Original Article

The Effects Of Conscious Sedation On Patient Outcomes During Bronchoscopic Procedure: A Systematic Review

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DOI: 10.47750/pnr.2023.14.S02.332

Abstract

Background: When the patient is accompanied by monitoring and bronchoscopy equipment, and treatment is delivered by strangers performing intimate, intrusive, and sometimes painful operations, bronchoscopy is likely to trigger anxiety. As a result, sedation is essential to alleviate anxiety, minimize tension, increase patient comfort and compliance, induce amnesia, and make the treatment easier. Those who are motivated can effectively undergo unseated endoscopic operations, Nonetheless, in affluent countries; the majority of patients prefer and require sedation when considering tolerability, comfort, or readiness to repeat the process. High-risk pulmonary patients are frequently given lesser doses due to the possibility of consequences, careful doses of sedation and analgesics for bronchoscopy.

Aim: To find out how conscious sedation affects patient outcomes. During bronchoscopic procedure.

Patients & Methods: A survey of the literature in PubMed was used to create the design for this research, Scopus, Web of Science medical databases, and English-language conference hand-search journals. All included studies evaluated the effectiveness of CS for bronchoscopy procedures.

Results: When conscious sedation was used, the patient's pain level (on a visual analogue scale) was basically positive. Conscious sedation, on the other hand, entails a mildly sedated patient who is awake, amnesiac, cooperative when requested, and freed from anxiety and stress. It is often used to reduce discomfort and comfort patients during broncoscopy operations. hypotension was additionally more severe with some medications than others.

Conclusion: In summary, According to the findings of the study, CS is a practical and well-tolerated anesthetic method for bronchoscopy procedures. However, CS are indeed a superior alternative for elective operations such as bronchoscopy. The advantages of CS for the bronchoscopist and patient results are better compared to GA, like: B. short recovery periods, less need for analgesia, comfort for the patient, which results in more rapid induction, faster bronchoscopy, faster discharge, and short response duration, and they are as well usually able to go home after a few hours.

Keywords: Conscious sedation, bronchoscopy procedure

Introduction:

