

# Moderate Conscious Sedation For In Vitro Fertilization Oocyte Retrieval Procedures In An Office Setting

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## Abstract

**Objective:** To determine whether moderate conscious sedation (using a benzodiazepine and opioid) provides adequate pain control during in vitro fertilization (IVF) oocyte retrieval, and if there is a difference in patient satisfaction using different opioids (Fentanyl versus Meperidine).

**Methods:** A post-oocyte retrieval questionnaire was administered to 312 consecutive patients undergoing IVF from 2001-03 at the University of Illinois Medical Center. From 2001-02, Midazolam and either Fentanyl or Meperidine was administered to 203 patients. In 2003, one physician administered Midazolam and Fentanyl to 71 patients (Group-A) and another physician administered Midazolam and Meperidine to 38 patients (Group-B). Chi-square test was used to compare results between the two groups.

**Results:** Of the 312 patients evaluated, 91.5% rated 'excellent' (65%) or 'good' (27%) pain prevention, and 91.4% rated 'excellent' (74 %) or 'good' (18%) expectation of pain relief. Furthermore, 97.5% rated 'excellent' (80%) or 'good' (17%) recovery from the sedation, and 98.5% rated the overall experience of conscious sedation as 'excellent' (81%) or 'good' (17%). Less than 3% of patients gave a 'poor' rating for any category. There was no statistically significant difference between Groups A and B for all of the questionnaire responses.

**Conclusion:** Moderate conscious sedation provides adequate pain control during IVF oocyte retrieval procedures. No significant differences in pain relief were found between Fentanyl and Meperidine.

## PRESENTED AT A MEETING

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## INTRODUCTION

Pain management is considered to be a fundamental aspect of in vitro fertilization (IVF) oocyte retrieval procedures that are performed transvaginally under ultrasound guidance. The pain during such procedures is the result of a needle passing through the posterior vagina, the peritoneum, and into the ovary. There is however, no well-accepted standard for providing pain control for such procedures. Various methods that have been employed include general anesthesia, regional (local) anesthesia, electro-acupuncture, or conscious sedation.

In a recent meta-analysis, the effects of various methods of pain control during oocyte retrieval were compared. The study concluded that no one method was superior, and no consensus was reached on which method was optimal for pain relief during oocyte retrieval (1).

According to the American Society of Anesthesiologists (ASA), moderate conscious sedation is a form of sedation/analgesia that is "a drug-induced depression of consciousness during which patients respond purposefully to verbal commands, either alone or accompanied by light tactile stimulation. No interventions are required to maintain a patent airway, and spontaneous ventilation is adequate (2). During moderate sedation, a physician supervises or personally administers sedative and/or analgesic medications that can safely and effectively allay anxiety and control pain

during a diagnostic or therapeutic procedure. The advantages of this form of pain control are that it is easy to administer, short acting, readily reversible, and well tolerated by patients. Furthermore, it can be administered in an office setting, and does not require highly specialized equipment or the need for an anesthesiologist. It does require continuous clinical monitoring of the patient including vital signs, state of consciousness, pain perception, and oxygenation via pulse oximetry (3). Such monitoring will continue post-procedure until stable and adequate function is restored. Dietary restrictions prior to the sedation include no clear liquids for six hours and no solid food for eight hours. As shown in Table 1, candidates for moderate sedation should be in good general medical health, have adequate ventilatory reserve, and not have significant medical problems (e.g., severe systemic disease, morbid obesity, sleep apnea, upper or lower structural airway abnormalities) (2).

**Figure 1**

Table 1: American Society of Anesthesiology (ASA) patient classification status

ASA Classification	Medical description of patient	Comment
ASA I	No known systemic disease	Optimal candidates for moderate sedation
ASA II	Mild or well controlled systemic disease	
ASA III	Multiple or moderately controlled systemic disease(s)	Medical consultation is an option
ASA IV	Poorly controlled systemic disease(s)	Poor candidates for moderate sedation
ASA V	Moribund patient	
E	Emergency	

The medications most commonly employed for moderate sedation include intravenous administration of an opioid analgesic along with a benzodiazepine. An opioid can provide analgesia while a benzodiazepine can provide sedative, anxiolytic and amnestic effects (3). Two commonly used opioids include Fentanyl (Sublimaze®) and Meperidine (Demerol®) due to their quick onset but short-acting effects. The benzodiazepine Midazolam (Versed®) is also commonly used due to its quick onset and short-acting properties.

Patient satisfaction with moderate conscious sedation has not been well documented among patients undergoing transvaginal, ultrasound-guided oocyte retrieval for IVF in an office setting. The purpose of this study was to determine whether moderate conscious sedation (using a

benzodiazepine and opioid) provides adequate pain control during oocyte retrieval in an office setting from the patient's perspective, and if there is a difference in patient satisfaction using different opioids (Fentanyl versus Meperidine).

**MATERIALS AND METHODS**

A prospective, questionnaire-based study was conducted at the University of Illinois Fertility Center. Institutional review board approval was obtained. A single-page questionnaire was designed to evaluate the provision of adequate pain control during IVF oocyte retrieval. The questionnaire addressed pain management, recovery satisfaction, and overall assessment. A 4-point rating scale was used (excellent, good, fair, and poor). The brief questionnaire was designed to take approximately one minute to complete.

