Original research article

The use of hypnosis to improve pain management during voluntary interruption of pregnancy: an open randomized preliminary study

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Abstract

Objective: This report describes an open randomized study that aims to determine whether a brief hypnotic intervention during first-trimester surgical abortion reduces requests for pain medication.

Methods: Thirty women undergoing first-trimester surgical abortion at the family planning clinics of a large hospital in Quebec City were randomized into a control group that received standard care and a hypnosis group that received, in addition to standard care, an intervention of hypnosis, including analgesia suggestions 20 min before and throughout the surgical procedure. Patients in both groups were given the option to control their pain with nitrous oxide (N\textsubscript{2}O) sedation administered through a nose mask as often and for as long as they wanted during the procedure. N\textsubscript{2}O sedation as the primary outcome was assessed at each step of the procedure. The patient’s self-reported anxiety and pain were also assessed during the procedure as secondary outcomes.

Results: Thirty-six percent of patients in the hypnosis group requested N\textsubscript{2}O sedation during the procedure versus 87% in the control group ($p < .01$). No differences between the groups were found in reports of pain and anxiety during the procedure.

Conclusion: These results suggest that hypnosis can be integrated into standard care and reduces the need for N\textsubscript{2}O in patients undergoing first-trimester surgical abortion. This reduction in N\textsubscript{2}O consumption did not lead to significant changes in pain or anxiety, and a larger sample size is required to assess the possible effects of hypnosis on those variables.

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Keywords: Abortion; Pain; Hypnosis; Medication use; Randomized clinical trial

1. Introduction

Approximately 100,000 abortions are performed every year in Canada, and 30% of women who undergo first-trimester abortion are between 20 and 24 years old [1].

Abortion is a short surgical procedure that can cause anxiety and pain [2–8]. During abortion, management of pain has to be weighed against the length of the surgical procedure. Furthermore, paracervical block is known to partially relieve pain during abortion, but 97% of women still experience pain [6,9]. The benefit of the administration of preoperative medication such as naproxen is not convincingly documented [10]. The use of conscious sedation to control pain also seems inconclusive as many women still experience pain during the procedure [6,11–13]. Finally, nitrous oxide (N\textsubscript{2}O) (mixed with oxygen) has been used as an analgesic either alone or in combination with other anesthetics [14,15]. In addition to pain, anxiety and fear of
pain increase the patient’s discomfort during the surgical procedure. Several studies suggest a relationship between anxiety before the surgical intervention and pain intensity during abortion [11,13,16].

Behavioral approaches to controlling pain and anxiety during abortion have not been studied thoroughly. During procedures under conscious sedation, hypnotic analgesia may provide an advantageous way of reducing the use of medication, while possibly contributing to the reduction of pain and anxiety [17–25]. Hypnosis is described as an “attentive, receptive, focal concentration state” in which heightened receptivity for suggestions is developed by the patient [26,27]. The hypnosis state is a “normal activity of a normal mind” and can occur naturally. Hypnosis is self-directed, but the presence of the hypnotist may create the experimental context that activates the patient’s own activity. During hypnosis, direct or indirect suggestions to decrease pain can be introduced. Suggestions directed to decrease pain have been shown to be effective in several experimental studies using measures of peripheral autonomic activity, spinal motor reflex or brain activity. These studies have shown a significant attenuation of pain-related physiological responses in response to hypnotic analgesia [28–30]. Although there is now considerable physiological evidence in support of the use of hypnosis to reduce pain, the scope and efficacy of hypnotic analgesia in various clinical settings have yet to be established.

The main objectives of this study were: (1) to determine whether a brief treatment of hypnosis, in comparison with standard care, could be effective in reducing requests for pain medication during the surgical procedure for the interruption of pregnancy; and (2) to determine the feasibility of such an intervention in this clinical context at the family planning clinic.

2. Materials and methods

2.1. Subjects

Patients were recruited for a period of 1 month (August 19, 2003, to September 17, 2003) at the local family planning clinics of Hôpital Saint-François d’Assise (CHUQ), Université Laval (Quebec City, Canada). The Clinical Research Ethics Board at Hôpital Saint-François d’Assise approved the protocol, and all participants provided verbal and written consent for participation in the study. Women (≥18 years of age) undergoing elective first-trimester abortion (6 weeks ≤ gestational age <14 weeks) who had consented to surgical abortion were considered for inclusion in the study. Excluded from the study were as follows: (1) non-French speakers; (2) patients referred from a hospital outside Quebec City; (3) patients whose medical condition required preplanned intravenous sedation (e.g., fentanyl); (4) daily users of any illegal drug, as noted in the patient chart during clinical visit interview with planning staff or as reported by the patient on the day of the surgical procedure before the purpose of the study was explained; and (5) patients with a psychiatric condition and those taking antidepressant therapy.

