Hypnoanesthesia and analgesia
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Hypnoanesthesia and analgesia have been shown to provide safe and effective pain relief, good muscle relaxation, a decreased need for premedication, and a shorter, less complicated postoperative course. In this article, the author gives a brief history and general overview of hypnosis and its many uses.

As anesthetists, we are faced daily with the problem of providing adequate pain relief without producing harmful effects to the patient. We have a wide range of chemical agents to assist us, but many of these drugs have some side effects and are contraindicated in certain situations.

Hypnosis is a unique clinical tool with no known side effects. It is perfectly safe for virtually all patients and has a morbidity and mortality rate of zero. Hypnosis has but recently been recognized by the medical profession as a very useful tool.

History

As a method of treatment, hypnosis is ancient. In the 4th Century B.C. Aesculapius, "the father of medicine," produced hypnotic sleep. It has been used by practically every culture and race of people since then. Hypnosis has been studied extensively by medical practitioners through research and experiments; however, their work was all too often dismissed as that of quacks or charlatans, thus inhibiting the rapid growth and acceptance of the many medical uses of hypnosis. Steps have also been taken to use hypnosis as an anesthetic technique. John Elliotson, (1791-1868), professor of medicine at a London university and president of the Royal Medical and Surgical Society, used hypnosis in the treatment of medical and nervous disorders and as an anesthetic. James Braid, (1795-1860), a physician in Manchester, England, scientifically studied what was formally called mesmerism. He renamed it hypnotism from the Greek word hypnos, meaning sleep. Braid then used this method to treat rheumatism, epilepsy, paralysis, and neuralgia. The use of hypnosis as an anesthetic was delayed with the introduction of chloroform.

The power of hypnosis to cure and to relieve pain had been greatly underestimated or ignored by the medical profession as a result of irrational prejudice. A major breakthrough came on April 23, 1955, when the British Medical Association reported its approval of hypnosis for the treatment of psychoneurosis and hypnoanesthesia for the relief of pain in childbirth and surgery.

In 1958, the Council on Mental Health of the American Medical Association recommended the instruction of hypnosis be included in the curricula of medical schools and post-graduate training centers. The American Society for Clinical Hypnosis and the International Society of Clinical and Experimental Hypnosis have established sections to maintain high ethical and training standards and to prevent the occurrence of abuses that caused hypnosis to fall into oblivion twice during the past century and a half.
Definitions

The word hypnos is misleading. Hypnosis is not sleep at all; it is simply an absolute, complete state of relaxation which is often called the trance state. Normal sleep is an unconscious state or a state of unawarness, whereas hypnosis is a conscious state or state of acute awareness. In hypnosis one's awareness is increased 1,000%.

Hypnosis requires the interaction of one person with another person who induces the trance. It also requires the uncritical acceptance of a suggestion, verbal or non-verbal, deliberate or inadvertent. The patient responds to a signal from the hypnotist or to an inner signal which activates a capacity for a shift of awareness and permits a more intense concentration. This shift is constantly sensitive and responsive to cues from the hypnotist.

There is nothing mysterious about hypnosis. All of us have experienced a hypnoidal state, which is a precursor of hypnosis. This state is induced by non-formalistic techniques such as fixation of attention. A good example of this is watching the white line on a highway and finding that you are not aware of the landmarks you have passed or even that time has lapsed. You get some degree of dissociation which can merge into true sleep. In this state, critical thinking is reduced, enhanced suggestibility results, and hypnosis can easily be induced. Another good example of this state is watching a movie. Your attention is on the screen and for a short period of time unreality becomes reality. When a need for reality thinking is obviated, a type of waking hypnosis occurs, as when the movie is over.

Amnesia may or may not occur spontaneously with hypnosis. It is most often produced with a post-hypnotic suggestion. Some patients have a great need to maintain control and will not develop amnesia.

Dissociation is another phenomenon that can be experienced with hypnosis. This is the inherent ability of the hypnotized subject to detach himself from his immediate environment. A person can be completely dissociated and retain the capacity to function adequately. This state may be described as stepping out of self and seeing self function.