The questionnaire was administered to 312 consecutive patients who underwent IVF oocyte retrieval from 2001-03 at the University of Illinois Fertility Center. The self-administered questionnaire was given to each patient to complete on the day of their embryo transfer (three days after the oocyte retrieval), and return prior to leaving the Fertility Center. The questionnaire was not administered on the day of the retrieval since the sedation medications may not have completely washed out of their system, thus clouding their judgment. The patient was instructed not to place any self-identifiers on the completed questionnaire.

All oocyte retrievals were performed by one of two physicians in an office setting with a dedicated, out-patient procedure room. Both physicians employed the same technique for oocyte retrieval. All patients fell under the category of ASA I or ASA II. Moderate conscious sedation was administered by a nurse under the direct supervision of the physician. All physicians and nurses had previously obtained proper training and certification to administer conscious sedation. The patients' vital signs and oxygen saturation were monitored continuously during the procedure.

From 2001-02, Midazolam (Versed®) 1-3 mg and either Fentanyl (Sublimaze®) 75-250 mcg or Meperidine (Demerol®) 75-175 mg was administered intravenously to 203 patients. For conversion purposes, Fentanyl 12.5 mcg or Meperidine 10 mg is equipotent to Morphine 1.0 mg. The same protocol of administration was employed by both physicians. In 2003, one physician exclusively administered Midazolam and Fentanyl to 71 patients (Group A) and another physician exclusively administered Midazolam and

Meperidine to 38 patients (Group B). Survey results were entered into a database and re-verified for accuracy. Chi-square test was used to compare results between Groups A and B. A p-value less than 0.05 was considered statistically significant.

**RESULTS**

Our findings are summarized in Table 2.

**Figure 2**

Table 2: Patient responses to various aspects of the moderate conscious sedation experience during IVF oocyte retrieval

Sedation experience	Rating			
	Excellent	Good	Fair	Poor
Pain prevention	64%	27%	6%	3%
Expectation of pain relief met with adequate sedation	74%	18%	7%	2%
Recovery from sedation	80%	17%	2%	1%
Overall experience	81%	17%	1%	1%

All patients who were approached completed the questionnaire. Of the 312 patients evaluated, 91% rated ‘excellent’ (64%) or ‘good’ (27%) pain prevention from the medication provided, and 92% rated ‘excellent’ (74 %) or ‘good’ (18%) expectation of pain relief. Furthermore, 97% rated ‘excellent’ (80%) or ‘good’ (17%) recovery from the sedation, and 98% rated the overall experience of conscious sedation for oocyte retrieval as ‘excellent’ (81%) or ‘good’ (17%). Less than 3% of patients gave a ‘poor’ rating for any category. Two percent of patients felt that their expectation of pain relief was not achieved, and one percent felt that their recovery from the sedation was poor. There were no adverse reactions (e.g. allergic reaction, cardiovascular or respiratory depression) noted in any patient.

No significant differences were found in ‘excellent’ and ‘good’ ratings between Group A (Midazolam and Fentanyl) and Group B (Midazolam and Meperidine) for pain prevention (92% and 95% respectively, p=0.82), expectation of pain relief (94% and 95% respectively, p=0.94), recovery from sedation (94% and 95% respectively, p=0.94), and overall experience (100% and 95% respectively, p=0.23). Similarly, there were no significant differences between the two groups in the ‘poor’ rating for any category.

**DISCUSSION**

Our study found that moderate conscious sedation for IVF oocyte retrieval procedures provides adequate pain control from a patient perspective. Furthermore, we found no significant differences in patient comfort between the use of Fentanyl or Meperidine.

Various drugs, effectiveness, and their effects on fertilization have been studied. In a 50 patient study by Ben-Shlomo et al in 1999, general anesthesia was compared to intravenous sedation with midazolam and ketamine and found that patient satisfaction was not different in the two groups (4). A study by Gonen et al comparing local anesthesia, epidural block, and general anesthesia found that general anesthesia using nitrous oxide has an adverse effect on IVF outcome leading to lower pregnancy rates (5). Paracervical block without conscious sedation was also found to be inadequate in a study by Ng et al in 2001 (6).

Studies have been performed comparing the effects of deep conscious sedation administered via staff versus self administered protocols (7,8,9). While these self-administration techniques have generally met with patient approval, it is not commonly used in the United States. Also attention has been paid to different drugs such as propofol and alfentanil to achieve adequate deep conscious sedation (10). Besides deep sedation requiring the services of an anesthesiologist to maintain a patent airway, there has been controversy over the effect of propofol in affecting fertilization rates (11).

When looking at anesthesia from a cost effectiveness stand point, by avoiding the cost of a surgery suite and anesthesiologist, one can help reduce the cost of anesthesia associated with IVF, without compromising on patient satisfaction (12). Moderate conscious sedation thus emerges as a safe, effective, and cost-efficient method for pain management during oocyte retrievals (3,13).

In summary, moderate conscious sedation provides adequate pain control during IVF oocyte retrieval procedures in an office setting. No significant differences in pain relief were found between Fentanyl and Meperidine. In the appropriate patient, this is a safe and effective form of pain control.

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