the first incision to the start of wound closures. Normal anesthetic and clinical procedures were not modified and the anesthetist recorded the duration of surgery, the intraoperative blood loss, the anesthetic agents used, and whether the patient showed any signs of consciousness during surgery.

When each patient got up for the first time after surgery, a nurse filled in a six point mobilization rating scale to assess the amount of help required; any vomiting was recorded. The number of half-days when a temperature exceeded 37.3°C was recorded for the first five postoperative days, as was analgesia usage. On the fifth day after surgery, each patient was asked to complete the mood and anxiety questionnaires again, and to make visual analogue scale ratings of pain intensity; distress caused

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by pain, difficulty with micturition, flatulence, and defecation; and severity of nausea. Each patient was asked whether she had any memories or dreams from the time of the operation, and to guess whether she had been played an instruction or a blank tape. The date of discharge was recorded to the nearest half-day, and the nurses were asked to assess patient recovery (worse than expected, as expected, or better than expected).

One-way analyses of variance and covariance were used to compare the mean scores of the suggestion and control groups on all continuous variables.

Results

There were no significant differences between the preoperative mood and distress scores for the suggestion and control groups. Thirty-three patients were anesthetized with thiopentone, nitrous oxide, and enflurane; six were given halothane (four from the suggestion group; two from the control group). No significant differences between the two groups were found for the distribution of ward or bed (single room vs. open bay) or allocation to clinical services. Table 1 summarizes other potentially confounding variables: no significant differences between the suggestion and control groups were found for age, ethnic origin, preoperative anxiety, intraoperative blood loss, duration of surgery, or anesthetist's and surgeon's experience.

Table 2 displays the mean scores and the distribution of the main dependent variables for the suggestion and control groups. The mean postoperative stay for the suggestion group was one to three days (16 percent) less than the control group. Patients' age was not significantly associated with the duration of postoperative hospital stay. Postoperative stay for the two groups is shown in the figure. The suggestion group patients also experienced one to eight (45 percent) fewer half-days of pyrexia and reported a significant reduction in gastrointestinal problems. No significant differences were detected between the suggestion and control groups for the quality of mobilization or difficulty with micturition. Two pa-

tients in each group required catheterization. Reported nausea, the incidence of vomiting, and analgesia requirement did not differ significantly between the two groups, nor did severity of the distress from pain on the fifth postoperative day. Mood and anxiety scores on the fifth postoperative day did not differ significantly between the two groups and the introduction of the preoperative scores as covariates did not alter this. Almost every member of the suggestion group was rated by nurses as having made a better than expected recovery; in contrast most controls were rated as having made typical or poorer than expected recoveries from surgery. No patient was able to recall any intraoperative events or conversation. All but one of the suggestion group patients guessed correctly that they had been played an instruction tape during surgery, while the control group guessed no better than chance would predict.

Discussion

The results of this study imply that therapeutic suggestions during anesthesia may significantly reduce the duration and improve the quality of recovery from hysterectomy. This conclusion is consistent with pervious controlled research involving different types of surgery.^{12,13} Many factors determine the quality and duration of recovery and observer error may have affected some of the measures, but these factors should have been equally distributed between the randomly allocated suggestion and control groups who were assessed double-blind. Surgical patients are usually exposed to operating theater sounds rather than silence and the control condition does not. therefore, represent normal clinical practice. However, earlier studies^{12,13} found that silence and operating theater sounds have similar effects upon recovery. The nurses' assessments of the quality of recovery also imply that the control condition was equivalent to normal clinical practice and that the patients who were played suggestions during surgery made better recoveries than expected. Furthermore, more than 50 percent of the suggestion group were discharged within a day of suture removal in

