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Review Article

Conscious Sedation for Endoscopic Procedure: A Systematic Review

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ABSTRACT

Background: Sedation has a beneficial impact on patient's tolerance to the endoscopic procedure. Conscious sedation is the anesthetic techniques of choice for endoscopic procedure. Conscious sedation for endoscopic procedure could be with one drug or a combination of drugs. There have been broad variations in sedation procedure between different countries, and even between different units within the same country. All drugs which depress the central nervous system have the ability to produce respiratory or cardiovascular complications. Endoscopy has a recorded mortality of 1 in 2000 and a morbidity rate of 1 in 200. These sedation techniques have their effects on patients.
The main goal of this study is to describe the effects of conscious sedation on patients' outcome for endoscopic procedure.
Methods: The design for this study was a review of literature in the medical databases of PubMed, Scopus, Embase, Cochrane and hand search journals from conferences in English. All studies that evaluated the use of CS for endoscopic procedure were included.
Results: The results showed that the pain level of the patient (visual analogue scale) was substantially positive when conscious sedation was used. Conscious sedation, however is a lightly sedated patient who is conscious, amnesic, co-operative on demand and free from fear and anxiety. It is often used during endoscopic procedures to minimize discomfort and relax the patients. The intraoperative hypotension has also been extreme in some medications relative to others.
Conclusion: The study revealed that CS is reliable and well tolerated anesthetic technique for endoscopic procedures, and is a better option for elective endoscopic procedures
CS benefits for endoscopisit and patient outcome is superior to GA such as; short recovery times, less analgesia requirement, comfortable for patient which in turn, leads to faster induction, faster endoscopy, faster discharge, and faster turnaround time. Patients are usually willing to go home after a couple of hours. Rapid recovery is a benefit not only for patients, but also for hospital and day surgery departments. This increases the overall performance of the endoscopy unit.

Sedation The term "sedation" is sometimes used generically to encompass both pain relief (analgesia) and anxiety, but it must be understood that these are different mechanisms, even though many patients need both. The therapeutic aims of sedation are the relief of anxiety, the elimination of psychological stress and amnesia for traumatic events or procedures.

In addition, certain procedures and supportive treatment, such as mechanical ventilation, can make the patient feel uncomfortable. Sedation is a reduction in

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irritability or anxiety through the use of sedative medications, usually to support a medical operation or diagnostic procedure.

Sedation is prescribed when patients have to endure procedures involving pain, anxiety or discomfort. Sedation may also be used to ease procedures that involve a patient's cooperation or minimal movement. The various levels of sedation across the depth spectrum are accomplished by giving sedatives. Various levels of sedation are defined as deep sedation, moderate sedation (conscious), and minimal sedation (anxiolysis).

Endoscopic Procedure an endoscopy is a technique used to look inside the body. The endoscopy technique uses an endoscope to view the inside of a hollow organ or body cavity. In contrast to many other medical imaging procedures, endoscopes are placed directly into the organ. There are a number of different types of endoscopes. Depending on the type of procedure and site in the body an endoscopy may be performed either by a surgeon or a doctor. A patient may be anaesthetized or fully conscious during the procedure. A therapeutic or diagnostic procedure in which an endoscope is placed into a tubular organ to inspect the structural architecture and/or extract abnormal tissues. The term endoscopy is most frequently used to refer to the evaluation of the upper part of the gastrointestinal tract, known as esophagogastroduodenoscopy. Endoscopy is a non-surgical technique used to examine the digestive tract of a patient. The development of gastrointestinal endoscopy has significantly improved the therapeutic and diagnostic capabilities of gastroenterologists. Adequate patient tolerance is necessary for the successful completion of a comfortable evaluation and for compliance with subsequent follow-up. As a result, endoscopists have gained expertise in the administration of a range of analgesic and sedative agents to promote procedures and increase patient comfort.

The indications for conscious sedation

It is often used during minor surgical procedures and endoscopies to minimize discomfort and relax patients. Conscious sedation helps reduce discomfort, anxiety and pain during procedures. This is achieved with drugs and sometimes local anesthesia to cause relaxation.

The rate of mortality associated with GA far exceeds that of conscious sedation. This makes CS the best option for endoscopic procedure indicating the advantage it has over GA. Some of the advantages of CS over GA include;

- Avoidance of the airway, reduces the risk of awareness, aspiration and failed intubation.
- Recovery from conscious sedation is pretty quick.
- It's typically not too expensive and has few complications or side effects.
- The patient can respond to verbal commands and physical stimuli.
- Reduces hospital stay with early ambulation.