The most of regular low-risk endoscopic techniques are currently conducted under sedation in developed countries. [1]. Procedural sedation is developed to make it easier to undertake various treatments while avoiding substantial variations in cardiorespiratory physiological measurements and maintaining protective airway reflexes [2]. According to these considerations, sedation during endoscopy continues to increase worldwide [3]. There is a continuing dispute concerning the safety of given anaesthesia versus sedative delivered by a procedurast, but recent research indicates both are safe and that endoscopically delivered sedation is more cost-effective, especially when a protocol is in place. [4-8]. Since sedation is a spectrum, it is impossible to know how each individual patient would react. As a result, practitioners who want to induce a specific level of drowsiness should be able to save patients whose sedative level gets deeper than expected[9]. Sedation/analgesia is a term that identifies and describes four stages of sedation and anesthesia: minimum sedation (anxiolysis), moderate sedation/analgesia, severe sedation/analgesia, and general anesthesia. [10]. Nonetheless, moderate sedation is typically thought to be appropriate for controlling discomfort and anxiety during normal endoscopic procedures, as well as achieving proper amnesia and being safer. [11A drug-induced condition in which the conscious patient is alleviated from anxiety, stress, while remaining blissfully relaxed is known as conscious sedation. [12]. Because no airway interventions is necessary, breathing is sufficient, and cardiovascular function is intact, aware sedation is regarded as a secure target degree of sedation. [13]. Aware sedation can be produced using a variety of medications, including propofol, and may be used in conjunction with local anesthetic. [14]. According to an American College of Heart Physicians consensus statement, ideal procedural conditions are obtained when patients feel at ease, physicians can Two trials including sedated and non-sedated patients undergoing bronchoscopy found that sedated patients handled the procedure better, with non- significant difference in problems other than a prolonged recovery period. complete the treatment, and risk is minimized. [15]. Conscious sedation has recently emerged as a popular anesthetic method for uncomplicated bronchoscopic treatments. [16] . Bronchoscopy is defined as an endoscopic method that is used to view the interiors of the airway for both therapeutic and diagnostic purposes. [16]. Because to worry about the negative effects of bronchoscopy, it was initially performed under minimal or no sedation. There was no differences in the complication rate between bronchoscopy either with or without sedation, hence bronchoscopy without sedation was judged safe. These trials, however, did not evaluate patient tolerance, comfort, to undergo a repeated surgery. [17]. Two studies involving sedated non-sedated patients during bronchoscopy reported that sedated patients tolerated the procedure better and apart from a longer recovery time there was no significant difference in complications [18,15]. Certain stiff and navigation bronchoscopic processes are conducted under general anesthesia in the hopes of increasing diagnostic yield while decreasing patient discomfort, but new research suggests that light sedation may be similar. [19,20]. Adaptable bronchoscopy can be conducted either with or without sedation, however the choice is usually left to the bronchoscopist's discretion. [21]. Sedation ought to be performed routinely in fiberoptic bronchoscopy, in our opinion, to provide a safe and comfortable operation both for the patient and the pulmonologist. [22]. According to a recent study, the majority of patients (62%) having fiberoptic bronchoscopy are frightened and fearful of the discomfort and breathing difficulties that may occur during the treatment. [23]. In another study, 68% of patients experienced worry as a result of a suspected diagnosis of cancer and dyspnea or suffocation. [24]. Understanding these anxieties will enable the physician to just provide relevant information to alleviate some of the patient's fears that may not be spoken. [25]. Among the most critical causes is inadequate interaction between the physician and the patient. [26]. It has been demonstrated that patients undergo an endoscopic surgery need no or little sedation if their worries are allayed by attentive discussion or an appropriate explanation of the planned procedure is provided. [27,28]. Education and patient data pamphlets have been used to minimize anxiety during endoscopic treatments. [29,30]. Flexible bronchoscopy has grown in popularity during the last ten years. Whereas the difficulty of adjustable bronchoscopy has increased, typical drug alternatives for moderate sedation have not altered in three decades. It is necessary to improve mild sedation while retaining safety. [31]. the process itself is uncomfortable, with patients frequently complaining of trouble breathing, coughing, anxiety, agitation, and airway irritation. Sedation in bronchoscopy has led to improved outcomes such as: A. Patient compliance, cough reduction, and patient probability of repeated procedure without additional complications [32,33]. Taiwanese researchers monitored patient movement and cough during bronchoscopy with different sedation regiments and

discovered that the patients received propofol infusion had much reduced patient intervention and cough (p0.001 and p=0.001, respectively). [34]. Coughing was greatly reduced in sedated patients in research done in France and Spain. [35]. To achieve sedation for such procedures, a benzodiazepine (e.g., midazolam) in conjunction with or without an opioid (e.g., fentanyl) or propofol is used. [36,37]. Propofol is a potent iv sedative/hypnotic with a 15-to-40-second onset of action and an unusually short half-life, enabling rapid recovery. [38-40]. A downside is the possibility of respiratory failure or hypotension in the absence of antidotes; thus, continual supervision by an anesthesiologist is usually required. [41]. Opioids are also frequently utilized during bronchoscopy, mostly for analgesic and antitussive effects. [42]. some medications have the potential to cause respiratory depression. As a result, conscious sedation is utilized to create consciousness depression without interfering with breathing. [14]. However, the most commonly utilized strategy is purposeful sedation using benzodiazepines. [43]. Midazolam (action starts within 3-5 min) continues to be the foundation of moderate sedation, although its active metabolite, with a clearance half-life of 1.8 to 6.4 h, might cause protracted drowsiness post-procedure, specifically in renal or hepatic dysfunction or HIV infection. Patients who test positive for HIV are given protease inhibitors. [44,45]. Although generally safe, such medications are not without negative effects. [46-48], and the chance of sedative-related problems rises with increased anxiety, necessitating bigger drug dosages [49].

