Hypnosis and Surgery: Past, Present, and Future

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Hypnosis has been defined as the induction of a subjective state in which alterations of perception or memory can be elicited by suggestion. Ever since the first public demonstrations of "animal magnetism" by Mesmer in the 18th century, the use of this psychological tool has fascinated the medical community and public alike. The application of hypnosis to alter pain perception and memory dates back centuries. Yet little progress has been made to fully comprehend or appreciate its potential compared to the pharmacologic advances in anesthesiology. Recently, hypnosis has aroused interest, as hypnosis seems to complement and possibly enhance conscious sedation. Contemporary clinical investigators claim that the combination of analgesia and hypnosis is superior to conventional pharmacologic anesthesia for minor surgical cases, with patients and surgeons responding favorably. Simultaneously, basic research of pain pathways involving the nociceptive flexion reflex and positron emission tomography has yielded objective data regarding the physiologic correlates of hypnosis. In this article I review the history, basic scientific and clinical studies, and modern practical considerations of one of the oldest therapeutical tools: the power of suggestion.

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Many anecdotes relate how an injury sustained during an intense activity or absorbing preoccupation was not noticed until after the excitement had subsided. Such examples provide evidence that the perception of pain and the reaction to a noxious stimulus can be altered by psychological mechanisms. Some anesthesiologists systematically marshal these central nervous system processes to spare their patients pain and reduce the need for drugs. To bring to bear, in the clinical situation, the strongest appeal to the mind means using hypnotic suggestions or hypnosis. In the following pages, a brief overview of the history of hypnosis will be presented, recent studies shedding light on the mechanisms of hypnosis will be explained, and clinical applications of hypnosis in the perioperative setting will be discussed.

A BRIEF HISTORY OF HYPNOSIS AND ITS ENTRY INTO CLINICAL PRACTICE

Franz Anton Mesmer (1734–1815) brought the medical use of hypnotic phenomena to the attention of the European medical community (1). He believed there was a magnetic field around and extended through people, and that this "animal magnetism" could be influenced to heal the sick. In treating patients, Mesmer provoked them to enter a trancelike state with changes in physical perception, which would transition into a therapeutic "crisis" when the patients might fall to the floor, faint, lapse into deep sleep, or convulse (1,2).

The Marquis de Puységur (1751–1825), a Mesmer disciple, referred to this altered state as "artificial somnabulism" as he noticed patients to be hyperalert, while seemingly being asleep (2). James Braid (1795–1860) later called this "neurhypnology," a neurophysiologic variant of sleep (3). Braid and Alexandre Bertrand (1795–1831), who emphasized the importance of the subject's suggestibility rather than the physician's magnetism, laid the groundwork for a psychological explanation of hypnosis (3,4). The term "hypnosis" (from the Greek root "hypnos," sleep) was coined by Etienne Felix d'Henin de Cuvillers in 1820, even though James Braid has often been credited (2,5). According to Orne (6), hypnosis is "a subjective state in which alterations of perception or memory can be elicited by suggestion." This definition will be adopted in the following review.

The documented use of hypnosis as an adjunct to surgical therapy dates back to the 1830s when Jules Cloquet (mastectomy) and John Elliotson (numerous operations) performed major surgical procedures with hypnosis as the only anesthetic (7,8). The Scottish physician James Esdaile, who used hypnoanesthesia in approximately 300 surgical patients in India between 1845 and 1851, became the best known early hypnoanesthetist (9). Almost simultaneous with Esdaile's report, chemical anesthetics (ether 1846, chloroform 1847) were successfully introduced into

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surgical practice. Hypnosis subsequently became discredited as a therapeutic tool and continued to be used mainly by charlatans and stage hypnotists while diethyl ether and nitrous oxide, drugs that had become known for their use in ether frolics and entertainment, along with chloroform, became standard clinical drugs for anesthesia. Collins (10) puts the discontinuation of hypnosis for anesthesia at about 1860, i.e., the era of the rapid adoption of inhaled anesthesia. Collins mentions that around the turn of the century Freud used hypnosis in psychotherapy, but that anesthesiologists paid little attention to hypnosis until 1955 when the British Medical Association declared that "there is a place for hypnotism in the production of anesthesia or analgesia for surgery and dental operations, and in suitable subjects it is an effective method of relieving pains in childbirth without altering normal course of labor" (11). In 1958 the American Medical Association endorsed the use of hypnotism by physicians while condemning hypnosis for entertainment (12).