The efficacy, safety and rapid recovery of conscious sedation make this technique useful in the ambulatory environment. The care of a sedated patient needs a team effort. The responsibility and individual role of physicians, anesthesiologists, nursing staff and patients are very critical. The patient's level of consciousness is depressed by conscious sedation, but the respiratory drive and airway reflexes are retained.

Rational and Background

Sedation had a beneficial impact on patient tolerance and rarely induced important alterations in cardio and respiratory monitoring parameters. Conscious sedation; drugs cause consciousness depression through which patients react to verbal commands deliberately, either accompanied by light tactile stimulation or alone. No interventions are required for the maintenance of the patented airway. The advancement of endoscopy and it is growing request among the population has led to an increasing conscious sedation strategies. All patients are evaluated by an anesthesia provider to assess the medical status and preparation for the planned procedure, develop an anesthetic plan and implement techniques to reduce risks. Most attention was placed on monitoring patients properly during the procedures and selecting the best regimen for producing procedural sedation. There has been some attempt to determine which procedures and which patients require deep sedation in order to achieve optimum conditions.

An essential step in the decision of selecting anesthesia technique for an endoscopic procedure is the safety and health benefits to the patients. Most endoscopic procedures involve conscious sedation in order to enable a safe and complete inspection.

The essence of conscious sedation for endoscopic procedure is to reduce fear and anxiety during the endoscopic process. Various low-dose drugs can be used to meet these requirements. Among these are butyrophenones, phenothiazines, non-barbiturate and barbiturate, benzodiazepines, hypnotics, and hypno _analgesic, Ketamine. It generally has few complications or side effects and at the same time not too costly compared to general anesthesia. You will also be motivated to go to important appointments that you may otherwise have missed because you are worried about the procedure itself, which will improve your overall health throughout your life.

The efficacy, rapid recovery and safety of conscious sedation makes this anesthetic procedure useful in ambulatory conditions. The sedated patient care requires a team effort. Conscious sedation codes are based on time intervals and patient age.

The use of procedural sedation differs considerably between different countries, indicating different standards of practice and social norms. For instance, in the International Editors' Survey for the journal Gastrointestinal Endoscopy, sedation was usually or

always administered in 44% of procedures in Asia, 56 % in Europe, and 72 % in the Americas (Central and South America, Canada). All drugs which depress the central nervous system have the ability to produce respiratory or cardiovascular complications. Endoscopy has a recorded mortality of 1 in 2000 and a morbidity rate of 1 in 200. These adverse effects are closely linked to lack of monitoring and high doses of sedatives.

Since 2008, the standard contraindications for all endoscopic procedures there exists a German S 3-guideline allowing non-anesthesiological administration of conscious sedation (propofol) for gastrointestinal endoscopy. In the last 15 years, the number of procedures conducted by endoscopists in the United States has grown from two to fourfold. Conscious sedation (Propofol) is commonly used for sedation in about one fifth of all endoscopies in the United States. The use of sedation such as short acting propofol in gastrointestinal endoscopy has shown an upward trend in Europe. There were very broad variations in sedation procedure between different countries, and even between different units within the same country.

Between January 2014-December 2014, in Hepatology Craiova and the Research Centre of Gastroenterology, 192 patients underwent endoscopic intervention procedures (62 ERCP and 130 EUS) under conscious sedation (propofol). In their analysis, 110 patients were followed-up from 4 and 6 hours after the procedure. In most of the patients, that's 90 (81.8%), no adverse effects were presented. Other 20 patients (18.2%) had the following adverse effects from sedation; drowsiness in 5 cases (4.5%), vomiting in one case (0.9%), nausea in 3 cases (2.8%), 2 (1.8%) dizziness, 3 (2.8%) coughing, 2 (1.8%) headache just 1 patient (0.9%) had an injection site reaction, 1 (0.9%) had shivering and 2 patients (1.8%) bradycardia. Patients that had adverse effects were mostly of old age with associated diseases which included cardiovascular diseases and chronic kidney disease. Potential benefits of conscious sedation (propofol) include faster recovery time, rapid onset and improved provider and patient satisfaction. The main drawback is the higher financial cost to the patient and health care system which is approximately 20 percent greater than costs without anesthesia assistance.

The hazard of endoscopy was insufficient, particularly in cases that were poorly educated patients, old and out patients. The information about options, the opportunity to request for additional information and the information about the dangerous of sedation during endoscopy have been adequately tackled.

Endoscopic interventional procedure under GA after induction of sevoflurane, alfentanil (8.5 μg•kg−1) was administered. The procedure lasted 22 minutes. There was an unexpected delayed recovery likely due to hypersensitivity to opioid and US over the past decade.