On the basis of the preceding, the study will assess the safety and efficacy of moderate sedation in bronchoscopy.

Main: The purpose of this study was to see how conscious sedation affected patient outcomes during a bronchoscopic operation..

Patients & Methods:

A survey of the literature in PubMed was used to create the design for this investigation., Scopus, Web of Science medical databases, and English-language conference hand-search journals. All included studies assessed the effectiveness of CS for bronchoscopy procedures.

Search Strategy:

The investigator searched all of the above databases for publications for the study using the following search terms: aware sedation and bronchoscopy procedures with filtering. The researcher examined all relevant literature and reference linked to CS in bronchoscopy methods used for this investigation.

Randomized controlled clinical studies are among the inclusion criteria. Observational studies, cross-sectional studies Published articles between 2010 and the present.

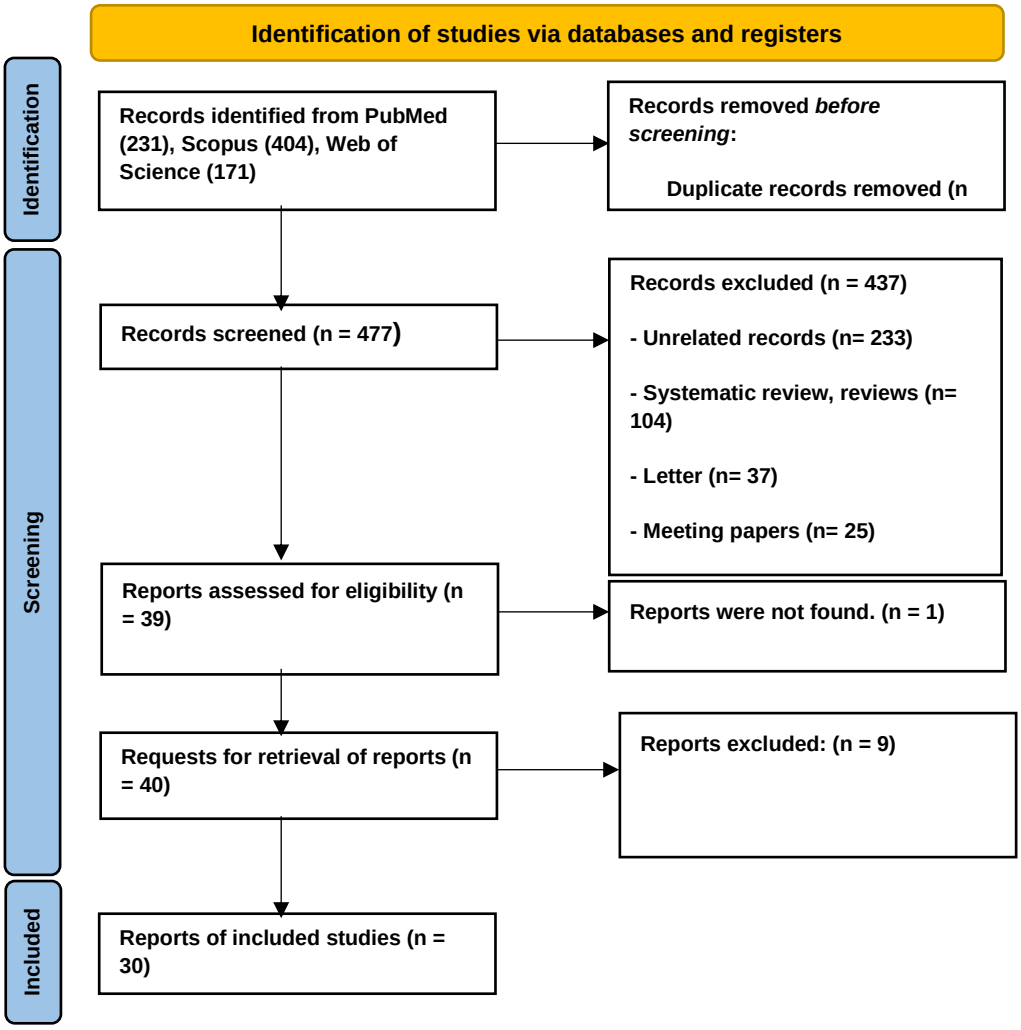
Publications that do not adhere to the theme are among the exclusion criteria. All articles that are not freely accessible, All works published or unpublished prior to 2010, including systematic reviews.