A clinical example of dissociation is the ability to anesthetize an arm. After getting the patient totally relaxed and ready for suggestions, one might tell the patient he sees both of his arms in his lap while in actuality one arm is out by his side. By seeing both arms in his lap, the patient has associated the extended arm, thus he feels no pain it.

Another state of hypnosis is somnambulism. This is one of the deepest stages of hypnosis. This state is observed in sleepwalkers who have no recollection of their nocturnal experience.

Misconceptions

The main reasons why hypnosis has not been more widely and rapidly accepted are misinformation and misconceptions. The main fallacy is that hypnosis is a form of sleep, a state of unconsciousness, a loss of control. This could not be farther from the truth. During hypnosis, the patient is aware of everything that is going on, his sense of awareness is acute, and he has complete control. The only resemblance hypnosis has to sleep is in the outward appearance of the patient. He may have his eyes closed to facilitate concentration, and he may look totally relaxed, as if asleep. The most frequent comment from a patient after being hypnotized for the first time is, "It didn't work, I heard everything."

A common fear of the patient is that he will surrender his will and control to the hypnotist, but this is not true. A person's capacity to be hypnotized is a subjective matter. The patient cannot be made to do or say anything he does not wish to do or say. However, if he is predisposed to do something that he has not done due to his inhibitions, the hypnotist may be able to get him to do it under hypnosis.

The patient is aware of everything. He can make decisions. The deeper the hypnosis, the deeper is his concentration and attention to the suggestions of the hypnotist. An example of this is that of a music lover totally absorbed in his world of music and oblivious to his surroundings; although he is awake, he can be brought back to reality immediately if the need arises.

The next biggest concern of the patient is, "What if you can't bring me out of it?" The fact is, the patient induces his own hypnosis through his own convictions and can dehypnotize himself at will. If the hypnotist suggests anything contrary to the wishes of the patient, he will spontaneously dehypnotize himself. A person cannot be hypnotized if he does not wish to be.

Hypnosis is an interpersonal relationship between patient and therapist, and this takes time to develop. A well informed patient makes the best subject.

Theories of hypnosis

The mind is extremely complex, controlling
the body consciously by thinking, reasoning, will power, and organized brain activity. It controls
the body subconsciously through the central nervous system, memory, imagination, the ability to
recall facts and experiences which affect behavior. The conscious mind is objective while the sub-
conscious is subjective or automatic. The other state of mind is the unconscious state, when the
person is not aware of his environment.

Hypnosis works on the subconscious level. The sub
conscious accepts what the conscious says as fact. It cannot analyze what it is told. The sub-
conscious mind is always aware of what is going on even if the person is in an unconscious state.11
Freud states that much of a person’s mental activity takes place outside his stream of conscious-
ness.20

In hypnosis, ideas or suggestions are presented
directly to the subconscious level, which is able to accept and act upon them more readily than when they are normally presented to the conscious level. Even though hypnosis works in the subconscious, there is an element of the conscious mind present and functioning at a minimal level. This is the patient’s safety mechanism which prevents him from doing something he does not wish to do.

Hypnosis cannot be explained by one single factor because, like any behavioral process it combines many aspects of human thinking. There is a variety of psychological and physical factors acting reciprocally through the imaginative process which may produce the perceptual response of hypnosis.6 The mind, if stimulated by suggestions, is capable of accomplishing remarkable things through the imagination. Emotional reactions can cause great physical and mental changes. Hypnosis uses these same phenomena to obtain desired changes in the patient.11

How can this work? There is considerable evidence that a dissociation of some kind plays a role in hypnosis. Phenomena such as automatic writing, posthypnotic suggestion, somnambulistic activity, lack of conscious awareness of painful stimulation during hypnotically induced anesthesia, and hypnotically induced amnestic states all point to coexisting, parallel systems of awareness or functions that exist on a dissociated level since they essentially contradict each other.20

A study done by Hilgard in 1969 shows that pain can be reduced through relaxation, but through the addition of hypnosis and a suggestion of analgesia, no pain is felt.5 Pain perceived in the tissues does not reach the pain receptors in the higher brain centers during hypnosis. With the higher cortical centers inhibited during deep hyp-

osis, the reticular activating system (RAS) and other subcortical centers prevent the intrusion of painful impulses into awareness.