Different types of complications associated with conscious sedation including medication-related complications, intravenous access, paradoxical reactions, topical oropharyngeal medications and cardiopulmonary complications have been observed.

Conscious sedation, however may induce hypoxemia, which could lead to cardiopulmonary complications, and most of the complications associated with endoscopy were due to the medications used in the procedure rather than to the procedure itself. Most patients who receive detailed information about the benefits and risks of sedation prefer EGD with pharyngeal anesthesia alone.

Therefore, after close observation of this problem, it is appropriate to study the effects of conscious sedation on endoscopic procedure.

Objectives of the Study

Main Objectives

To determine the effects of conscious sedation on patient outcome for endoscopic procedure.

Specific Objectives

To determine the effects of conscious sedation on respiration of patients.

To determine the effects of conscious sedation on the cardiovascular system of patients

To evaluate other complications of conscious sedation.

Goal

To further explore the effects of conscious sedation during endoscopic procedure.

Research hypothesis

There is a relationship between the effects of conscious sedation on the patient undergoing endoscopic procedure.

Methods

The design for this study was a review of literature in the medical databases of PubMed, Scopus, Embase, Cochrane and hand search journals from conferences in English. All studies that included evaluated the use of CS for endoscopic procedure.

Search Strategy

For selection of articles for the study, the researcher searched all the above databases using the following keywords; Conscious sedation and endoscopic procedure with filters.

The researcher read all articles and reviewed relevant references related to CS in endoscopic procedures which were used for the purpose of this study.

Inclusion Criteria

Randomized controlled clinical trials Cross Sectional Observational studies

Articles published between 2010 to present date

Exclusion Criteria

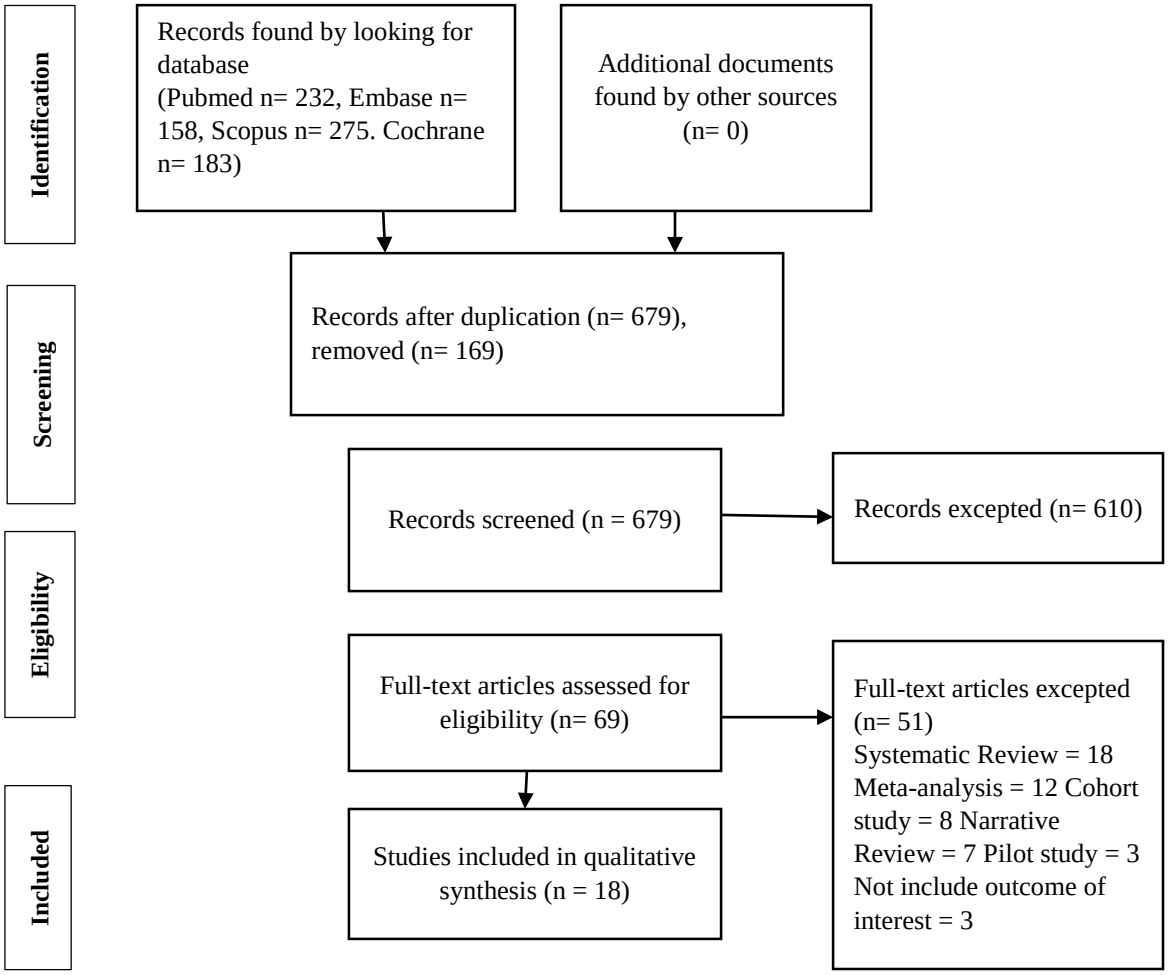
Articles that do not conform to the topic.
All articles which are not open access.

