Section: Anaesthesiology

Original Research Article

ENDOBRONCHIAL ULTRASOUND UNDER INTRAVENOUS ANAESTHESIA WITH LARYNGEAL MASK AIRWAY- A BEGINNER'S EXPERIENCE

Aakash Kasana[1], Yatin Mehta[2], Geeta Karki[3], Lalit Singh[4]

[1]Junior Resident, Department of Anaesthesiology, SRMS IMS, Bareilly, Uttar Pradesh, India
[2]Associate Professor, Department of Respiratory Medicine, SRMS IMS, Bareilly, Uttar Pradesh, India
[3]Professor and HOD, Department of Anaesthesiology, SRMS IMS, Bareilly, Uttar Pradesh, India
[4]Professor and HOD, Department of Respiratory Medicine, SRMS IMS, Bareilly, Uttar Pradesh, India

Received : 06/01/2026
Received in revised form : 07/02/2026
Accepted : 26/02/2026

Keywords:
Endobronchial ultrasound; EBUS-TBNA; Total intravenous anaesthesia; Laryngeal mask airway; Hemodynamic stability; Patient satisfaction.

Corresponding Author:
Dr. Yatin Mehta,
Email: yatin.mehta1989@gmail.com

DOI: 10.47009/jamp.2026.8.2.89

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2026; 8 (2); 486-492

ABSTRACT

Background: Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) is widely used for diagnosing and staging mediastinal and pulmonary diseases. Optimal anaesthetic management varies, and limited data exist on the use of total intravenous anaesthesia with a laryngeal mask airway (LMA) in this setting.

Materials and Methods: An observational study was conducted on 100 ASA Grade I and II patients who underwent EBUS-TBNA under total intravenous anaesthesia at SRMS IMS, Bareilly. Induction was done using butorphanol and propofol, and airway secured with appropriately sized LMA. Patients were maintained on spontaneous ventilation. Vital parameters, intra- and post-procedure complications were monitored. Feedback was collected from patients and the bronchoscopist using structured questionnaires.

Result: Of 100 patients (57 males, 43 females; mean age 58.06 ± 12.56 years), the average procedure duration was 65.32 ± 18.67 minutes. Transient hypotension occurred in 6%, desaturation in 4%, and minor bleeding in 7%. Post-procedure issues included sore throat (10%) and cough (8%). One patient required brief non-invasive ventilation. 86% of patients were willing to undergo the procedure again. The bronchoscopist reported no difficulty in 83% of cases and was satisfied with anaesthesia in 93%.

Conclusion: EBUS-TBNA under intravenous anaesthesia with LMA is safe and well tolerated. It provides favourable operating conditions and high patient satisfaction, making it a suitable method in centres where the procedure is newly introduced.

INTRODUCTION

Endobronchial ultrasound is an advanced and vital tool for the diagnosis of mediastinal and lung diseases and also helps in staging of the disease. Moderate sedation,[1-3] deep sedation and general anaesthesia has been widely used in different centres.[4,5] The choice of sedation depends on the operator and the location. In USA the majority of endo bronchial ultrasound TBNA are performed under sedation. This facilitates procedure and patient comfort. Multiple studies have evaluated and compared the results of EBUS TBNA under different types of sedation ranging from conscious sedation to general anaesthesia.[4,6]

During endo bronchial ultrasound when the bronchoscope comes in contact with the bronchial mucosa it causes cough and may lead to laryngospasm and cause difficulty for the bronchoscopist in puncturing the target tissue. Experts are of the opinion that it is vital to prevent any patient movement while ensuring adequate ventilation by means of either endotracheal intubation or laryngeal mask airway.[7,8] Laryngeal mask airway with deep sedation for EBUS TBNA allows adequate ventilation, ease of bronchoscope insertion and access to all lymph node stations. But it needs to be emphasized that general anaesthesia or deep sedation with laryngeal mask airway needs to be performed in operative room by the anaesthesiologist thus increasing the cost of the procedure which may not always be feasible.

The technique of endo bronchial ultrasound guided trans needle aspiration has been recently introduced in our institute. As both the pulmonologist and the anaesthetist are new to the procedure it was decided to perform the procedure under deep sedation with

ISSN (O): 2687-5365; ISSN (P): 2753-6556

laryngeal mask airway in situ. Here in this study we share a beginners experience.

Endobronchial Ultrasound Bronchoscope with Transbronchial Needle Assembly Used for EBUS-TBNA

MATERIALS AND METHODS

This observational study was conducted after approval from the institutional ethical community. All ASA GRADE 1 AND 2 patients who were posted for EBUS under anaesthesia in the department of pulmonary medicine were included in the study. The study was started in January 2025. All the patients presented to the pulmonary department with complaints of cough and other constitutional symptoms were evaluated for tuberculosis, sarcoidosis, interstitial lung disease, lymphoma etc and were posted for EBUS when diagnosis could not be established by haematological investigations, chest x-ray and computed tomography of thorax. All patients were thoroughly evaluated a day prior to procedure by detailed history, physical examination, airway examination and necessary investigations. Patients belonging to ASA grade 3 and above were excluded from the study. This technique has been introduced recently in our institute and as both the pulmonary physician and anaesthetist are new, it was decided to perform the procedure under general anaesthesia with laryngeal mask airway. All cases were performed by the same pulmonary physician and anaesthetist. Informed consent was taken from all patients. To make calculations and interpretation easier it was decided to collect and share experience after collecting data from 100 patients.