2.2. Surgical procedure

The surgical procedure was similar to the ones outlined in clinical policy guidelines [31]. Following a brief preoperative discussion with one of four physicians performing the abortion, a manual pelvic examination was performed. The surgeon then inserted a sterile vaginal speculum (Step 1) and injected 1–2 mL of 0.5% lidocaine on the cervix at 12 o’clock and an additional 5 mL each at 4 and 8 o’clock at 1–2 cm depth, for a total volume of 12 mL of lidocaine. Dilators were used to dilate the cervix sufficiently (Step 2, maximal dilatation) to admit a rigid vacuum cannula of 8–12 mm, depending on gestational age. Uterine content was evacuated with suction (Step 3) using a uterine aspirator at maximum vacuum. Suction was followed by sharp curettage (Step 4) to confirm that the uterus was empty. If necessary, reaspiration of uterine content was performed. The patient recovered for a few minutes on the surgical table and then walked to the recovery room. Most of the patients were discharged within 1–2 h after the end of the procedure.

To help with cervical dilatation, intracervical laminaria tents were placed 4–12 h prior to the surgical procedure. Indications for the use of laminaria tents include the following: pregnancy of ≥9 weeks, stenosis or surgical history of the cervix, age of <20 years, gravidity of ≥5. If so, the laminaria tent was removed just before the surgical procedure [32].

2.3. N₂O sedation

The treatment complied with the standard use of N₂O sedation. A mixture of N₂O (50%) and oxygen (50%) was administered to the patient through a nose mask. The mask was ready for use, and the patient was free to ask for N₂O sedation at any time and for as long as she wanted during the procedure. In both groups, the patient was encouraged to request N₂O freely to achieve maximum reduction in pain or discomfort. If the N₂O was requested, the patient was immediately given the mask, and the physicians waited about 2 min after the first inhalation before resuming the surgical procedure. A few deep inhalations of the gas in the mask quickly produced a feeling of numbness and anesthesia.

2.4. Prerandomization period

Patients were asked to participate in a randomized study when they arrived at the clinic for their elective abortion. It was briefly explained that the purpose of the study was to determine whether hypnosis could be useful during the procedure for reducing anxiety and pain. We assured all patients that, regardless of their randomization group, they would have access to N₂O sedation on request during the procedure. It was emphasized that the patients would be able
to request and obtain this medication at any time during the procedure. The family planning nurse then initiated standard care: emotional support, counseling, preoperative oral analgesic agent (naproxen, 100 mg) and anxiolytic agent (lorazepam, 1 mg) before the randomization.

2.5. Randomization and blinding

Thirty minutes before the procedure, the women were randomized into the hypnosis group or the standard-care group using a computer-generated list of random numbers in blocks of six and four. A research assistant not involved in clinical care prepared sealed opaque envelopes with entries of hypnosis or standard care. In terms of its design, this was an open randomized pilot study.

2.6. Hypnosis group

After randomization and for the 20 min leading up to the procedure, patients in the hypnosis group met with the hypnosis provider. First, misconceptions about hypnosis were cleared to facilitate a positive attitude. The practitioner then induced hypnosis by reading from a script prepared for this purpose. Physical and mental relaxations were initiated. Suggestions to transfer the numbness to the abdominal area or suggestions for imagery were introduced, including feelings of a warm or a cold wave of light spreading in the body and relaxation in a safe and pleasant place that they particularly liked. Direct suggestions to decrease pain intensity (like a rheostat) and unpleasantness (feeling more comfortable) during the surgical procedure were also introduced. Suggestion was made that the participant would be able to ask for anything that would increase her comfort during the surgical procedure. The patient was then asked to walk to the surgery room. Once she was positioned supine on the surgical table, the hypnotist practitioner suggested that she go back deeper into hypnosis. The patient was told again that she could ask for anything that would increase her comfort at any time during the procedure. At the end of the surgical procedure (removal of the speculum), the patient received suggestions to end hypnosis and become alert.