Interest in the clinical applications of hypnosis in anesthesia has been waxing and waning since the end of the Second World War. Clinically hypnosis has been used sporadically in anesthesia in a variety of settings. Rather than an alternative for general anesthesia it has been studied as a complementary technique. Scientific constraints have limited the progress of hypnosis from experimental use to routine clinical practice. It has been difficult, for example, to find measurable physiologic variables identifying the hypnotic state. It is a challenge to reliably and reproducibly measure a hypnotic trance and it is impossible to conduct a double-blind clinical study involving hypnosis. More recently, the trend towards greater prominence of conscious sedation in anesthesia has reawakened the interest in hypnosis. In fact, hypnoanalgesia has emerged as a combination of hypnotic techniques with pharmacological analgesia and sedation, and has found its way into the everyday practice of specialists (13–17).

EXPERIMENTAL STUDIES

Changes in the Perception of Experimental Pain Under Hypnosis

The mitigating effects of hypnosis on pain threshold and on the subjective experience of painful stimuli have been studied and validated in volunteers. A significant decrease in the perception of experimental pain under hypnosis has been a recurrent observation in these studies. The following four studies illustrate the experimental design and summarize their results.

Li et al. (18) elicited pain by stimulating the supraorbital nerve in 14 subjects. Under the influence of hypnosis, with continued suggestions throughout the experiment, the pain threshold could be significantly increased when compared to the same stimulus applied without hypnosis, or with acupuncture at true and false acupuncture needle application sites. Acupuncture did not significantly alter the pain threshold.

Stern et al. (19) studied 20 male volunteers, inducing pain by immersion of a hand in ice water or inflating a tourniquet on the arm. Pain could be significantly reduced with hypnosis and with morphine, although acupuncture at true acupuncture sites decreased the pain response to the ice water bath only, and acupuncture at false acupuncture sites did not exert any influence on pain perception.

Moret et al. (20) used the cold pressor test (hand held for 1 min in ice water) to assess pain response under the influence of hypnosis and acupuncture with or without the concomitant administration of naloxone. Both hypnosis and acupuncture significantly reduced the response to pain, hypnosis significantly more than acupuncture. Neither the effects of hypnosis nor those of acupuncture could be blocked by the administration of naloxone, suggesting that neither of these techniques worked directly or indirectly through opiate receptors.

Meier et al. (21) demonstrated significantly decreased pain sensation using hypnotic suggestions evoking hypalgesia in 10 volunteers subjected to intracutaneous electrical stimulation of a finger. When suggestions were used to evoke hyperalgesia, the participants reported a significant increase in pain. Somatosensory evoked potentials, auditory evoked potentials, and the electroencephalogram remained unchanged with and without suggestions. This study offers support to the important concept of pain as consisting of two components: the physical response to possible tissue damage and the affective component of the emotional response, either enhancing or reducing the pain sensation.

In these and similar studies the hypnotic effects on pain perception compared favorably to the effects of acupuncture, aspirin, or diazepam. The investigators did not observe changes in plasma concentrations of endorphins and adrenocorticotropic hormone, or an effect of opiate antagonists. Continuous suggestions throughout the painful experience improved the effects of suggestions given before application of the painful stimuli (18–24).

Physiologic Correlates of Hypnoanalgesia

During the last decade electrophysiologic and imaging studies have contributed sometimes contradictory data on physiologic changes under hypnosis. Danzinger et al. (25) reported that hypnotic analgesia could either increase or decrease the nociceptive flexion reflex (NFR). This team observed a decrease in the amplitude of late somatosensory evoked cerebral potentials without concomitant changes in autonomic or electroencephalogram activity. The authors point to a possible relationship between the decrease in late somatosensory potentials and the shifting of attention away from the noxious stimuli. NFR is a polysynaptic reflex which leads to flexion of the biceps femoris muscle after ipsilateral electrical stimulation of the sural nerve. Because the subjects undergoing sural nerve stimulation were unable to willfully influence NFR without hypnosis, it was postulated that hypnotic suggestions activate descending antinociceptive mechanisms exerting control at the spinal level (26). A shift of attention away from the painful stimulus and an inhibitory influence on the affective component of pain are the two other hypothetical processes involved.

