



Impact of Sedation during Bronchoscopy - The best practice of Sedation

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Citation this Article: Jackin Moses, Sebin John Thampan, Arun Prasath, J Janifer Jasmine, Pinkutty Sagar, “Impact of Sedation during Bronchoscopy - The best practice of Sedation”, IJMSIR- November - 2022, Vol – 7, Issue - 6, P. No. 80 – 91.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Aims: To identify the impact of sedation during bronchoscopy, ill symptoms or discomfort during bronchoscopy or /and post-procedure in genders, age impacts, and the best practice of Sedation.

Methods: A total of 270 bronchoscopy patients who expressed discomfort after bronchoscopy procedural details were observed and recorded including follow-up of the patient at the respiratory medicine of Pondicherry Institute of Medical Science.

The patient’s demographic details, procedure time, Indication for bronchoscopy, symptoms during bronchoscopy, symptoms after bronchoscopy, and symptoms related to sedation were observed and recorded.

Statistical significance was found using SPSS version 20.0. Mean standard deviation, Frequencies with percentages, and Chi-square test was done. A p-value of <0.05 was considered statistically significant.

Results: A total of 270 bronchoscopy patients who expressed discomfort (ill symptoms) were analyzed, male: female (150:120) with a mean age of 51.9 ± 16.12 .

Out of 270 bronchoscopy patients, males were higher, the age group of > 51 was higher, and the mass lesion was the higher indication for bronchoscopy. In 93% (n=251) of patients, bronchoscopy procedure time was ≤ 15 minutes. Cough was higher in 149 (55.2%) patients during the procedure of bronchoscopy. Fever was the symptom after bronchoscopy which was higher in 251 (93%) of patients. After bronchoscopy due to sedation, patients who experienced higher symptoms were, anxiety followed by respiratory depression.

Higher bronchoscopy was done in both genders in the >50 years of age group than <50 years (0.009). Mass lesion was the higher Indication for Bronchoscopy in the >50 years of the age group of patients (0.0138). During bronchoscopy, a higher number of patients experienced agitation in the >51 years of age group. After bronchoscopy higher number of patients had a fever in

the >51 years of age group (0.00001). After bronchoscopy, due to sedation higher number of patients experienced Gastro-esophageal reflux, hallucinations, anxiety, and respiratory depression higher in the >51 years of age group.

Among the gender-based analysis, in both genders, the bronchoscopy procedure time was ≤ 15 minutes (0.0292). Among the Indication for Bronchoscopy, the mass lesion was higher in females than males (0.0059), and nodules were higher in males than females (0.0009). During bronchoscopy, agitation was higher in females, whereas cough was higher in males (< 0.00001). After bronchoscopy higher number of female patients experienced Hemoptysis (< 0.00001). A higher number of sore throats were experienced by males (< 0.0004).

Among all the symptoms after bronchoscopy, fever was experienced by a higher number of patients for both < 1 day (n=86) and > 2 days (n=165). Among all the symptoms due to sedation, a higher number of patients experienced hallucination in the < 1 day (n=109), whereas anxiety was experienced by a higher number of patients > 2 days (n=131).

Conclusions: After bronchoscopy, the discomfort in relation to sedation affects both patient and the bronchoscopist. Discomfort in relation to sedation was higher in elderly patients (> 51 years of age group) than < 50 years of age group. As bronchoscopy is performed higher in > 51 years of age groups, usage of sedation during bronchoscopy makes the patients face different types of symptoms even for more than 2 days. Both genders face a lot of ill discomfort during bronchoscopy, after bronchoscopy, and due to sedation also, hence, the pulmonologist has to explain to the patient the ill symptoms that the patient may experience during bronchoscopy, before fixing the date for bronchoscopy. Local sedatives or spraying sedatives can be used instead

of rigid sedations. A consent form can be issued to the patient for sedation choice. As these ill symptoms need to be addressed and a protocol for best practice of sedation for bronchoscopy is essential for the best quality of life of patients.

Because, in our study, we have asked each patient for follow-up, and we feel, there are some unreported cases of ill symptoms also, which can be identified by a special, specific follow-up of these post-bronchoscopy patients.