All articles published or unpublished before 2010. All systematic review articles.

Table 1- Search Strategy

Database	Search strategy	Total number	Date
PubMed	1. "sedation, conscious"[Mesh] 2. "endoscopic procedure"[Mesh] 3. "sedation, conscious"[Mesh] AND "endoscopic procedure"[Mesh] 4. "sedation, conscious"[Mesh] AND "endoscopic procedure"[Mesh] AND ("2010/01/01"[PDAT]: "2019/12/31"[PDAT])	2287 56218 360 232	9 December 2020
Scopus	TITLE-ABS-KEY ("conscious sedation" AND "endoscopic procedure") AND PUBYEAR > 2009	275	9 December 2020
Embase	1. ('conscious sedation':ti,ab,kw AND 'endoscopic procedure':ti,ab,kw AND [2010-2020]/py	158	9 December 2020
Cochrane	1. "Conscious sedation" AND "endoscopic procedure" { Including Limited Related Terms}	183	9 December 2020

Figure 1- Prisma Flowchart



Eighteen studies (10967 patients) met the criterion for the inclusion of the review element.

Most of the studies were conducted in parturient patients scheduled for endoscopic procedure.

As a study aimed at comparing the impact of conscious sedation on patients' outcomes, six studies compared safety of CS (Conscious Sedation), two compared drugs, eight also compared the effects and use of CS, whiles the remaining considered patients' satisfaction.

Results

All the eighteen studies included in our analysis reviewed with the findings based on the objectives of the study. We looked at Ramsay Sedation Scale during the procedure, visual analogue scale(VAS) and the Aldrete Score which examines the following five conditions: motor activity, blood pressure, consciousness, respiration and color. Simplified Post Anesthetic Recovery Score evaluates three criteria: airway, consciousness, and movement.

Blood pressure and heart rate monitoring is a standard anesthesia practice which is carried out during the perioperative period. Therefore, our study monitored the effects of CS on blood pressure and heart rate, and the drug used. Furthermore, we grouped the effects of CS on patients into main headings; patient outcomes.

Patients' Outcome

As part of standard anesthesia monitoring, Oxygen saturation, blood pressure and heart rate of patients were monitored during the endoscopic procedure and until complete recovery of patients. However, any significant changes were recorded after induction of sedation and during the intraoperative period.

We found hypotension during the intraoperative period. This was as a result of the vasodilation and venous pooling effects of the drugs used. However, our findings showed lower heart rate in CS. Our study recorded during the ESD procedure that patients had a circulatory adverse reaction and the sedation process was the only important danger factor and the patients had an adverse sedation event, and current smoking has been the only important factor associated with negative incident. We also found oxygen desaturation that was recorded in CS. The hazards of desaturation when used propofol and midazolam with propofol were higher than that of dexmedetomidine, the dangers of bradycardia when utilizing propofol and midazolam were lower than when using dexmedetomidine. During sedation, the respiratory rate has been dramatically lower in the group of

Dexmedetomidine; however, SpO 2 was significantly more than that in propofol group.

Our study recorded that when using propofol based sedation group (A), the complications were treated easily, with no adverse effects. The mean dose of midazolam and fentanyl in group A was substantially lower than in the non propofol -based sedation group (B).

Furthermore, our study found endoscope insertion time requirement in patient exposed to CS was lower while there was no substantial difference in the occurrence of sedation-related and procedural complications.

For instance, it has been noted that in the patients undergoing endoscopic procedure, propofol administration in conjunction with opioid provided reliable and successful sedation.

Ramsay Sedation Scale was assessed during the procedure.