Sandrini et al. (27) took the investigation of the influence of hypnosis on the NFR one step further. They confirmed that by evoking pain in a different part of the body (counter-stimulation) the pain response to electrical NFR could be dampened. This effect has been attributed to the influence of the activation of diffuse noxious inhibitory controls (DNICs) on descending pain pathways. Sandrini et al. demonstrated that hypnosis significantly reduced pain perception with and without concurrent DNICs. The activity of DNICs, however, was more difficult to demonstrate with the concurrent use of hypnosis. The interpretation of these results led the researchers to propose that both hypnosis and DNICs influence the same descending pathways to reduce pain perception (27).

Imaging studies using positron emission tomography and functional magnetic resonance imaging (MRI), and studies of evoked potentials in response to painful stimuli, have helped to improve our understanding of the neural pain pathways. Large areas of the brain, including cortical and subcortical regions, are involved with pain perception. The anterior cingulated cortex, insula, frontal cortices, S1, second somatosensory cortex (S2) and amygdala are among the structures included in the pain matrix (28). When the discriminative-sensory components of pain are processed, such as localization and duration, areas in the lateral thalamus and S1 and S2 area of the hemispheres show high metabolic activity (28–32). When the affective (cognitive-evaluative) components of pain are emphasized, for example under the influence of hypnosis, the information seems to be processed mainly in medial regions of the thalamus and projected to the anterior cingulate gyrus (31–39). The insula is thought to be involved in the coding of pain intensity related to the affective and discriminative-sensory aspects (40–45).

The physiologic correlates of hypnosis have been elegantly shown by Rainville et al. (46) and Faymonville et al. (47) With positron emission tomography studies the authors were able to demonstrate specific alterations of metabolic activity and perfusion of the anterior cingulate gyrus consistent with changes in affective pain perception under hypnosis. Other cortex areas involved in pain perception (primary somatosensory cortex) did not show changes under the same conditions. Similar results were obtained with functional MRI in healthy volunteers subjected to thermal pain with and without hypnosis (48).

The influence of hypnosis on pain perception has been studied using somatosensory event-related potentials (SERPs). After a painful phasic stimulus reproducible somatosensory evoked potentials were observed. Hypnotically reduced pain perception has repeatedly been shown to correlate with reduced amplitudes of peak components of late SERPs (49–52). Furthermore, Crawford et al. (50) has shown a significant enhancement of a negative peak of the SERP in the anterior frontal region of the cortex during hypnotic analgesia. An inhibitory feedback from the anterior frontal cortex or the anterior cingulate cortex on thalamocortical activity under hypnosis might explain these findings (49).

These observations support the results of Horton et al., (53) who studied two groups of healthy young adults, one group easily hypnotized, the other not easily hypnotized. MRI images of their corpus callosum, and particularly of its rostrum, showed significant differences between the groups. Volunteers easily hypnotized had a significantly larger rostrum ($P < 0.003$) than volunteers not easily hypnotized. The authors point out that the rostrum and genu in the anterior corpus callosum serve as a bridge between the prefrontal cortices. They cite studies supporting their suggestion that "the rostrum, in concert with the frontal cortices, may play a crucial role in the deployment of attentional and inhibitory control, and influence the effectiveness of the frontal cortices in sensory gating" (53).

CLINICAL STUDIES

Many clinical studies investigating the use of hypnosis involve small patient populations and often lack controls and statistical evaluations. Because active involvement of the study subjects in the hypnosis interventions is required, a double-blind study is impossible, and even a single-blinded study would be a challenge. Interpretation of results from different studies is also complicated by the lack of standard techniques and procedures.

To assess the various applications of hypnosis in the operative setting, an overview of studies concentrating on the use of hypnosis for surgical procedures involving general anesthesia and monitored anesthesia care has been generated. All studies found in a search of the PubMed database of the National Library of Medicine and the National Institutes of Health which involve hypnosis and suggestions in the operative/perioperative setting and include a control group are listed (Tables 1–3). Individual studies will then be commented on in brief to explain goals, procedures, and outcome.

Studies Involving Intraoperative Suggestions to Patients Under General Anesthesia

By definition hypnosis relies on the participation of the hypnotized subject. Thus, literature evaluating the influence of suggestions to patients under general anesthesia is not the focus of this review (54–66).