Table 1: Search Strategy

Database	Search string	Number of results	Total number of results	No. of duplicated records	Date of search	No. of records for screening
PubMed	("Conscious Sedation"[MeSH Terms] OR Conscious Sedat*[Title/Abstract]) AND ("Bronchoscopy"[Mesh] OR Bronchoscop*[Title/Abstract])	231				
Web of Science	TS = ("Conscious Sedat*") AND TS = ("Bronchoscop*")	171				

Scopus	TITLE-ABS-KEY ("Conscious Sedat*") AND TITLE-ABS-KEY ("Bronchoscop*")	404				
			806	329	7 January 2023	477

Figure1: Prisma Flowchart



Thirty studies (15,773 patients) satisfied the criteria for insertion of the assessment item. The majority of the investigations were carried out on labor patients who were due for a bronchoscopy surgery. Fourteen research evaluated the security and effectiveness of conscious sedation (CS) in to compare and evaluate the effect of CS on patient outcomes., nine compared between sedatives, while the remaining seven considered patient satisfaction.

Results:

Our analysis includes a total of 30 studies, with outcomes determined by research objectives. The Ramsey Sedation Scale, which was evaluated during the operation, the Visual Analog scale (vas Scale (VAS), and the Aldrete Score, which assessed the following 5 criteria: motor activity, respiratory, bp, awareness, and skin color, were all examined. The Simple After Anesthetic Recovery Score looks at three things: awareness, airway, and mobility. During the perioperative period, blood pressure and heart rate are monitored as part of conventional anesthetic practice. As a

result, our study tracked the effects of CS on blood pressure and heart rate, as well as the medication utilized. Furthermore, we divided the impacts of CS on patients into major categories: Patient Outcomes.

Patients Outcome:

oxygen saturation, heart rate, and bp of patients were observed as part of normal anesthetic monitoring during the bronchoscopy procedure and until they were fully recovered. Nonetheless, considerable alterations were observed upon sedative induction and throughout the intraoperative period.We found that the occurrence of transient hypoxemia, hypoxemia, respiratory depression, Saturation less than 85% for more than 1 minute in addition to Administration of oxygen through the nose of 2 L/min was accepted as desaturation, desaturation < 90, transient decrease in SpO2 below O2 90% and significant oxygen desaturation (84%-86%). Respiratory failure requiring assisted ventilation, pulmonary insufficiency requiring hospitalization of the patient, and patients experiencing severe oxyhemoglobin desaturation were also recorded. Furthermore, transient hypotension, transient hypertension, hypotension, hypertension, more transient bradycardia and arrhythmia were observed. Regarding the comparative studies, in one of our studies, the incidence of hypoxia and tachycardia was lesser in the DEX (dexmedetomidine) group than in the FEN (fentanyl) group, and The DEX group had a higher occurrence of bradycardia and hypotension than the FEN group.. while the incidence rates of hypertension, respiratory depression during intubation were lower in the DEX group than in the SUF (sufentanil) group, and the incidence of bradycardia was higher in the DEX group than in the SUF group in another study. In addition, there were 15 patients with relative hypotension in the MAC group (monitored anesthetic care) and none were reported in the MS group (moderate sedation). Mean nadir peripheral oxygen saturation was substantially lower in the midazolam group than in the dexmedetomidine group, while heart rate and systolic arterial pressure were both may greater bronchoscopy in the dexmedetomidine group than in the midazolam group. In addition, the mean nadir SpO2 value during Bronchoscopy was more common in the elderly than in the non-elderly, and the reduction in SpO2 was greater. Patients who are not elderly outnumber those who are elderly. Our study also recorded mean sedative doses and procedure duration; midazolam dosage was significantly lower in the DEX group compared to the FEN group, and the operation time was significantly longer in the DEX group, whereas the total amount of dexmedetomidine used in the PG (pregabalin group) was lower than in the C (placebo) group. The midazolam dose was lower in the elderly group than in the non-elderly group, but no significant differences were observed between the two groups in terms of procedure times. The median duration of the procedure was 20 min, 33 min, 22 min, 51 min, and 57 min. In addition, the median duration of the procedure such as flexible bronchoscopy was 10 min, 10 min, 11 min in the placebo, midazolam, and fentanyl midazolam group, and the mean (SD) time required to reach the Ramsay score 03 was lower in propofol than in fentanyl. The Ramsay Sedation Scale and the modified Observers Assessment of Alertness/Sedation (MOAA/S) and Visual Analogue (VAS) scores were also assessed during the procedure. Moderate/conscious sedation was achieved in 92% of patients when the mean RASS score was -2. Furthermore, there was no significant difference in the satisfaction VAS score between the two groups. We reported that the sedation score was higher in the PG (DEX, pregabalin) group than in the C (DEX, placebo) group. 96% of the patients experienced no or only moderate pain in the study with CS sedation. We also found that the procedures were repeated in only seven patients (2%) under general anesthesia. Recovery time was one of the outcomes that was also recorded in the present study. Where patients in Group D (DEX-Propofol-Fentanyl) showed faster recovery in a shorter walking time than Group M (Midazolam-Propofol-Fentanyl) was the time to full alertness after the end of bronchoscopy in patients treated with significantly shorter remimazolam (median 6.0 min) compared to those treated with placebo (13.6 min) and midazolam, although no patients in either arm required antidotes. Elapsed time to recovery was also significantly shorter in the nebulized dexmedetomidine group than in the intravenous dexmedetomidine group. In addition, there was a faster recovery of full consciousness, and both elderly and non-elderly patients regained their cognitive abilities within minutes after bronchoscopy. We verified that the mean recovery time was 10,28.5 minutes while all subjects achieved the modified Aldrete score 9 with a recovery time of 5 and 10 minutes in 62% and 23% of subjects. Regarding the tolerability of the procedures under CS sedation, the study showed that the patients on these tramadol and fentanyl doses could easily endure thyrocricocentesis airway surface anesthetic and fiberoptic bronchoscope-

guided tracheal intubation, and all patients were able to finish the process guided tracheal intubation to complete fiberoptic bronchoscopy, suggesting that the procedure was well tolerated. In additionThe DEX group had better nasotracheal intubation circumstances and greater intubation tolerance than the SUF group. The tolerability was also evident in our study report. Our present study also showed positive results in terms of comfort, willingness and satisfaction with the CS technique. In our study, both groups (DEX and FEN) showed no statistical difference in VAS discomfort score, VAS satisfaction, and willingness to undergo bronchoscopy again. In addition, bronchoscopist satisfaction with sedation was higher in group D (DEX-propofol-fentanyl) than in group M (midazolam-propofol-fentanyl) in the intraprocedural and in the DEX group significantly higher than in the SUF group. Higher physician-patient satisfaction in the propofol arm compared to the fentanyl arm, while higher patient and pulmonologist satisfaction scores occurred in the PG (DEX, pregabalin) group, along with greater comfort in the elderly group than in the non-elderly group, with willingness to undergo reassessment being similar between the two groups was. It was reported that only five subjects in our study were unwilling to repeat the procedure. Meanwhile, nurses' perceived comfort of subjects with conscious sedation was worse than that of proceduralists, but in terms of perceived willingness, Procedures discovered six subjects, included 3 of the 5 who had individually indicated displeasure and three others who expressed readiness to repeat the process. A Likert scale questionnaire was administered at the conclusion of the process., in which (94.4%) of the patients stated that they expressly agreed to repeat the test, if necessary, while only two patients expressly disagreed. On the other hand, and compared to unsedated patients, sedated patients expressed less discomfort with lower VAS scores related to endoscope insertion, but more sedated patients expressed willingness to return. Group D (DEX-Propofol-Fentanyl) showed higher safety with less procedural intervention by coughing or body movements than Group M (Midazolam-Propofol-Fentanyl), and the proportion of procedural intervention by patient movements was similar in the DEX group higher than in the FEN group. In addition, The safety of all three arms (remimazolam, midazolam, and placebo) was comparable, with 5.6% of patients in the remimazolam group experiencing significant treatment-emergent adverse outcomes compared to 6.8% in the placebo group. Our study's final endpoint confirmed safety and procedural interference.