The psychological state of a patient greatly effects the outcome of hypnoanesthesia or analgesia.6,18 Ideational processes occurring as functions of neocortical and limbic lobe activity reach peripheral pathways via the RAS. Thus with hypnosis, there is an increased alertness, vividness of sensory imagery, and facilitation of ideomotor activity.

**Neurophysiology**

To better understand how hypnoanesthesia works, the anesthetist first needs to understand the physiology of pain, how the brain interprets it, and how the body responds, in addition to the psychological factors associated with pain.

**Pain pathways.** Pain fibers enter the spinal cord via the dorsal roots and ascend or descend one or two segments and terminate on the neurons in the dorsal horns of the cord gray matter. They then cross to the opposite side of the cord in the anterior commissure and pass upward to the brain. Most pain fibers lie in the lateral portions of the spino thalmic and spino reticular tracts. The impulses finally travel to the thalamus and somatic sensory cortex.

Some fibers terminate in the reticular area of the brain stem and excite the RAS which activates the central nervous system (CNS). The conditioning impulses entering the CNS will determine whether the incoming impulses will be transmitted as weak or strong and how much one will react to pain.

**Reticular activating system.** In addition to receiving pain impulses, the reticular activating system controls the overall degree of CNS activity. The brain stem portion controls our state of wakefulness or sleep and the ability to direct our attention toward specific areas of our conscious mind. Furthermore, the brain is the primary controller of our orderly sequence of thoughts. The RAS begins in the lower brain stem and extends upward through the mesencephalon and thalmus to be distributed throughout the cerebral cortex.

The RAS has an influence on almost all sensory inflow via the thalmus, and influences motor outflow as well. It participates in the vital autonomic responses, elicits generalized inhibition of movement, and reduces or eliminates incoming sensory impulses at the level of the entrance to the brain stem. Stimulation, inhibition, arousal and depression can be experienced simultaneously in
different areas of the RAS since it receives impulses from almost all parts of the brain.

Hypnosis maintains wakefulness while some degree of cortical inhibition occurs. The RAS is an important screening mechanism for a continuum of sleep, hypnosis, and wakefulness. Somnambulism can be obtained by inhibiting the mesencephalic portion of the RAS.

Limbic system. The limbic system includes the hypothalamus, hippocampus, amygdala, and portions of the basal ganglia. The RAS and limbic system work together in behavioral functions. This system is concerned with the effective nature of sensory stimuli such as differentiating an impulse of pain from one of pleasure. The hippocampus provides a channel through which incoming sensory signals can excite the appropriate limbic reactions. Emotions and feelings are also found here. The limbic system can facilitate or inhibit the learning memory. It also helps to elucidate the nature of hypnosis, hysteria, schizophrenia, and psychosomatic diseases.

The limbic system influences smooth and striated muscles, which explains the close relationship between voluntary and involuntary control of visceral functions during hypnotic behavior. The involuntary system is not as involuntary as we tend to think, and portions of the voluntary system can come under noncortical control with appropriate conditioning—as in hypnosis. Controls of the limbic system are massive and diffuse, so entire organ systems as well as the body image appear as one whole rather than as specific muscles or movements.

The amygdaloid complex, along with the RAS and intralaminar system, is capable of exerting a diffuse regulatory influence on the cortex. The cortex is responsible for the storage, comparison, and coding of impulses which occur to provide perception, memory, and learning. The electrical activity of the amygdaloid complex changes when an animal is startled or, as a result of conditioning, its attention is focused on some environmental event. Hypnosis makes use of these phenomena.

