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# Successful Use of Hypnosis as an Adjunctive Therapy for Weaning from Mechanical Ventilation

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HYPNOTIC techniques have been used in medical practice in different situations, mainly for pain control and anxiety relief[1–6] and to reduce stress symptoms such as tachycardia or shivering.[7] In burn victims, Crasilneck *et al.* showed that hypnosis could stimulate emotional recovery, mobility, and wound healing.[8] Hypnosis could also reduce by one third the incidence of postoperative nausea and vomiting in women undergoing breast surgery.[9]

In the case we report, hypnotic psychotherapy resulted in hastened weaning from mechanical ventilation as well as to reestablishment the day–night sleep cycle.

## Case Report

We report the case of a 46-yr-old man with a history of pulmonary tuberculosis, ischemic heart disease, gout, psoriasis, heavy smoking, and previous alcohol abuse who underwent right pneumonectomy for invasive aspergillosis. The postoperative clinical course was complicated by the development of a right bronchopleural fistulae and empyema. Associated comorbidities included left vocal cord paresis, muscle weakness caused by neuromyopathy of the critically ill, recurrence of gout arthritis with polyarthralgia, and eventually psoriasis.

Postoperative weaning from mechanical ventilation was extremely difficult because unresolving bronchopleural fistula caused multiple septic episodes, and repeated surgical procedures were necessary to seal the leak. Definitive closure was obtained 28 days postoperatively, but pleural infection resolved 48 days postoperatively. On the 77th postoperative day, a tracheotomy was performed. Ventilatory mode consisted in a 25-cm $H_2O$ pressure support with a fraction of inspired oxygen of 0.3. The weaning protocol consisted in progressive reduction, in 2-cm $H_2O$ steps, of the pressure support. Pressure support ventilation was also intermittently replaced by periods of 2- to 5-cm $H_2O$ continuous positive airway pressure. The patient was maintained on continuous positive airway pressure as long as the respiratory rate remained $< 40$ breaths/min while keeping arterial *p*H above 7.30. The patient regularly received respiratory and physical therapies, passive and around-the-bed mobilization.

At this stage, the patient demonstrated major sleep disturbances with day–night cycle rhythm loss, an extreme anxiety, and apprehension secondary to multiple life-threatening episodes (cardiac arrest, aspiration) that occurred during periods of awareness, and he developed a feeling of vulnerability, with a permanent fear of impending death. Minor episodes of decreasing oxygen saturation during chest therapy, tracheal aspiration, or physical therapy exacerbated his previous fearful experiences. Although chest radiograph was unchanged, gas exchange and lung mechanics were stable over the ventilatory weaning period (mean arterial oxygen partial pressure/fraction of inspired oxygen ratio was $308 \pm 30$ mmHg, minute ventilation $7.7 \pm 1$ l/min, and the relationship between arterial carbon dioxide partial pressure and minute ventilation [an index of mechanical ventilation requirement] was $7.2 \pm 1.35$ mmHg $\cdot$ $l^{-1}$ $\cdot$ $min^{-1}$; fig. 1), and concomitant drug administration was unchanged, including low doses of haloperidol, thioridazine, and midazolam since the 43 postoperative day; he was unable to tolerate more than approximately 12 h without mechanical ventilation. Postoperative enteral nutrition was provided early and was well tolerated. Eighty-

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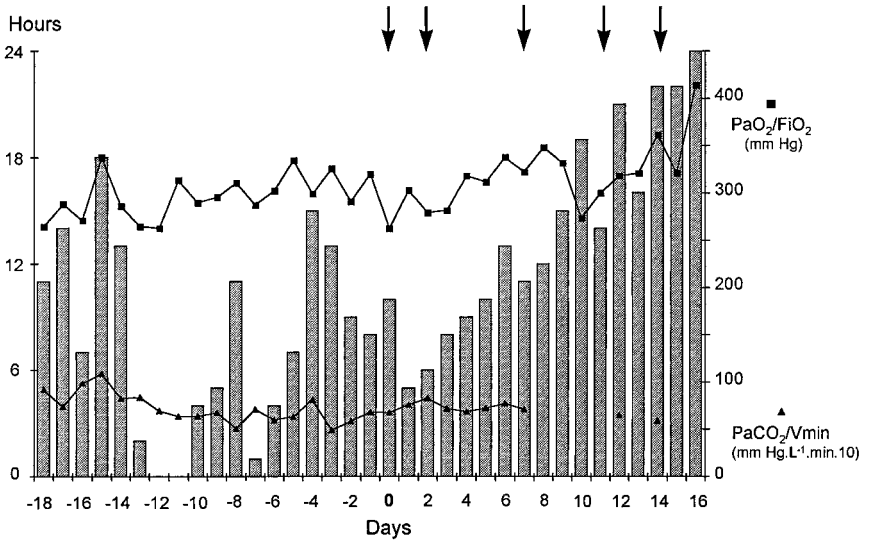


**Fig. 1. Histogram showing the daily time in hours (bars) spent without mechanical ventilation on continuous positive airway pressure. Day 0 designates the first session of hypnosis; arrows = the hypnotic sessions; squares = daily mean arterial oxygen partial pressure/fraction of inspired oxygen ratio (right ordinate axis; mmHg); triangles = indicated daily mean arterial carbon dioxide partial pressure per minute ventilation ratio (right ordinate axis; mmHg · $l^{-1}$ · $min^{-1}$ · 10).**

eight days after pneumonectomy, a decision was made to start hypnotic psychotherapy.