Table 1. Nonrandomized Studies of Preoperative Suggestions Combined with General Anesthesia

Author	Surgical procedure	Intervention	No. of patients in study group	No. of patients in control group	No differences between groups	Type of differences between groups
Doberneck et al. (1959) (67)	General surgery (various)	Preoperative hypnosis by surgeons	31	31		Significant reduction of postoperative narcotic administration by surgeons (researchers) to hypnosis subjects, no P value given
Bonilla et al. (1961) (68)	Knee arthroscopy	Preop hypnosis 30–70 min by surgeons compared to historic controls	9	40		Reduction in narcotics administered and hospital stay in hypnosis group, no statistical analysis
Werbel (1963) (69)	Hemorrhoidectomy	Pre- and postoperative hypnosis by surgeons	11	11		Reduction in pain and doses of narcotics administered, no statistical analysis
Bartlett (1966) (70)	General surgery (various)	Group1 hypnosis training prior to hospital, group 2 hypnosis used starting during hospitalization, group 3, group 4 historic controls	25 (hypnosis training prior to hospitalization); 25 (hypnosis during hospitalization); 25 (polypharmacy and minimal suggestions)	25 (standard care)	Postoperative scores among the treatment groups	Postoperative scores better for treatment groups ($P < 0.001$) and preoperative scores better for treatment groups
Surman et al. (1974) (71)	Cardiac surgery	Pre- and postoperative hypnosis and standard care	20	20	Pain, medication requirements, depression, anxiety	
Rapkin et al. (1991) (72)	Head and neck surgery	Preoperative hypnosis and standard care	15	21	Complications, estimated blood loss, administration of pain medication	Decreased postoperative stay for hypnosis group ($P < 0.05$)
Enqvist et al. (1995) (73)	Maxillofacial surgery	Tape with suggestions (preoperative); tape with pre-and perioperative suggestions; tape with perioperative suggestions; matched controls	18 (preoperative suggestions); 18 (pre- and perioperative suggestions); 24 (perioperative suggestions)	matched controls	Postoperative pyrexia, heart rate, anxiolytics and analgesics, blood loss (perioperative and combined pre- and perioperative suggestions), hospital stay (preoperative and combined suggestions)	Decreased intraoperative blood loss ($P < 0.008$ for preoperative suggestions); decreased systolic blood pressure ($P = 0.032$) for pre- and perioperative suggestions and for perioperative suggestions alone $P = 0.002$); hospital stay (perioperative suggestions, $P = 0.025$)
Mauer et al. (1999) (74)	Orthopedic hand surgery	20 min script (relaxation and positive suggestions)	30 (cohort of 30 study patients followed by 30 control patients)	30	State anxiety scores on day two and three	Decreased state anxiety scores on day 4 ($P = 0.02$); decreased pain intensity and pain affect rating postoperatively ($P < 0.002$); better surgical rating of recovery ($P = 0.004$); decreased postoperative complications ($P = 0.004$)

Perioperative Hypnosis and General Anesthesia

Studies of the various aspects of the perioperative course of patients under general anesthesia are listed in Tables 1 and 2. Many of these studies are nonrandomized, and statistically significant results may be due to selection bias (67–74). In many of the pioneer studies, the investigators were also the caregivers. Therefore, some of the variables measured (e.g., pain medication administration) depended directly on the investigators (67–69). In this review results of the randomized studies will be examined more closely.

The study objectives differ among the randomized studies and the results are not always clear (75–85). van der Laan et al. (79) found no difference in postoperative pain, analgesia requirement, and nausea after preoperative and intraoperative suggestions during various gynecological procedures. A questionable benefit for the treatment interventions was noted in other studies (76,77,80). However, some studies have shown improvement of perioperative pain, anxiety, and postoperative nausea by hypnosis and suggestions (78,81,84,85).

Table 2. Randomized Studies of Preoperative Suggestions Combined with General Anesthesia