The hippocampus has a staying effect, it keeps the brain attentive to carrying out goal-directed behavior and to prevent it from being shunted haphazardly by fluctuations in the environment. Crasilneck and colleagues have described how hypnosis terminates each time during brain surgery when the hippocampus is stimulated. They suggest that the hippocampus mediates whatever neural circuits are involved in hypnosis.

By understanding this basic anatomy and physiology, we can see how sensory input to the brain can be controlled, and how pain stimuli can be diminished or eliminated in the lower centers of the brain (since nervous pathways from almost all sensory areas of the brain extend downward to these lower centers). Parts of the brain can be stimulated and can exert powerful inhibition by sending descending impulses which are capable of preventing transmission of noxious impulses in the dorsal horn, and at different levels of the neuraxis.

The psychological influences on pain include:
1. Early experience, perceptual factors, personality, and ethnic and cultural patterns.
2. Anxiety, a very powerful factor in pain tolerance. High anxiety results in low pain tolerance.
3. Selective attention, or orientation of the receptor system to one source of stimulation at the exclusion of others. This can be seen in the athlete who sustains an injury during the game and is unaware of it until the game is over.
4. Motivation, possibly the strongest factor of all. Motivation may be so strong that an injury may be sustained and no pain felt. This probably is due to inhibition of the transmission of pain impulses from the dorsal horn. This inhibition may not be sufficient to block reflex action but is sufficient enough to suppress overt pain behavior.

Hypnosis is a part of daily behavior dynamics. Activity of an inhibited network of neuronal synapses, to produce altered states of awareness, can be modified by experience through learning. The capacity to enter hypnosis is already built into the organism and is merely elicited on the basis of altering the subject’s perceptions and interpretations of himself and his surroundings.

During hypnosis, the central nervous system is immobilized because the reticular activity system has been deprived of data requisite to the normal direction of psychic activity and response. Certain signals are selected for focused arousal and amplification to the exclusion of irrelevant ones, demonstrated in a study by Amadeo and Yanorski (1975).

Signs and stages of hypnosis
There are planes and stages of hypnosis which have characteristic signs. A person usually does not stay in one stage all the time, he will fluctuate. This is called the tide theory.

In the light plane of hypnosis there are two stages. Stage one is when rapport is established, and there is a release of body tension accompanied by flutter of the eyelids. Stage two is selective muscle relaxation. The patient reports a heavy or floating feeling, warm, tingling sensation, and complete

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cooperation and deep concentration is achieved. Twenty-five per cent of the populace will not go deeper than the light plane of hypnosis the first time. The patient will remember everything that occurs during the hypnotic session.

The medium plane has two stages. Stage three is complete body relaxation, physical and mental. Olfactory and taste changes and aphasia can be demonstrated. Stage four is partial amnesia. Analgesia is achieved along with automatic movements. Sixty per cent of the populace will reach this plane.

In deep-plane hypnosis, stage five is total amnesia with positive hallucinations. Stage six is total anesthesia with somnambulism. Ten to 15% of the populace will reach this plane.

Anesthesia can be obtained in any plane with the help of suggestions, but it is automatic in stage six.1

Clinical uses of hypnosis

Kroger states, “There is almost no surgical procedure that cannot be done under hypnoanesthesia.” Approximately one in five persons can achieve a deep hypnotic state, sufficient for major surgery. With the careful selection of patients and improved techniques, more could achieve this state. In the mid-19th Century, several thousand operations were done under hypnosis. In 1960, there were an estimated six to seven thousand physicians and an equal number of dentists using hypnosis in the clinical area.1

Hypnosis has been accepted as a valuable therapeutic adjunct to potentiate chemoanesthesia. This is useful when pure hypnosis is not applicable. Pain is of two types, physical and emotional. Chemoanalgesia blocks only the physical pain whereas hypnosis can block emotional as well as physical pain. Hence, chemo- and hypno-anesthesia work well together.6

Anesthesia is the complete lack of awareness of pain. Electromyographic studies show that under hypnosis, pain is present in the tissues but there is no awareness of it. Since physiologic reactions to pain such as increased heart rate, respiration, and galvanic skin reflexes are diminished, hypnoanesthesia is apparently genuine. There is a positive relationship between the depth of hypnosis and the degree of induced anesthesia.