Induction of hypnosis by one of the authors (M. T. V.) was obtained with the point fixation technique and concentration on hand sensations, accompanied by suggestions of muscle relaxation and heaviness. Trance was deepened by counting the breathing rate, but the therapist count was pronounced at a slower rate than the actual respiratory rate to make the patient to breath at a lower frequency. During this period, the patient was able to reduce his breathing rate and adapt to the therapist's count. Suggestions were oriented to focus attention on goal-directed imaging and to enhance the patient's expectation. Repetitive verbal stimulation with suggestions of relaxation, tiredness, and sleepiness were given during the induction phase. Once hypnotic trance deepened, psychotherapy included a behavioral aspect directed toward relearning to breathe and a cognitive aspect suggesting that relaxation favored his breathing. Self reinforcement was provided during each session, using metaphors such as the image of a strong tree.

Hypnotic imagery and posthypnotic suggestions were accompanied by significant anxiety relief, with the patient remaining asleep at the end of the session and maintaining spontaneous ventilation with ease. A weekly plan of care was formulated, of which the patient was informed, with an objective set and renewed in a step-by-step manner (*i.e.*, increasing the daily time on continuous positive airway pressure up to 24 h; twice-a-day mobilization around the bed and daily in-bed physical therapy). As shown in figure 1, time spent on continuous positive airway pressure without pressure support steadily increased. Hypnotic trance was regularly repeated, and an extra session was given if signs of improvement faded or if the patient asked for it. Time spent for induction was greatly shortened, from 20 to 10 min, after the third hypnotic session using posthypnotic suggestions and learning techniques. After the fifth session, the patient was trained to practice self-hypnosis, and his cooperation dramatically improved. In addition, with certain stimulus cues, he could evoke feelings of well-being and of increased comfort, as experienced during the hypnotic session.

## Discussion

The use of hypnosis for anxiety control has shown a dramatic improvement of the self perception of physical state and substantial facilitation in providing care. In the case we report, that hypnosis substantially reduced the anxiety state produced by the belief that breathing was a conscious effort and the fear of disconnection from the ventilator. We used a cognitive behavioral technique associated with self-reinforcement suggestions to modulate the patient's experience of previous distresses. Use of positive hypnotic suggestions helped to direct the patient's expectations and his ultimate behavior. We are not able to exclude that a time-related improvement did not play a role in the weaning process; however, as demonstrated in figure 1, there seems to be a clear acceleration and stabilization of the process when hypnosis was conducted.

This seems to be a safe technique that may represent an auxiliary tool to aid in an otherwise long and difficult weaning from mechanical ventilation. The potential advantages are not offset by any risk or side effect. In addition, this technique is a substitute for other medication therapy and improves the patients appreciation of their own condition. In patients suffering from chronic respiratory disease, Dales *et al.* found a strong association between respiratory symptoms and psychological indicators of anxiety, depression, anger, and cognitive disturbances.[10] In particular, these authors described

discrepancies between subjective and objective respiratory health indicators in relation to psychological status.

With repeated sessions, induction time was greatly shortened, and it was possible to train for induction of self-hypnosis. A further advantage of the therapy was that it facilitated the nurse team–patient relationship with improved comfort in care delivery. A limitation of this therapy is that the patient's cooperation is an indispensable requirement.

Although hypnotic effects are intriguing, the reason why hypnosis did not enter into common practice is that clinicians are unfamiliar with this technique, and research in this field is unlikely to generate large-scale trials. Thus, the clinical literature in the context of acute illness or pain management remains largely anecdotal. However, current investigations indicate that hypnotic analgesia is not simply relaxation, cognitive coping, or placebo.[5] In addition to inhibition of excitatory neural impulses in the brain, hypnosis may also result in peripheral nervous system inhibition. The galvanic skin response may be decreased to new stimuli, as well as emotional, conditioned, and painful stimuli.[5] Sympathetic nervous activity is reduced during hypnosis. A theory of central nervous system inhibitory mechanisms related to hypnosis and hypnoanalgesia has also been proposed. It is possible that in the case we report, application of hypnosis influenced the breathing pattern because of an effect on breathing control at the level of upper and vegetative centers.

We conclude that hypnosis may be a useful tool for difficult and long weaning from mechanical ventilation, especially when subjective patient distress restrains the overall critical care management.

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