Keywords: Bronchoscopy, Sedation, Consolidation, Visual Analog Scale, Hemoptysis, Respiratory depression, Hallucinations

Introduction

Bronchoscopies are widely performed to diagnose and provide appropriate treatment to pulmonary disease, most commonly bronchoscopy results in cough, pain, shortness, anxiety, agitation, breathing difficulties and other sedation-related discomforts¹.

Bronchoscopy, a routine technique in a pulmonary medicine unit, provides crucial information by enabling in-person inspection of the airway and collecting biological samples for a thorough assessment of the patient's clinical status². Due to the patient's desire to prevent the extra discomfort by sedation during operation is gradually becoming the standard of care for Bronchoscopy surgery³.

Bronchoscopy involves additional factors that might affect the level of comfort during flexible bronchoscopy, even though sedatives have a significant impact on it. The degree of patient comfort during flexible bronchoscopy can be increased by the bronchoscopist's better planning of treatments to address these issues and the best practice of sedation⁴.

Sedation considerably lessens patient discomfort and improves the likelihood of the procedure of

bronchoscopy⁵. Reduced levels of pain during flexible bronchoscopy are related to the midazolam-fentanyl combination and lower bronchoscopy anxiety⁶.

The bronchoscopist (also known as a proceduralist), who is ultimately responsible for the patient's comfort under their care, administers sedation in the majority of scenarios instead of an anesthetist, hence bronchoscopist renders great support to the patient's recovery⁷.

To achieve procedure tolerance without endangering the patient's ability to maintain a patent airway, as well as ventilatory and cardiovascular function, a bronchoscopist can safely administer pharmacological sedatives to reduce depression or use topical sedatives to a level of consciousness that is sufficient to carry out the procedure⁸.

An ideal sedative should be simple to administer, have a quick onset, a brief duration of effect, and a quick recovery with a quick return to cognition during bronchoscopy⁹. Sedatives should be reversible with a predictable and specific antagonist and have a predictable pharmacokinetic and pharmacodynamic profile that is not affected by interactions with other medications¹⁰. For longer and more involved interventional pulmonology treatments, heavy sedation administered must be completely prevented¹¹.

However, given the present evidence that proceduralist-administered sedation is seen to be safe and economical, additional thought should be given to formal sedation training and certification for non-anesthetists. Additionally, bronchoscopists must practice within their areas of expertise and be aware of the licenses that are available in each nation for the use of the various pharmacological sedatives¹².

It is well established that insufficient sedation makes patients feel more uncomfortable and makes them less likely to want repeat surgery¹³.

As the positive effects of individual sedatives on the process of clinical care, patient satisfaction, and resource utilization may outweigh their acquisition cost, higher-quality studies are required to evaluate the efficacy of the emerging pharmacological sedatives as well as their adverse effects in bronchoscopy¹⁴.

When a patient is fixed for bronchoscopy, the patient's anxiety increases, and becomes more ill, then the patient loses the preparedness for bronchoscopy, causing more discomfort to the patient and to the bronchoscopist also¹⁵. Sogukpinar, Ö, et al express that 70% of the study pulmonologist expressed, that administered sedatives were sufficient for the patient to perform the procedure of bronchoscopy¹⁶.

With the above background, and above publication, it is very clear that different types of researches were conducted by several authors, all for one reason, reducing the discomfort to the patients due to sedation, and the bronchoscopist during bronchoscopy, hence we conducted a follow-up study to assess the illness or discomforts causing during the process of bronchoscopy, or post procedure illness or discomfort caused in relation to sedation.

Patient satisfaction affects patients' willingness to return in flexible bronchoscopy and other clinical settings as well, hence willingness to return has been utilized as a stand-in indication of patient comfort. In the end, the Sedative's characteristics and use need to increase the procedure's safety as well as the comfort and tolerance of the patient.

Ethical clearance: This study received ethical clearance from the Institutional Ethical Committee to conduct the study.

Inclusion criteria

The patients were admitted for bronchoscopy procedures and expressed discomfort after bronchoscopy from Oct-2021 to Sep-2022.

Exclusion criteria

Moribund patients, infants, and women under gestation were not included in the present study.

Materials and methods

Methodology

Study Subjects: For a period of 1 year, at the respiratory medicine of Pondicherry Institute of Medical Science, 270 patients were included in this study after the bronchoscopy procedure and expressed discomfort. In this observational study patient demographic details, bronchoscopy procedure time, Indication for bronchoscopy, symptoms during bronchoscopy, symptoms after bronchoscopy, and symptoms related to sedation were observed and recorded.