Author	Surgical procedure	Intervention	No. of patients in study group	No. of patients in control group	No differences between groups	Type of differences between groups
Hart (1980) (75)	Open heart surgery	Preoperative taped hypnotic suggestions and control patients	20	20	Blood pressure relaxation ratings	Decreased postsurgical blood transfusion ($P < 0.05$); less transitional emotional stress ($P < 0.02$)
Greenleaf e al. (1992) (76)	Coronary artery bypass	Preoperative hypnosis/imagery, preoperative hypnosis/suggestions, standard care	Total of 32 patients, individual number per group not identified		Sodium nitroprusside, time on ventilator, intensive care unit and hospital stay	Decreased wound drainage (clinically valued as insignificant) in hypnosis/imagery group ($P < 0.05$)
Disbrow et al. (1993) (77)	Abdominal surgery	Preoperative hypnotic suggestion for return of bowel function (5 min tape) or control instruction for postoperative recovery	20	20	Time to first oral liquid intake, duration of nasogastric tube placement, time to discharge	Decreased time to first flatus in suggestion group ($P < 0.05$)
Lambert (1996) (78)	General surgery (various) children	Guided imagery taught by the investigator compared to group with equal amount of staff contact	26	26	Pain medication received, anxiety scores	Decreased postoperative stay for hypnosis group ($P < 0.05$); decreased pain rating in hypnosis group ($P < 0.01$)
van der Laan et al. (1996) (79)	Various gynecological procedures	Tape (suggestions preoperatively and sham intraoperatively; sham preoperatively, suggestions intraoperatively; sham pre- and intraoperatively)	20 (suggestions preoperatively) 20 (suggestions intraoperatively)	20 (sham tape only)	Pain, nausea, analgetic requirement	
Ashton et al. (1997) (80)	Coronary artery bypass	Patients were taught self-hypnosis relaxation preoperatively and compared to standard regimen	16	16	Intraoperative parameters, morbidity and mortality	Increased postoperative ability to feel relaxed in study group ($P < 0.03$)
Enqvist et al. (1997) (81)	Breast surgery	Audiotaped suggestions prior to hospital visit for study group	23	25	Postoperative well being, pain	Decreased nausea ($P = 0.009$); decreased vomiting ($P < 0.05$); decreased analgesic use ($P < 0.02$)
Montgomery et al. (2002) (82)	Excisional breast biopsy	Hypnosis versus control	10	10	Recovery time and patient satisfaction	Decreased pain ($P < 0.001$); decreased distress postoperatively ($P < 0.025$)
de Klerk et al. (2004) (83)	Coronary artery bypass	Hypnotherapeutic ego strengthening versus standard care	25	25	Results for postoperative depression, results for postoperative anxiety	Increased reduction of preoperative anxiety and depression over time in postoperative course in treatment group ($P < 0.001$)
Calipel et al. (2005) (84)	General surgery (various) children	Midazolam preoperatively or placebo and 30 minutes of hypnotic relation with anesthesiologist prior to surgery	25	25		Decreased anxiety at mask placement ($P < 0.05$); decreased postoperative behavior disorders ($P < 0.05$)
Sadaat et al. (2006) (85)	Ambulatory surgical procedures	Hypnosis by hypnotherapist, attention control and control group	26 (hypnosis)	26 (attention control) 24 (standard care)	Systolic blood pressure, diastolic blood pressure and heart rate	Decreased anxiety upon entry into operating room ($P = 0.001$) and postoperatively ($P = 0.008$) for hypnosis group

An improvement in the recovery of postoperative gastrointestinal function after abdominal surgery was claimed by Disbrow et al. (77). Patients in the study group had less time to documented first flatus, but none of the other variables of gastrointestinal function (time to first liquid intake, time to removal of nasogastric tube) showed a significant difference among groups. The study by Ashton et al. (80) demonstrated the success of the therapeutic intervention of self-hypnosis relaxation postoperatively, with patients in the study group being more relaxed than control patients. No consequence of this treatment effect on morbidity, mortality, or intraoperative variables could be shown. Greenleaf et al. (76) analyzed the effect of

Table 3. Studies of Pre- and Perioperative Suggestions Combined with Monitored Anesthesia Care

Author	Surgical procedure	Intervention	No. of patients in study group
John et al. (1983) (86)	Radial keratotomy	Four minute script prior to surgery	34
Faymonville et al. (1997) (13)	Plastic surgery	Monitored anesthesia care with hypnosis compared to historic controls with intravenous sedation	172 (hypnosis achieved) 28 (sedation achieved instead of hypnosis)
Faymonville et al. (1995) (14)	Plastic surgery	Pre- and intraoperative hypnosis or emotional support by investigator	31
Defechereux et al. (2000) (16)	Thyroid surgery	Pre- and intraoperative hypnosis plus local anesthesia plus patient administered Midazolam and Alfentanil compared to general endotracheal anesthesia	20
Lang et al. (2000) (17)	Percutaneous vascular and renal procedures	Self-hypnotic relaxation and structured attention facilitated by additional provider perioperatively and standard care	54 (hypnosis) 57 (attention group)
Butler et al. (2005) (87)	Voiding cysturography	Hypnosis and standard care	21

preoperative hypnosis and suggestion on the postoperative course of coronary artery bypass patients. Postoperative hospital stay, time in the intensive care unit, and postoperative infusion of nitroprusside were the same among intervention and treatment groups. They did find a decrease in postoperative wound drainage for the hypnosis group (valued clinically insignificant by the surgeons), but that seems irrelevant.