Marmer reports a case of a 42-year-old female who had a mitral commissurotomy. After receiving hexylcaine HCl topically for intubation and succinylcholine for muscular relaxation, she required no drugs intra- or post-operatively. She had total operative amnesia. Marmer concluded that reassurance induced by hypnosis allays fears, anxiety, and tension more effectively than tranquilizing drugs. He also recommends the use of hypnoanesthesia for the patient undergoing cardiac surgery.

Hypnoanesthesia used alone offers the greatest advantage and safety to the heart patient. However, the somnambulistic level must be reached for this to be successful. The cords are sprayed with a topical anesthetic for intubation and insertion of the airway. Succinylcholine may be used for muscular relaxation. At the end of the operation, the patient can remove his own endotracheal tube, and the anesthetist knows the patient is awake with good muscle control.10

Pain and anxiety are interrelated. With hypnosis, the pain threshold can be raised by 50%. Hypnosis and minimal chemoanesthesia will result in decreased cardiac and respiratory depression.10 Stress, anxiety, and fear all produce changes in the cardiovascular and respiratory function. Under stress, the heart does not function normally, and this is true even more so under emotional stress. Atrial fibrillation and ventricular tachycardia may be induced by stress. These factors are especially important in the patient with cardiac disease. If general anesthesia is used, it has to be in light levels, using less toxic agents. Thus, hypnoanesthesia is a good alternative. Preoperative fear is reduced, the need for premedication is lessened, the patient is cooperative, and postanesthesia recovery is hastened.

Kelsey and Barron describe a patient whose foot was to be repaired with a pedicle graft from his abdomen, transported via his left forearm. Under hypnosis, his left arm was fixed in rigid catalepsy against his abdomen and, with post-hypnotic suggestion, remained there until “unlocked” by a hypnotic suggestion three weeks later at the next operation. From the moment of release, he had complete movement of elbow and shoulder joints without pain or stiffness.

Lowenstein (1978) reports of two successful cases conducted under hypnosis. One was an 11-year-old boy and the other was a six-year-old boy who had postoperative suture adjustments after strabismus surgery. This procedure requires a cooperative patient, analgesia, facial relaxation, and immobility of extraocular muscles. The patient must be alert and free of sedation. Hypnoanesthesia can be the answer. A retrobulbar block may be used to supplement this. If this trance is disrupted during the case, you only need to stop momentarily to deepen the patient. Individualization is the key to successful hypnosis.

Crasilneck (1956) reports a case where a 14-year-old female with epilepsy required a temporal lobectomy for control of seizures. This was done...
with hypnoanesthesia. She experienced mild pain when the dura was separated from the bone. This was a nine-hour procedure and a local anesthetic was added only twice. She also complained of pain and suddenly awoke from the hypnotic trance when a blood vessel in the hippocappal region was cauterized. She was immediately rehypnotized and had amnesia postoperatively.

Crasilneck admits that his patients are carefully selected for hypnosis, and he stresses the importance of a careful psychiatric evaluation prior to hypnosis.8

Nayyar (1962) reports a case of a 38-year-old male with an old gunshot wound to the right frontal area that resulted in the hemiplegia and grand mal seizures. General anesthesia was contraindicated because of needed electrocortical graphic monitoring of the debridement and topectomy. The patient was given a hypnotic suggestion for restful sleep the night before surgery and for relaxation to begin with the intravenous administration, which was accomplished without pain. The procedure lasted 4½ hours and hypnoanesthesia was supplemented with local anesthetic and Demerol, resulting in a good operative and postoperative course.12