2.7. Standard-care group

After randomization, patients in the standard-care group waited for 20 min before the procedure, usually in the company of a relative or a friend. The family planning nurse was available to provide attention to the patient during those 20 min. Then the patient entered the operating room with the nurse and lay supine on a gynecological table (see Section 2.2). As the abortion was performed by the physician, the family planning nurse provided attention and support to the patient, talking and listening to her, and giving positive encouragement, reassurance and instructions for relaxation (abdominal and pelvic area) and deep breathing. There were no instructions for imagery and no suggestions directed at decreasing pain or anxiety. The practitioner who performed the hypnosis in the experimental group was also present in the room but limited interactions with the patient to assessments of pain and anxiety during the procedure.

2.8. Measures

2.8.1. Initial assessment on arrival

2.8.1.1. Self-reported anxiety and pain. Patient self-reported anxiety and pain were assessed before randomization. In both the hypnosis group and the control group, the practitioner asked the patient to rate her anxiety and pain on an 11-point verbal numerical scale. Anxiety levels were assessed on scales from 0 to 10 (0 = not anxious at all; 10 = the most anxious that you can be). Components of pain (intensity and unpleasantness) were rated on separate scales from 0 to 10 (0 = no pain/not unpleasant at all; 10 = the most intense pain/unpleasantness possible). These verbal scales have been validated for pain and anxiety [33–35].

Fig. 1. Flow chart: patient recruitment.
2.8.1.2. Other measurements. Furthermore, before randomization, expected pain intensity and unpleasantness were assessed. Anxiety was also self-assessed using the 12-item version of the Spielberger State–Trait Anxiety Inventory (S-STAI), a self-completed survey that asks patients to rate how they currently feel (calm, anxious, worried, content, etc.) on a 4-point ordinal scale (1 = not all; 4 = very much so) [36,37]. The Beck Depression Inventory (BDI) [38] was used to assess depression. The Pain Catastrophizing Scale (PCS) [39] and the Positive and Negative Affective Scale (PANAS) [40] were used to assess emotions previously shown to affect pain.

2.8.2. During the surgical procedure

2.8.2.1. Assessment of N₂O sedation as the primary outcome. N₂O sedation during abortion was assessed as a dichotomous variable (requested or not requested by the patient) at four steps of the surgical procedure: insertion of speculum, maximum dilation, suction and end of the first curettage abortion.

2.8.2.2. Assessment of pain and anxiety. Patient self-reported anxiety and pain (intensity and unpleasantness) were assessed using the same 11-point verbal scales described above at each of the four steps of the procedure.

2.8.3. During recovery

Once again, patient self-reported anxiety and components of pain (intensity and unpleasantness) were assessed using the same scales described above. Patients were also asked to report their level of comfort and feeling of being in control on a scale from 0 = no comfort/feeling of being in control to 10 = maximum comfort/feeling of being in control. Additional questionnaires were administered to obtain demographic information (maternal age, gestational age, parity and previous history of abortion). The physician who performed the abortion also completed a questionnaire describing oral medication administered before or after the abortion and the presurgical use of a laminaria tent to facilitate cervical dilation. His appraisal of the overall success of the procedure was assessed with a short series of questions regarding surgical difficulties on a 10-point scale (1 = worse; 2 = best). The duration of the procedure