Our study recorded patient-reported tolerance and satisfaction composite scores, when using of midazolam with fentanyl-midazolam combination during flexible bronchoscopy. Nowadays, combination with sedative agents is typically an option for sedation and analgesia for endoscopic procedure. Observer’s assessment of alertness - sedation (MOAA-S) scale and the time of recovery to discharge was significantly lower for endoscopic procedure. Median duration of the procedure (EUS-FNA) was 32 mins (range 18 to 72 mins). However, clinicians conducting procedure noted that for at least 50% of the patients, deep sedation would be preferable. In one study when using bolus doses of fentanyl and continuous propofol infusion there was no difference in time of sedation, procedure and time of recovery, adverse events and drug requirements. Outcomes were recorded in our study for patient pain level (visual analogue scale VAS) these were significantly positive when using dexmedetomidine for colorectal ESD. Patient outcomes were evaluated in the dexmedetomidine group; visual analog scale values have been considerably lower than those in propofol -group at 20-35 min assessments. The visual analog scale was used to measure the pain, the patient tolerance was good, greater discomfort was associated with anxiety, indication of the operation, females, length of time and complexity of the test, and dosage of sedatives.

Fentanyl reduced total procedure time, this will result in a potential improvement in the productivity of the endoscopy suite by 22 percent.

Our study recorded that the level of endoscopists satisfaction was substantially higher in the continuous propofol infusion by anesthesiologist (CPIA) group compared with the intermittent midazolam -propofol injection by endoscopist (IMIE) group (IMIE vs. CPIA), high satisfaction score. In comparison, the level of patient satisfaction was found to be substantially higher in the IMIE category (IMIE vs. CPIA) with high score of satisfaction.

Furthermore, our study showed that endoscopist and patients who were exposed CS for the endoscopic procedure were much satisfied and would choose it again if the need was felt.

The study reports a success 96.5 percent of the procedures that underwent ERCP with CS. Just 3.5 per cent of cases could not be successfully completed under conscious sedation and have been transferred to GA.

Discussion

The objective of the research was to describe effects of sedation strategies on patient outcome. Various studies included in the review showed that CS had a better patient outcome.

Regarding patients' outcome, our findings did show responsiveness of patients receiving ambulatory endoscopic procedure under CS was fine in most cases and complications were rare and mild. Similarly, Grilo (2018) in their study did find good results for patients under CS at endoscopic procedure. Therefore, patients who have CS for endoscopic procedure have less pain to require analgesia after procedure. Also, Kingugusa (2018) in their study demonstrated that CS is useful not only for patient and endoscopist satisfaction but also for pain relief.

In our results, blood pressure intraoperatively, the was lower in the CS. This is similar to what Amornyotin (2015) in their study stated that hypotension is common in CS especially in the intraoperative period. Also, our study recorded severe hypotension when we use some drugs of CS more than other in intraoperative period. Seo (2018) stated that the hypotension was more when propofol and propofol were used with midazolam.

Jo (2019) stated that clinicians should note that as sedation depth rises, the risks of cardiovascular suppression and respiratory depression become serious. And so, precautions must be taken using adequate surveillance systems.

Our findings showed that patients were satisfied with CS. In support of this, patient satisfaction of

the anaesthetic technique was significantly more towards CS which not only reduces

patient discomfort but also improves the overall quality of procedure.

So that sedation can reduce the patient's reluctance to repeat the same procedure in the coming years without affecting the performance of the procedure, endoscopist satisfaction or the time of recovery.

CS is first-choice in endoscopy due to its short half-life and rapid onset of action, and many safety reports exist when used by gastroenterologists rather than anesthesiologists. This was evidenced as more patients said they will choose CS again should there be the need for a procedure again. Also, Keiichiro (2019) in their study demonstrated that non anesthesiologist-administrated propofol during enoscopic procedure is safe and effective. Endoscopists have gained expertise in the administration of a range of sedative and analgesic agents to promote procedures and increase patient satisfaction.

Conclusion

In conclusion, the study found out that CS is reliable and well tolerated anaesthetic technique for endoscopic procedure. However, CS is a better option to elective procedure such as endoscopic procedure.

CS benefits for endoscopisit and patient outcome is superior to GA such as; short recovery times, less analgesia requirement, comfortable for patient which in turn, leads to faster induction, faster endoscopy, faster discharge, and faster turnaround time.

They're usually willing to go home after a couple of hours. Rapid recovery is a benefit not only for patients, but also for hospital and day surgery departments. This increases the overall performance of the unit endoscopy. Sedation is ideally suited for delivery by endoscopists.

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