Clinical profile and data collection

For all the 270 patients included in this study details such as age, gender, Procedure Time, Indication for Bronchoscopy, and symptoms during bronchoscopy were observed and recorded. The patients were asked to come for review daily for four days to observe the symptoms after the procedure of bronchoscopy and symptoms after the sedation. The follow-up of the study subjects was done and the details such as Symptoms after the procedure, Symptoms after Procedure related to Sedation were collected with the questionnaire, and the results were recorded.

Symptoms during Bronchoscopy

Flexible bronchoscopy was done for the study patients in whom Midazolam, and fentanyl (up to 50 mcg)¹⁷⁻²⁰, were used as sedatives. During bronchoscopy, the patient's discomfort or ill symptoms were observed and recorded.

Symptoms after Bronchoscopy

The symptoms after bronchoscopy were observed, questioned, and the responses were analyzed using Post-procedure Visual Analog Scale (VAS)²¹ and recorded.

Symptoms after Bronchoscopy in relation to sedation

The symptoms after bronchoscopy in relation to sedation were observed, questioned, and the responses were analyzed using Post-procedure Visual Analog Scale (VAS), and recorded.

Statistical Analysis

This study data was analyzed using 20.0 versions of SPSS. Mean \pm SD was done. Frequency and proportions were done for categorical variables. To identify the statistical significance between the group Chi-square tests were performed. A p-value of <0.05 was considered statistically significant.

Results

A total of 270 patients performed the procedure of bronchoscopy in the respiratory medicine unit. The basic facet of the bronchoscopy study population was observed, recorded, analyzed, and described in table-1. Males were 150 patients with a percentage of 55.6% and the females were 120 patients with a percentage of 44.4%. All the 270 patients' age was recorded and the Mean \pm SD was 51.9 \pm 16.12 years. The patients were further categorized for analysis as ≤ 50 years and >51 years, ≤ 50 years patients were 97 with a percentage of 35.9% and >51 years of patients were 173 with a percentage of 64.1%.

Table 1 also describes the indication for bronchoscopies such as consolidation, fibrosis, mass lesion, and nodules. Consolidation was found in 66 (24.4%) of patients, fibrosis in 51 (18.9%), and mass lesions, and nodules were in 81 (30.0%) and 72 (26.7%) respectively. The bronchoscopy procedure time is recorded, analyzed, and found ≤ 15 minutes bronchoscopy procedure was

performed in 251 (93.0%) of patients, and >15 minutes bronchoscopy procedure was performed in 19 (7.0%) of patients.

Table 1 also shows the symptoms during the Procedure was agitation found in 121 (44.8%), and cough was found in 149 (55.2%) of the patients. As this study is a follow-up study, the patients were asked to come for review daily for 4 days. The recorded symptoms after the procedure were hemoptysis, fever, sore throat, and very tiredness. Fever was found in 251 (93.0%) followed by very tired 133 (49.3%). Sore throat and hemoptysis were 125 (42.3%) and 114 (42.2%) respectively. Symptoms after the Procedure related to Sedation were Gastroesophageal reflux, Anxiety, Hallucinations, and Respiratory depression. Anxiety was found in 185 (68.5%) followed by Respiratory depression in 173 (64.1%). Gastroesophageal reflux and Hallucinations were 164 (60.7%) and 150 (55.6%) respectively.

Table 1: Basic Facet of Bronchoscopy Study Patients.

Variables	No (%)
Gender (n=270)	
Male	150 (55.6)
Females	120 (44.4)
Age Categories (in years) Mean±SD was 51.9 ± 16.12 years	
≤ 50 years	97 (35.9)
>51 years	173 (64.1)
Indication for Bronchoscopy	
Consolidation	66 (24.4)
Fibrosis	51 (18.9)
Mass lesion	81 (30.0)
Nodules	72 (26.7)
Procedure Time	
≤15 minutes	251 (93.0)
>15 minutes	19 (7.0)

Symptoms during Procedure	
Agitation	121 (44.8)
Cough	149 (55.2)
Symptoms after procedure	
Hemoptysis	114 (42.2)
Fever	251 (93.0)
Sore Throat	125 (42.3)
Very Tired	133 (49.3)
Symptoms after Procedure related to Sedation	
Gastro esophageal reflux	164 (60.7)
Anxiety	185 (68.5)
Hallucinations	150 (55.6)
Respiratory depression	173 (64.1)