Hypnosis can also be used for the following: obstetrics cases in both labor and delivery, burn debridement, treatment of all kinds of pain, psychological disorders, elimination of premedication and facilitation of a smooth, quick postoperative period. The use of hypnosis in obstetrics has decreased fetal and maternal morbidity and mortality. Schafner notes that the use of hypnosis in a burn unit is multifold, with pain-free dressing changes being most beneficial.10 In medicine, hypnosis can be used to treat disorders that might benefit from changes in digestion, heart rate, respiratory rate, blood pressure, peristalsis, perspiration, gastric secretions, skin temperature, and menstrual cycle.20

Disadvantages of hypnosis

Hypnoanesthesia is unpredictable with various depths of anesthesia and muscle relaxation. A good rapport and interpersonal relationship needs to be formed to have a receptive subject and a successful hypnotic session. This takes time that may not always be available. Successful use of hypnoanesthesia also requires at least one, if not several, preoperative sessions requiring additional time and personnel. Increased costs can result.

All personnel who will be in contact with the patient need to understand hypnosis and know how to help facilitate a successful trance. Hypnoanesthesia can be used on only 10% of the population. Twenty per cent of the adult population can be hypnotized if carefully selected and trained.

Certain religious or personal beliefs of the patient may prohibit him from accepting hypnotic suggestion. For example, the patient who feels that pain in childbirth is necessary would have guilt feelings if no pain was felt. This patient would not allow the pain to be removed.

Also, if the therapist tries too hard or is irritating to the patient, the hypnosis will fail. The hypnotist must know the patient and the patient's level of understanding. In the case of psychogenic pain, the patient may need to retain his symptoms for a particular reason and will not part with them.14,15

Subject choice

Suppose you have the time to use hypnosis. Who would be a good subject? A good choice is the young, intelligent person with an amenable personality who is able to focus attention on a defined subject matter and disregard distracting stimuli.20 A person who sleepwalks or talks in his sleep is also an excellent subject and very easily hypnotized. These people develop spontaneous analgesia and anesthesia, dissociation, and deper-sonalization. Hypnotically-induced suggestions become the convictions of the somnambulist or sleep-walker.6

Those who are not easily hypnotized are the very young and mentally retarded because their attention spans are so short. An older child on the other hand is very easily hypnotized due to a very active imagination. Hypnosis should not be used if the patient suffers from psychoneurotic reactions or antisocial behavior.

Stages

There are four stages in a hypnotic session. Induction is the first; this is the method used to put the patient into relaxation. The second is deepening and maintenance of the relaxation. The third is utilization, whereby the hypnotic suggestion is given. Termination is the fourth stage and ends the hypnotic session.

Ethical and legal aspects

The welfare of the patient must always be the first consideration. Hypnosis should be used within the limits of training and competency of the hypnotist. The patient's rights, confidences, and desires must be respected. The laws of the community and/or state in which you practice must govern. Hypnosis should not be used for entertainment or
self-exaltation, nor should false or exaggerated claims be made regarding hypnosis.

The patient's permission, as well as that of the surgeon, must be obtained before hypnosis can be used. The patient should be assured that he can have a chemical anesthetic at any time. If hypnosis is used as an adjunct to chemoanesthesia, permission is not necessary, since we basically use this "conscious state hypnosis" every day.11

A leading medical malpractice insurance company in Los Angeles claims, "As far as we can determine, there has not been a physician in California sued for hypnosis, and as far as we are aware, there has only been one physician other than a psychiatrist sued for hypnosis in the United States."8

Summary

Although it is not clearly understood exactly how hypnoanesthesia works, it has proven effective in properly selected and trained patients. The major reason that hypnoanesthesia is not used more widely now is because it requires more time than other methods, ultimately costs more, is not totally predictable, and cannot be used on every patient. There are situations, however, when hypnoanesthesia would be the method of choice even in view of these disadvantages.

The major uses of hypnoanesthesia and analgesia include minor surgery, as a replacement for pre-medications, to provide relief of postoperative discomfort and complications, for pain relief and muscle relaxation.

REFERENCES


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