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Table 1

<table>
<thead>
<tr>
<th>Participant characteristics at baseline</th>
<th>Hypnosis group (n=14)</th>
<th>Control group (n=15)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years) (mean±SD)</td>
<td>27.0±7.2</td>
<td>25.6±4.9</td>
</tr>
<tr>
<td>BMI (mean±SD)</td>
<td>23.5±5.6</td>
<td>21.4±2.8</td>
</tr>
<tr>
<td>Schooling &gt;13 years [%]</td>
<td>8 (57)</td>
<td>6 (40)</td>
</tr>
<tr>
<td>Low socioeconomic status [%]</td>
<td>3 (21)</td>
<td>4 (27)</td>
</tr>
<tr>
<td>Social support [%]</td>
<td>13 (93)</td>
<td>14 (93)</td>
</tr>
<tr>
<td>Occasional drug use [%]</td>
<td>1 (7)</td>
<td>7 (47)</td>
</tr>
<tr>
<td>Premedication with NSAI [%]</td>
<td>14 (100)</td>
<td>15 (100)</td>
</tr>
<tr>
<td>Premedication with lorazepam [%]</td>
<td>14 (100)</td>
<td>14 (93)</td>
</tr>
<tr>
<td>Gestational age (weeks) (mean±SD)</td>
<td>8.4±2.2</td>
<td>8.0±1.8</td>
</tr>
<tr>
<td>First pregnancy [%]</td>
<td>5 (36)</td>
<td>8 (53)</td>
</tr>
<tr>
<td>Experience of childbirth [%]</td>
<td>6 (43)</td>
<td>4 (27)</td>
</tr>
<tr>
<td>Experience of abortion [%]</td>
<td>8 (57)</td>
<td>5 (33)</td>
</tr>
<tr>
<td>Use of laminaria tent [%]</td>
<td>6 (43)</td>
<td>5 (33)</td>
</tr>
<tr>
<td>BDIa (mean±SD)</td>
<td>0.6±0.3</td>
<td>0.5±0.3</td>
</tr>
<tr>
<td>PCSb (mean±SD)</td>
<td>1±0.7</td>
<td>1.2±0.8</td>
</tr>
<tr>
<td>PANASC (mean±SD)</td>
<td>3.2±0.5</td>
<td>3.1±0.5</td>
</tr>
<tr>
<td>Expected pain intensity (0–10) (mean±SD)</td>
<td>2.6±0.5</td>
<td>2.8±0.5</td>
</tr>
<tr>
<td>Expected pain unpleasantness (0–10) (mean±SD)</td>
<td>6.3±1.5</td>
<td>5.9±2.9</td>
</tr>
</tbody>
</table>

* For depression.

b For emotion.

c For emotion.

d For anxiety.

p < .05.
was calculated from the total time spent by women in the surgical room.

2.9. Statistical analysis

All statistical analyses were carried out using SAS Version 8. The Wilcoxon test was used to compare the self-ratings of pain and anxiety in the control group and the hypnosis group. Fisher’s Exact Test was used to compare the percentages of patients in both groups who requested N₂O at any time during the procedure.

3. Results

Over the 1-month study period, 88 patients underwent surgical abortion at the family planning clinics of Hôpital Saint-François d’Assise; 47 patients met the inclusion criteria. A flow chart describes the study population (Fig. 1). Analyses were performed on 15 patients in the control group and on 14 patients in the hypnosis group. One patient in the hypnosis group was excluded after randomization because she had previously decided with her physician to use intravenous sedation, although this had not been recorded in her chart. Abortion was performed by four different physicians. Two of them performed most of the abortions but equally in the two groups.

The characteristics of both groups are summarized in Table 1. Illegal drugs were used more frequently in the control group (7 vs. 1 in the hypnosis group, p < .05) but still only occasionally (mean of 11 times per month), since daily drug users had been excluded from the study. Assessed on a scale (0–10) just before randomization, baseline pain intensity, pain unpleasantness and anxiety were identical in both groups (Table 1; Fig. 2).

Only 36% (95% confidence interval = 16–61) of the patients (5 of 14) in the hypnosis group requested N₂O at any point during the procedure versus 87% (95% confidence interval = 61–97) of the patients (13 of 15) in the control group (p < .01) (Table 2). In statistical analyses, confounding by this variable did not seem to be a major problem since, among patients who did not consume illegal drugs, requests for N₂O were also higher in the control group (75%; 6 of 8) than in the hypnotic intervention group (38%; 5 of 13). No differences were found between the groups in their experiences of pain and anxiety during the procedure (Fig. 1).

The procedure time was comparable in both groups (16.3 ± 3.8 min in the hypnosis group vs. 18.0 ± 6.2 in the control group). In two cases, there were short interruptions in the abortion procedure due to: (1) panic attack in one patient during inhalation of N₂O through the mask; and (2) one patient with a vasovagal reaction. These two events occurred in the control group.

The patients who underwent hypnosis did not report a higher level of comfort (6.3 ± 2.6 vs. 6.6 ± 3) or a stronger feeling of being in control (6.4 ± 2.1 vs. 6.8 ± 2.3) during the procedure, compared to the control group. The physicians assessed the level of anxiety of their patients upon their arrival in the surgical room as lower in the hypnosis group than in the control group (1.4 ± 1.7 vs. 3.4 ± 3.1, respectively; p < .05). In both groups, the physicians assessed the surgical conditions as excellent.