As we further categorized the patients based on their age and the categorized 2 groups were ≤ 50 years patients and >51 years of patients which were explained in Table 2. Out of 270 patients, ≤ 50 years were 97 (35.9%), and >51 years were 173 (64.1%). Out of 270 patients, males were 64 (66.0%) in the ≤ 50 years of age group, 86 (49.7%) were in the >51 years of age group with a statistical significance of 0.009, and females were 33 (34.0%) in the ≤ 50 years of age group, 87 (50.3%) were in the >51 years of age group with the statistical significance of 0.009.

Table 2 also explains the indication for bronchoscopy based on age group. Among the age groups, indications for bronchoscopy were analyzed and 13 (13.4%) consolidation was found in the ≤ 50 years of age group, and 53 (30.6%) were in the >51 years of age group with a statistical significance of 0.0016. Among the 270 patients, 21 (21.6%), had fibrosis found in the ≤ 50 years of age group, and 30 (17.3%) were in the >51 years of age group. 38 (39.2%) mass lesion was found in the ≤ 50 years of age group, and 43 (24.9%) was found in the >51

years of age group with statically significance of 0.0138.

Nodules were also one of the indications for bronchoscopy, and 25 (25.8%) of nodules were found in the ≤ 50 years of age group, and 47 (27.2%) were found in the >51 years of age group. As we have calculated the bronchoscopy procedure time and analyzed based on age groups, we found that in 94 (96.9%) patients, in the age group of ≤ 50 years, and in 157 (90.8%) of patients in >51 years, the bronchoscopy was performed in ≤15 minutes. In 3 (3.1%) patients, in the age group of ≤ 50 years, and in 16 (9.2%) patients in the >51 years of age group, the bronchoscopy was performed in >15 minutes.

Table 2 also describes the age-wise distribution of symptoms during the procedure. Agitation was found in 26(26.8%) of patients whose age group is ≤ 50 years, and in 95(54.9%) of patients whose age group is >51 years with a statistical significance of 0.00001. Cough was found in 71 (73.2%) of patients whose age group is ≤ 50 years of age group, and in 78 (45.1%) of patients whose age group is >51 years age group with a statistical significance of 0.00001.

We analyzed symptoms after procedure and symptoms after procedure related to sedation based on age groups as

Table 2: Age-wise distribution of characteristics of bronchoscopy and its Impact.

Variables		Age of the patients		P Value
		≤ 50 years (n=97) (35.9%)	>51 years (n=173) (64.1%)	
Gender (n=270)	Male	64 (66.0)	86 (49.7)	0.009*
	Female	33(34.0)	87(50.3)	0.009*
Indication for Bronchoscopy	Consolidation	13(13.4)	53(30.6)	0.0016*
	Fibrosis	21(21.6)	30(17.3)	0.386
	Mass lesion	38(39.2)	43(24.9)	0.0138*
	Nodules	25(25.8)	47(27.2)	0.8037
Procedure Time	≤15 minutes	94(96.9)	157(90.8)	0.0578
	>15 minutes	3(3.1)	16(9.2)	0.0578
Symptoms during	Agitation	26(26.8)	95(54.9)	<0.00001*

illustrated in Table 2. In the symptoms after the procedure, fever was high with 93 (95.9%) in the ≤ 50 years of age group, and 158 (91.3%) in the >51 years age group. Hemoptysis was in 26 (26.8%) in the ≤ 50 years of age group, and 88 (50.9%) in the >51 years age group with a statistical significance of 0.00001. The sore throat was in 54 (55.7%) in the ≤ 50 years of age group, and 71 (41.0%) in the >51 years age group with a statistical significance of 0.0207 (Table 2).

Very tired was 46 (47.4%) in the ≤ 50 years of age group, and 87(50.3%) in the >51 years age group. Gastroesophageal reflux was with 58 (59.8%) in the ≤ 50 years of age group, and 106 (61.3%) in the >51 years age group. Anxiety was in 61 (62.9%) in the ≤ 50 years of age group, and 124 (71.7%) in the >51 years age group. Hallucinations were in 47 (48.5%) in the ≤ 50 years of age group, and 103 (59.5%) in the >51 years age group. Respiratory depression was with 63 (64.9%) in the ≤ 50 years of age group, and 110 (63.6%) in the >51 years age group (Table 2).