Discussion:

The purpose of this research was to explain the impact of sedation techniques on patient outcomes. CS had a superior outcome for patients in numerous studies that were reviewed. The patient outcome and the results of our study showed good results in terms of comfort and willingness to recurrence bronchoscopy under conscious sedation with rare or minor complications in most cases, similar to Kyung Soo Hong (2015) et al. who stated in their study that modest sedation during FB was related with an raised in the effectiveness of willingness to repeat FB and a reduction in procedure time [50]. As a result, patients with CS for a bronchoscopy procedure have a lower pain level to need post-procedure analgesia. Also Yung-Lun N. (2010) et al. demonstrated that conscious sedation with some clinically judged depressants such as midazolam and alfentanil lower discomfort, improves satisfaction, and carries a small but manageable risk of hypoxia in patients having surgery FB [51]. Although the majority of our research patients evaluated the CS procedure as pleasant or extremely pleasant, each successive operation adds worry to an already difficult condition. [52]. As a result of the deleterious impact that stress has on pain perception, [53], assessing and reducing patients' stress and pain levels has become a priority. As a result, current recommendations already propose that this treatment be performed under anesthesia. [54]. Speaking of hypoxemia that may be associated with CS, our findings related to minor respiratory adverse effects such as transient hypoxemia, respiratory depression, and desaturation related with CS. This is supported by Sarkiss, M. (2011) et al. Generally speaking, anesthetics with short durations of action and elimination (e.g. remifentanil and propofol) and those with minimal interference with respiratory drive are desirable [55]. Blood pressure is one of the vital signs that decreased during CS in our study. This is similar to what Early DS (2018) et al. showed in their study that hypotension is one of the most common complications that we must consider before administering sedation/analgesia and deal with potential antidotes for any sedative if available [56]. Qiudi Zhang (2021) et al. stated that the incidence of hypotension was higher when we used DEX [57]. As a result, Jo (2019) et al. suggested that clinicians be aware that as the degree of sedation grows, the risks of respiratory failure and cardiovascular suppressing become more severe, and that preventive measures, such as the use of appropriate monitoring devices, should be adopted. [58]. In terms of safety