4. Discussion

These results suggest that hypnotic intervention can reduce the request for N₂O in patients undergoing first-trimester surgical abortion. This reduction in N₂O utilization was not accompanied by an increase in pain or distress in the hypnosis group, but this is a preliminary study and it could be explained by a lack of power. Inhalation of 50% N₂O (mixed with oxygen) is widely used to provide pain relief during labor [41–43]. In many conditions, at a concentration of 20–50%, N₂O produces mild analgesia and relieves fear and apprehension [44,45].

Nonpharmacological approaches such as hypnotic analgesia have been used successfully to reduce pain and anxiety during medical and surgical procedures under conscious sedation [18–25,46]. This approach can be used alone or in conjunction with other more conventional treatments for acute pain and anxiety, with the advantage that it may reduce the need for medication. Less medication means better recovery, fewer side effects and earlier discharge from the hospital [18–20,47,48]. As shown by several clinical and experimental studies, the peripheral and cerebral cortical activities involved in pain experience can be modified by hypnotic suggestions of analgesia [29,49–55]. Hypnosis during surgical procedures has been used successfully in the treatment of acute pain. In a randomized clinical trial, Lang et al. [19] suggested that self-hypnotic relaxation could be beneficial for decreasing pain and anxiety and for improving hemodynamic stability during invasive radiological procedures when compared to structured attention and placebo.

In facial and neck surgery, hypnosis could reduce discom- fort and the need for intravenous conscious sedation during intervention [20,21]. A few studies in obstetrics and gynecology have assessed the effects of hypnosis in a variety of clinical situations in which women experience acute pain, such as breast biopsy [24,56], childbirth [57–60], cephalic conversion [61] and pelvic examination [62,63]. Pain management during abortion remains a challenge because of the poor efficacy of the drugs that are available for short elective surgical procedures, compared to the adverse effects and expectations of patients. Short interventions of hypnosis before gynecological surgery, including

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Number of patients using N₂O at least once at any step of the surgical procedure [n (%)]</th>
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<tbody>
<tr>
<td>Hypnosis group (n = 14)</td>
<td>Control group (n = 15)</td>
</tr>
<tr>
<td>Use</td>
<td>5 (36)</td>
</tr>
<tr>
<td>No use</td>
<td>9 (64)</td>
</tr>
</tbody>
</table>

Fisher’s Exact Test (p = .008).
abortion, have been shown to be effective in decreasing preoperative anxiety, when compared to a simple discussion with the patient [48].

The most important limitation of our design is that it does not allow us to differentiate between the specific and the nonspecific effects of hypnosis. Changes in the request of medication by the women under hypnosis in this small study can be explained by: (a) a specific effect of hypnosis on the experience of pain, as suggested by physiologic responses in response to hypnotic analgesia [28]; and (b) a nonspecific effect associated with any treatment as expectancy (motivation). Although much attention was given to the control group, we cannot be sure that less consumption of N2O in the hypnosis group is due to the extra attention given to patients or due to the specific effect of hypnosis. As the patient is aware of the treatment she received, bias in the request for the drug in the hypnosis group could have been introduced by patients wanting to please the practitioner who performed the hypnosis (i.e., social demands) or by their expectancy about the hypnotic intervention effect on pain.

The lack of ethical and credible control conditions to hypnosis that cannot be administered in a double-blind fashion has been underlined in several studies [64].

A similar design has been used recently in a study by Butler et al. [17] using hypnosis with children to reduce the distress and duration of an invasive medical procedure. From a pragmatic viewpoint, the installation of a screen as a distraction and the presence of the practitioner who performed the hypnosis (i.e., social demands) or by their expectancy about the hypnotic intervention effect on pain.

Pain management during abortion remains a challenge [11,12]. Hypnotic analgesia could be useful in the clinical context of acute pain and anxiety during abortion. The high participation rate of the patients indicates that they are open to safe complementary medical therapies that have none of the risks or side effects of medication. The results of this pilot study strongly support further study of a larger randomized trial to confirm that hypnosis can reduce the need for pharmacological treatment during surgery and to further test potential effects on pain measures.

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