Procedure	Cough	71(73.2)	78(45.1)	<0.00001*
Symptoms after procedure	Hemoptysis	26(26.8)	88(50.9)	0.0001*
	Fever	93(95.9)	158(91.3)	0.1611
	Sore Throat	54(55.7)	71(41.0)	0.0207*
	Very Tired	46(47.4)	87(50.3)	0.6513
Symptoms after Procedure related to Sedation	Gastro esophageal reflux	58(59.8)	106 (61.3)	0.8143
	Anxiety	61(62.9)	124 (71.7)	0.1357
	Hallucinations	47(48.5)	103 (59.5)	0.0787
	Respiratory depression	63(64.9)	110 (63.6)	0.8226

Chi-square test *-Statistically Significant

We further categorized the study population into 2 groups based on their gender and table 3 shows the gender-based distribution of characteristics of bronchoscopy and its impact.

Out of 270 patients, males were 150 (55.6%), and females were 120 (44.4%). 64 (66.0%) of male patients were in the age group of ≤ 50 years, and 33 (34.0%) were females in the age group of ≤ 50 years group with a statistical significance of 0.0095. 86 (49.7%) of male patients were in the age group of >51 years, and 87 (50.3%) were females in the age group of >51 years group with a statistical significance of 0.0095 (Table 3).

The indication for bronchoscopy was also analyzed based on gender and found among the 66 patients with consolidation, males were 32 (48.5%), and females were 34 (51.5%). Among the 51 patients with fibrosis, males were 26 (51.0%), and females 25 (49.0%). Mass lesion was in 81 patients, and among them, males were 27 (33.3%), and females were 54 (66.7%) with a statistical significance of 0.0059. Among the 72 patients with nodules, males 52 (72.2%), and females 20 (27.8%) with a statistical significance of 0.0009 (Table 3).

Table 3 also expresses the Procedure Time of the bronchoscopy in both genders. 144 (57.4%) male patients

and 107 (42.6%) female patients' bronchoscopy procedure time was ≤15 minutes with a statistical significance of 0.0292. 6 (31.6%) male's bronchoscopy procedure time was >15 minutes, and among females 13 (68.4 %), the bronchoscopy procedure time was >15 minutes with a statistical significance of 0.0292. Among the 121 patients who showed agitation symptoms during the procedure, were males 48 (39.7%), and females 73 (60.3%) with statistical significance of <0.00001. Among the 149 patients who showed cough symptoms during the procedure, males were 119 (79.9%), females 30 (20.1%) with a statistical significance of <0.00001.

Among the 270 patients, symptoms after the procedure were observed on follow-up, and analyzed data outlines that hemoptysis was observed in 114 patients, among them males 41 (36.0%), and females 73 (64.0%) with statistical significance of <0.00001. Among 251 patients who were observed with fever after the procedure of bronchoscopy, males 142 (56.6%), and females 109 (43.4%). Among the 125 patients who expressed that they had a sore throat after the procedure of bronchoscopy, males were 84 (67.2%), and females 41 (32.8%) with a statistical significance of <0.0004. 133 patients expressed that they were very tired than routine,

among them, males were 74 (55.6%), and females were 59 (44.4%) (Table 3).

Table 3 represents the 270 patient's gender-based observation of symptoms after the procedure of bronchoscopy in relation to sedation. Gastro-esophageal refluxes were observed in 164 patients, among them, males 92 (50.1%), and found females 72 (43.9%). Among 185 patients in whom anxiety was found high

than their normal behavior after the procedure of bronchoscopy, males 96 (51.9%), and females 89 (48.1%). 150 patients expressed hallucinations (which were not normal and not routine behavior) after the procedure of bronchoscopy. Males were 86 (57.3%), and females 64 (42.7%). Among the 173 patients expressed respiratory depression, among them, males 96 (55.5%), and females were 77 (44.5 %)

Table 3: Gender-based distribution of characteristics of bronchoscopy and its Impact