and efficacy, our result showed that it was significantly more towards CS. Evidence is that EBUS-TBNA/EUS-B-FNA performed under bronchoscopically controlled moderate sedation is not only safe but also has acceptable diagnostic yield [59], With a high diagnostic yield, it is useful for high-risk patients who are poor candidates for GA. [60]. Looking more closely at our study, we can observe the preference for some drugs over others in the CS technique. She Liang Shen (2014) et al. pointed out that DEX could create better conditions, improve tolerability, reduce incidence of hypertension, respiratory depression and sore throat, and decrease postoperative memory score for sedation during awake nasotracheal intubation compared to SUF, and this supported our study [61] and showed improved oxygen saturation with comparable tolerability when administered for conscious sedation in postoperative bronchoscopy patients via midazolam in W LIAOs (2012) et al. study [62]. With regard to recovery time and satisfaction, PKG GUNATHILAKA (2019) et al. As comparison to fentanyl, propofol has a short induction time, lower cough during the operation, a shorter recovery time, and improved physician satisfaction for adjustable bronchoscopy in children. [63]. The same results are found in Nicholas J. Pastis (2019) et al. Study with remimazolam versus midazolam [64]. Another property was revealed in our study on the effect of the CS technique on the cost of procedures and evidence for this, Ziad Boujaoude (2019) et al. found that EBUS-TBNA is associated with less impact on healthcare system costs under moderate sedation and without reducing diagnostic yield or possibly having fewer adverse effects. This is crucial at a time when lowering costs and improving resource usage are becoming increasingly important [65]. This is exactly what Shabashev (2017) et al. showed that the use of conscious sedation achieves a significant reduction in almost all cost categories [66]. In this study, different techniques of CS administration were mentioned to demonstrate their efficiency. One of them appeared in Ezzeldin Ibrahims (2019) et al. on. Study in which conscious sedation with pregabalin premedication facilitates flexible bronchoscopy and has many advantages [67], and in this regard Wei Gu (2019) et al. were dependent on the inhalation of aerosolized dexmedetomidine lidocaine as premedication in bronchoscopies under moderate sedation and were linked with acceptable tolerability, a lower frequency of moderate to severe cough, a quicker recovery time, and lower vasoconstriction consumption [68]. The combination of drugs has been shown to be the most effective for moderate sedation. Piro Roberto (2022) et al. supports this by noting that conscious sedation achieves satisfactory results with fewer resources by combining sedative and amnesiac properties of benzodiazepines with antitussive and analgesic properties of opioids such as midazolam and meperidine in EBUS-TBNA procedures used in their study [69]. Ascedio José Rodrigues (2013) et al. confirmed that after evidence that The FBI is effective and safe for challenging airway management conducted with the patient under spontaneous ventilation, sedated with iv midazolam and fentanyl, and local anesthetic with lidocaine. [70 and this is what Sarkiss (2011) et al. also added in their study [55]. Our study related to the ability of non-anaesthesiologists to perform the procedures under CS. Similar to Sahajal (2017) et al. showed that EBUS-TBNA/EUS-B-FNA performed under bronchoscopy-guided Medium sedation isn't just safe, but it also provides a good diagnostic yield [59]. Also, Chrissian AA (2015) et al., Dang D (2012) et al. and Grendelmeier P (2011) et al. reported in their study that According to current research, procedurally delivered sedation is safer and endoscopically provided sedation is much more cost efficient, especially when a procedure is in place. [4-8]. Another advantage of the CS approach over GA or DS is that certain procedures, like as EBUS-TBNA, can be conducted under conscious sedation while maintaining diagnostic yield and efficiency. [71].

Conclusion:

The study concluded that CS is a safe and well-tolerated anesthetic method for bronchoscopy procedures. However, for elective surgeries such as bronchoscopy, CS are a preferable option. The advantages of CS for bronchoscopists and patients are better to GA, such as shorter recovery times, less need for analgesics, and more patient comfort, which leads to faster induction, bronchoscopy, discharge, and turnaround time, and they may generally go home after a few hours. A quick recovery is beneficial not only to the patient, but also to hospitals and day clinics. As a result, sedation is perfectly suited for administration by bronchoscopists in order to improve the overall efficiency of the bronchoscopy unit.

Acknowledgement:

First and foremost, I want to thank ALLAH for motivating me from the beginning to the finish of this humble endeavor and for providing me with strength, ability, and guidance. I would like to express my heartfelt appreciation and gratitude to Dr. Afzal Shamsi for his kindness, encouragement, direction, and in-depth knowledge, as well as his consistent support throughout my master's studies. His knowledge and assistance have been so beneficial to me in all parts of my studies, not to include the preparation of this project, that I could not have asked for a finer supervisor than you. I'd want to thank everyone in the Anesthesiology Department at Imam Khomeini Hospital Complex for their unwavering support and assistance throughout my research,

Lastly but not least, I'd like to express my gratitude to my father, mother, and brothers for their encouragement and prayers. Not to mention my close friends, who inspired me throughout my research, which would not have been possible without them.

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