Of particular interest to the anesthesiologist are the studies that focus on perioperative pain, anxiety, and nausea (78,84,85,81). Lambert (78) demonstrated reduced pain and a shorter postoperative stay among the children in a hypnosis/guided imagery group compared to an attention-control group. There was no difference in anxiety scores among the groups in this study. This contrasts with the results of a study by Calipel et al. (84) who compared the reduction of preoperative anxiety by hypnosis versus preoperative midazolam in children. Children in the hypnosis group had lower preoperative anxiety scores and less postoperative behavioral disorders than children in the midazolam group. Sadaat et al. (85) confirmed a positive effect of hypnosis on preoperative and postoperative anxiety for ambulatory surgical patients compared to an attention-control group, who received attentive listening and support, and a "standard of care" control group. Enqvist et al. (81) analyzed the positive effects of patients listening to audiotaped suggestions before breast surgery. They found a significant difference among intervention and control groups with less nausea, emesis, and analgesia requirements in the intervention group.

Hypnosis as Part of Conscious Sedation and Monitored Anesthesia Care

The effects of involving patients with hypnosis and guided imagery during procedures performed with monitored anesthesia care have been studied in a variety of clinical settings (Table 3). John and Parrino

Table 3. (continued)

No. of patients in control group	No differences between groups	Type of differences between groups	Randomization
25	Behavior during procedure, pain, awareness	Hypnosis group felt better the day after surgery ($P < 0.05$)	No
131		Decreased intraoperative ($P < 0.01$) and postoperative ($P < 0.05$) anxiety in intervention groups; decreased pain scores for hypnosis ($P < 0.001$) and sedation ($0 < 0.01$); decreased narcotic use for hypnosis ($P < 0.002$); better surgical condition for hypnosis group than for standard group ($P < 0.001$); decreased nausea and vomiting of hypnosis group compared to relaxation and standard groups (no P values given)	No
25		Decreased intraoperative narcotic and sedative use ($P < 0.001$); decreased pain scores ($P < 0.02$); decreased nausea and vomiting ($P < 0.001$); increased perceived intraoperative control by patients ($P < 0.01$);, greater surgeon's satisfaction ($P < 0.001$)	Yes
20	Intraoperative serum cortisol, adrenaline, and noradrenaline levels, blood loss, procedure duration, postoperative muscular strength	Increased stability in heart rate ($P < 0.05$) and systolic blood pressure ($P < 0.05$); decreased postoperative pain ($P < 0.01$ day 1); decreased analgesic use ($P < 0.05$ day 1); decreased anxiety postoperative ($P < 0.01$); decreased postoperative fatigue ($P < 0.05$ day 1); decreased nausea ($P < 0.01$ day 1); decreased time to return to work ($P < 0.01$); increased patient satisfaction ($P < 0.01$)	Yes
57		Decreased duration of procedure for hypnosis group (<0.005); less increase in pain over time than standard ($P < 0.0001$) and attention group ($P < 0.05$); greater decrease in anxiety over time in hypnosis group compared to standard group ($P < 0.005$); increased drug use in standard group compared to attention and hypnosis groups ($P < 0.0001$)	Yes
23	Child report of distress during procedure	Decreased parent reports of child distress ($P < 0.05$) and staff ratings of child distress ($P < 0.05$); decreased staff report of procedural difficulty ($P < 0.05$); decreased procedure time for study group ($P = 0.002$)	Yes

(86) used a 4-min script with hypnotic suggestions read by the surgeon prior to radial keratotomy in a nonrandomized study. The procedure was performed under regional anesthesia with sedation. No differences between study and control groups were noted intraoperatively or immediately postoperatively. In contrast, other studies have documented significant benefits of pre- and intraoperative hypnosis (13,16, 17,87).