Variables		Gender N (%)		P Value
		Male n=150 (55.6)	Female n=120 (44.4)	
Age	≤ 50 years (n=97)	64 (66.0)	33 (34.0)	0.0095*
	>51 years (n=173)	86 (49.7)	87 (50.3)	0.0095*
Indication for Bronchoscopy	Consolidation (n=66)	32 (48.5)	34 (51.5)	0.1835
	Fibrosis (n=51)	26 (51.0)	25 (49.0)	0.5061
	Mass lesion (n=81)	27 (33.3)	54 (66.7)	0.0059*
	Nodules (n=72)	52 (72.2)	20 (27.8)	0.0009*
Procedure Time	≤15 minutes (n=251)	144 (57.4)	107 (42.6)	0.0292*
	>15 minutes (n=19)	6 (31.6)	13 (68.4)	0.0292*
Symptoms during Procedure	Agitation (n=121)	48 (39.7)	73 (60.3)	<0.00001*
	Cough (n=149)	119 (79.9)	30 (20.1)	<0.00001*
Symptoms after procedure	Hemoptysis (n=114)	41 (36.0)	73 (64.0)	<0.00001*
	Fever (n=251)	142 (56.6)	109 (43.4)	0.2211
	Sore Throat (n=125)	84 (67.2)	41 (32.8)	0.0004*
	Very Tired (n=133)	74 (55.6)	59 (44.4)	0.9783
Symptoms after Procedure related to Sedation	Gastro esophageal reflux (n=164)	92 (50.1)	72 (43.9)	0.8235
	Anxiety (n=185)	96 (51.9)	89 (48.1)	0.0576
	Hallucinations (n=150)	86 (57.3)	64 (42.7)	0.5110
	Respiratory depression (n=173)	96 (55.5)	77 (44.5)	0.9774

Chi-square test *-Statistically Significant

Figure 1 illustrates the number of days of all symptoms after the procedure, out of 270 patients, hemoptysis was found in 30 patients, fever in 86 patients, Sore Throat in 70 patients, and very tired than usual in 62 patients for ≤1 day. Out of 270 patients, hemoptysis was found in 84

patients, fever in 165 patients, sore throat in 55 patients, and very tired than usual in 71 patients for ≥2 days.

Figure 1: Symptoms after the procedure and it's presentence in the Number of days

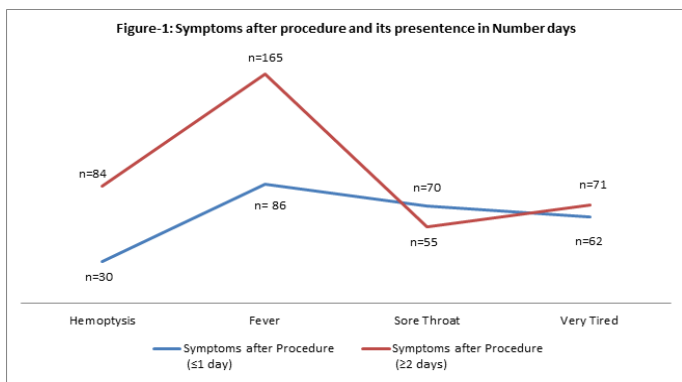
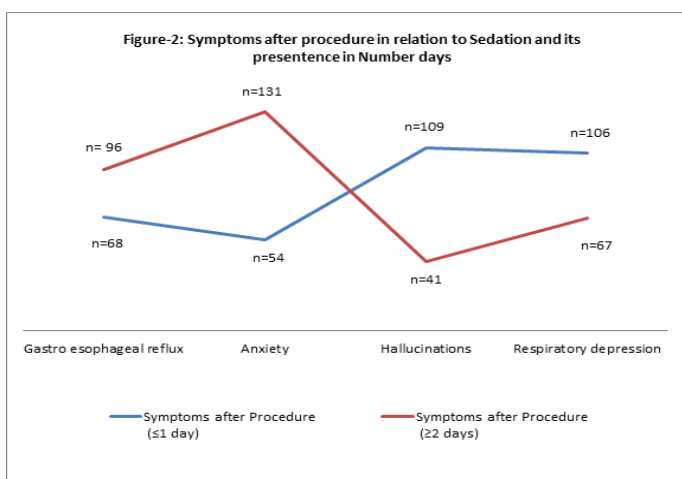


Figure 2 shows the number of days of all symptoms after the procedure in relation to sedation. Out of 270 patients, gastro-esophageal reflux was found in 68 patients, anxiety in 54 patients, hallucinations in 109 patients, and respiratory depression in 106 patients for ≤ 1 day. Out of 270 patients, gastro-esophageal reflux was found in 96 patients, anxiety in 131 patients, hallucinations in 41 patients, and respiratory depression than usual were in 67 patients for ≥ 2 days.