Table 2. Dependent Variables

	Control Group	Suggestion Group	р
			-0.0001
Postoperative stay (d)	8.4(1.3)	7.1 (1.0)	<0.002†
Pyrexia (half-days)	3.9(2.2)	2.2(1.2)	< 0.005
Difficulties with bowels $(0-100)$	55.7 (34.1)	31.3 (29.2)	< 0.03
Flatulence $(0-100)$	57.9 (33.1)	63.4(36.4)	NS
Mobilization rating $(0-5)$	2.6(1.1)	3.1(0.9)	NS
Urinary difficulties (0-100)	26.5 (32.7)	13.7 (19.6)	NS
Nausea $(0-100)$	43.4 (40.3)	28.3 (31.6)	NS
Pain intensity $(0-100)$	26.5 (25.4)	23.9 (20.0)	NS
Pain distress $(0-100)$	20.8 (27.4)	18.2 (18.2)	NS
Record of vomiting	• • • • •		
No vomiting	12	14	
Vomited	8	5	NS
Nurses' assessment of recovery			
*Poorer than or as expected	14	1	
Better than expected	6	16	< 0.002
Patient quess of tape contents			
Blank tape	11	1	
Instruction tape	9	18	< 0.004

*Only 3 patients were reported to have made a worse than expected recovery; the poorer than and as expected groups were therefore combined because this small cell size prevented the chi-squared test from being used. tNS = not statistically significant

Figure 1 Postoperative Stay in Hospital.



contrast with only 10 percent of the control group.

Inappropriate or misinterpreted operating theater comments may have a harmful effect upon recovery¹⁹⁻²³ and suggestion that patients' ears should be plugged during surgery have been made.^{1,24,25} Our results suggest that auditory perception without awareness may instead be employed to the benefit of the patient. None of our patients was able to recall any intraoperative events or sounds and the ward staff had no access to the visually indistinguishable tapes played in the operating theater. The accuracy with which the suggestion group patients guessed that they had been played an instruction tape suggests that auditory perception was maintained at some level during general anesthesia. The stress associated with an operation can affect resistance to infection, rate of blood clotting, and other

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mechanisms likely to be involved in the physical recovery from surgery.26 Psychophysiological mechanisms²⁷⁻²⁹ may have accounted for the suggestion group's improved and accelerated recovery. The recommendations on the suggestion tape (e.g., frequent mobilization) may also have contributed to these effects. There is little information about the most effective types of suggestion to use, and future studies may find ways of increasing their therapeutic effect; the effectiveness of these therapeutic suggestions may be increased by exposure during induction of anesthesia and during recovery^{30,31} in addition to the deepest period of anesthesia used for this study. 3

Carlton Evans and P. H. Richardson are affiliated with St. Thomas's Hospital in London.

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Author Interview:

Carlton Evans

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What did you expect to learn from this work? Were there any unexpected findings?

We hoped that by integrating concepts from several different fields of study it would be possible to increase the effectiveness of therapeutic suggestions played during surgery and hence allow patients to recover from their operations more comfortably and quickly. We expected to demonstrate an improvement in the average recovery from surgery for the suggestion group compared with the control group, but we assumed that the natural variation in the measures of recovery would cause considerable overlap between the two groups. We were therefore pleased to discover that most or all of the members of the suggestion group appear to have responded to the suggestions played during surgery. This was indicated by the accuracy with which patients guessed which tape had been played, by the large reduction in the duration of recovery, and especially by the nurses' rating of all but one of the suggestion group patients as having made a better than expected recovery.

I was surprised at how readily the research was accepted by the doctors and nurses responsible for patient care and am very grateful for their help and support.

What do you see as the future of this work?

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Our paper describes neurophysiological, cognitive, behavioral, and clinical studies which indicate that auditory information can be registered during normal clinical general anesthesia and that it may affect postoperative behavior. Our study demonstrates that this phenomenon is of considerable clinical importance and further research is clearly necessary to establish the effectiveness of therapeutic suggestions during different types of surgery and with different groups of patients. It is also important to establish which type of suggestion is most effective and whether it is possible to improve other aspects of postoperative recovery with different intraoperative suggestions. It may be possible to prevent pain, nausea, or even craving for cigarettes with appropriate therapeutic suggestions and, perhaps more important, it may be possible to produce measurable and clinically significant improvements in immune function. If it is possible to demonstrate similar improvements in recovery from other types of surgery, then the implications for improved medical care may be widespread.

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