Faymonville et al. (13,14) and Defechereux et al. (16) used a 10-min hypnotic induction session by a separate caregiver prior to the conventional administration of sedatives and local anesthetic infiltration of the operative site for plastic surgical procedures, neck dissections, and thyroid surgery. In their prospective randomized clinical trial (13,14) patients in the treatment group had significantly lower pain scores, required less intraoperative opioid analgesics and sedatives, and had less postoperative nausea than the control group. Defechereux et al. compared the combination of hypnosis, local anesthesia and patient-controlled sedation and analgesia to general anesthesia for thyroidectomies. They observed a significant benefit for the hypnosis/sedation group in terms of greater hemodynamic stability, less postoperative pain, analgesic use, anxiety, and nausea (16), although it is not possible to know whether these benefits were attributable to the hypnosis or the sedatives in the hypnosis/sedation group. Lang et al. (17) assessed the efficacy of structured attention or hypnosis compared to standard care on pain, anxiety, and analgesic use during conscious sedation for minimally invasive procedures performed by interventional radiology. The hypnosis group had less anxiety throughout the procedure, decreased pain, and required significantly less analgesic medication than the groups receiving standard care or structured attention. The shorter average duration of the interventional procedures in the hypnosis group is a confounding factor as the groups were not stratified for degree of difficulty of the procedure. Butler at al. (87) used hypnosis in an attempt to make repeat voiding cystourethrographies more tolerable for children. Children who underwent a 1-h hypnosis training session with psychologists seemed to tolerate the procedure with less distress and in a significantly shorter time than the control group.

Limitations to Hypnosis and Monitored Anesthesia Care for Surgical Procedures

Procedures

Some limits for hypnosis and sedation as the only anesthetic for surgical procedures have been demonstrated by Sefiani et al. (88). Laparoscopic cholecystectomies and hernia repairs were attempted with a combination of local anesthesia, hypnosis and sedation. Thirteen of 35 cholecystectomies and 1 of 15 hernia repairs had to be converted to general anesthesia due to the patients' discomfort.

Patients

Not every patient can be hypnotized, and not every anesthesia care provider may be willing and able to integrate hypnosis into his or her practice. Hypnotic susceptibility is a feature that describes the ability of the individual to reach a state of hypnotic trance. Patients receptive to hypnosis will reach a deeper hypnotic trance and attain a greater reduction of pain perception and operative stress than those who are less receptive to hypnosis (27,51–53). Evidence shows, however, that even patients who do not reach the stage of hypnotic trance benefit from hypnotic suggestions (or, perhaps, benefit from the closer personal attention provided by the anesthesiologist, which is also the power of suggestion) (17,89,90).

CONCLUSIONS

More than 200 yr have passed since Mesmer's demonstrations of animal magnetism, and more than 150 yr have passed since the first documented use of hypnosis as the sole anesthetic for general surgical cases. We now have data showing physically measurable effects of suggestion or hypnosis on the nervous system. Imaging and electrophysiologic studies have demonstrated changes in spinal and supraspinal pain pathways under the influence of hypnosis. Because suggestions and focused attention can measurably alter pain perception and pain pathways, a similar influence may be expected for the autonomous nervous system involved in modulating gastric motility, regional blood perfusion, and the humoral response to stress. Faster wound healing, earlier postoperative gastrointestinal recovery, and less nausea have been reported when hypnosis or positive suggestions were part of the perioperative management (13,14,16,91,92).

The clinician is left with the question: Do we have enough data to elevate autohypnosis and hypnosis to a clinical routine that promises benefits for patient and surgeon? Research on hypnotic techniques in the operating room has been performed by a few dedicated investigators. Only multi-institutional studies encompassing large numbers of patients could test the hypothesis that hypnosis benefits patients and health care facilities by increasing satisfaction, reducing patient morbidity, and reducing cost. A meta-analysis by Montgomery et al. (93) on the effectiveness of adjunctive hypnosis with surgical patients suggests that hypnosis improves outcome. However, the data must be interpreted with caution because of the great variability in techniques and definitions among the reports comprising the analysis.

If hypnosis and autosuggestions provide clinical benefit, they do so without the need for equipment or drugs. What other therapeutic measure appears so devoid of increased cost and demonstrable adverse effects? Personal attention to the patient, emotional support, positive suggestions, and even hypnosis are readily available, safe, inexpensive, and attractive measures that might improve the care of our patients.

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