Figure 2: Symptoms after the procedure in relation to Sedation and its presence in Number of days



Discussion

Even though bronchoscopy is a diagnostic tool, this procedure causes a lot of discomfort for patients. These discomforts are not addressed in the clinical unit, but bring less quality of life to the patient. In our study, we found that in both genders, the bronchoscopy procedure

time was ≤ 15 minutes (0.0292), whereas a study by Magazine, R., et al showed the mean duration, but not provided between genders, as gender is a vital vulnerability for any diseases²².

In a published data by Grossmann, B., et al, 14 patients after sedation showed ill symptoms such as confusion, epigastric pain, headache, dizziness, post-procedural fever, and chest pressure, in our study also, all these discomforts were observed with patients, but this study also did not analyze between genders²³.

A study by Pertzov, B., shows that 22 patients expressed discomfort after bronchoscopy and its sedation, 5 (22.8%) out of them expressed respiratory depression, in our present study, we reported 64% of respiratory depression, the high percentage is due to all patients selected for the study were with discomforts, and not only underwent bronchoscopy. We also reported that respiratory depression is higher in the >51 years of age group, and males expressed a higher percentage of respiratory depression than females²⁴.

Barends, C. R et al reported nausea, hypotension, bradycardia, hypertension, and dry mouth, but not reported the gender-based report, in our study, anxiety was higher experienced discomfort followed by respiratory depression, and males were higher than females experiencing discomfort due to sedation²⁵.

Tariq, A., et reported that 100% of study patients experienced obstructive events such as apnea, and central events in 36% of the study patients, whereas in our study, we reported males experienced more discomfort, particularly above the age of 51 years²⁶. In a study conducted on COPD patients, minor bleeding was observed in 7.1%, and major bleeding was observed in 0.8% of the patients and in our study, we found 42.2% of the patients experienced minor hemoptysis²⁷.

In a study by Douglas, N., et al²⁸, the traditional way of conscious sedation makes the patient at risk positively of de-saturation, and the other author reported prolonged apnea in 48.8%²⁹, but both the authors did not report the percentages in males, and which age groups were more prone to apnea, whereas in our study also respiratory depression was in 64.1%, especially high in males with >51 years of age. This percentage is high, which may be due to the reason that even a small amount of breathing discomfort or not normal breathing was considered respiratory depression.

Franzen, D. P., explains that, if non-anesthesiologist is administering sedation, they must be trained and educated well to sedate a patient, and they must be certified to give sedation to the patient³⁰. Published research declared that 40% of bronchoscopists do not regularly administer sedation, but other healthcare workers administer the sedation, and the article also describes, if bronchoscopists administer the sedation, the patient feels comfortable³¹.

Ibrahim, E., et al reported another way of reducing the sedatives by giving a premedication with pregabalin, which can reduce the dosage of sedatives to be administered, leading to less discomfort due to sedatives³². de Lima, A., et al suggests that sedation must be depending on patient-specific or as per the patient's wish and comfort, the choice of selection of bronchoscopy or airway method, the choice of ventilation mode, premedication or choice of sedative based on the patient-specific and pharmacologic specific³³. As per Strohleit, D., et al, only 6 guidelines, and 3 expert statements on bronchoscopy are available. 2 guidelines provide recovery time but lack recommendations³⁴.

Hence, in conclusion, our present study suggests and recommends that premedication, local sedatives, or topical sedatives can be used instead of rigid or flexible

sedations. Bronchoscopy can be performed via tracheostomy tube, in which sedation will not be required. A consent form can be issued to the patient for sedation choice. If we administer patient-specific sedatives during bronchoscopy it will bring a good impact in reducing the discomfort to the patient and improve the best practice of sedation.

A protocol or Global Guidelines for best practice of sedation which includes a follow-up section, in which the patient's discomforts can be addressed, and identify the complete recovery of patients from the discomforts due to sedation. These Global Guidelines are very essential to bring the best life to a patient, no matter what the procedure is, whatever the diagnosis will be, and whatever the surgery may be, the patient must willfully accept to enter into any medical unit to receive a recovery to live a complete, and quality of life.

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