All the patients were advised to be nil by mouth for 6 to 8 hours before the procedure. On the day of the procedure, an intravenous access was established, all standard anaesthetic monitors (ECG, SPO2, NIBP, EtO2) were attached and premedication in the form of injection glycopyrrolate 0.2 mg, injection ondansetron 4 mg, injection midazolam 1 mg was given. As airway instrumentation was a pivotal part of both anaesthesia and the procedure, prophylactic steroid injection dexamethasone was given to prevent airway oedema in post procedure period. After oxygenating the patient for three minutes injection butorphanol 2 mg and injection propofol 2 milligram per kg was given intravenously as induction agent. Laryngeal mask airway of size appropriate to the weight was introduced and cuff inflated to provide adequate oropharyngeal seal and proper ventilation as monitored by adequate chest rise and end tidal carbon dioxide. A catheter mount was attached to LMA and Bain's circuit was used for ventilating the patient. Patients were maintained on spontaneous respiration with oxygen nitrous mixture of 30 : 70 and injection propofol as intermittent bolus of 30-50 mg whenever the depth of anaesthesia was sub optimal. The catheter mount provided easy access for the Bronchoscope through its port. Ultrasound guided biopsy was taken followed by adequate haemostasis. The primary objective was the stability of the patient hemodynamically during the procedure. Anaesthetic complications during procedure like hypotension, hypertension and hypoxemia were noted. Hypotension was defined as mean arterial pressure or MAP less than 20% of baseline requiring fluid bolus or vasopressor injection mephentermine. Hypertension was defined as MAP more than 20% of base line requiring propofol bolus or injection metoprolol. Hypoxemia defined as SpO2 less than 90% for more than 1 minute. Before removing the bronchoscope a thorough check of the entire tracheo bronchial tree was done and suctioning of clots and secretions was done. In the post procedure period, a questionnaire was given to the pulmonologist for assessing the satisfaction and the difficulties encountered if any. At the time of discharge the patient was given a questionnaire asking for any symptoms and his willingness to undergo the procedure if necessary in future.

RESULTS

During the study period a total of 100 patients under went EBUS TBNA under general anaesthesia with laryngeal mask airway. All the data regarding the demographic details, duration of procedure hemodynamic parameters, intra procedure and post procedure adverse effects were recorded on MS Excel sheet. Answers to the questionnaire given to the patient and pulmonologist were also recorded. [Table 1] shows the demographic details of the patients. Out of a total of 100 patients 46 were females and 54 were males. The youngest patient was 28 years and oldest was 82 years with an average age of 58.06 years (mean± SD= 58.06 ± 12.56).The mean duration of the procedure was 65.32 ± 18.67 minutes. During the procedure, all patients remained hemodynamically stable for majority of the duration except during initial 15 minutes when there was a significant fall in blood pressure and heart rate. [Table 2] shows the hemodynamic parameters of the patients. The mean baseline systolic blood pressure was 120.22 ± 17.65

ISSN (O): 2687-5365; ISSN (P): 2753-6556

mm Hg and baseline diastolic blood pressure was 80.69 ± 7.68 mm Hg. Heart rate was 83.28 ± 12.15 per minute. The mean systolic blood pressure at 5 minutes after induction was 127.19 ± 10.94 mm Hg which was significantly lower than baseline (p =0.0009) and at 15 minutes it was 123.69 ± 10.19 (p =_0.0894). At all other times till end of procedure there was no significant difference in Systolic BP . Diastolic blood pressure and heart rate also were significantly lower at 5 and 15 minutes.

[Table 3] shows intra procedure adverse effects. Out of 100 patients 6 patients developed hypotension that required bolus of injection mephentermine. One patient developed bradycardia requiring injection atropine, 4 patients developed desaturation and seven patients had some bleeding during the procedure which was controlled by cold saline lavage. [Table 4] shows post procedure adverse effects. The most common adverse effect (15/100) was upper airway obstruction due to tongue fall. The second common adverse effect was sore throat/ pain which was observed in 10 patients and 8 patients developed cough in post procedure period. One patient had CO2 retention because of respiratory depression and had to be given non invasive ventilation support for 1 hour after which the patient became normal. There was no incidence of bronchospasm, laryngospasm, bleeding and chest pain after procedure.

[Table 5] shows the response of patients to the questionnaire designed for determining patient satisfaction. Majority of patients (86/100) answered that they would definitely undergo the procedure in the same way again if needed. 9 patients responded that they probably would undergo the procedure if needed. Five patients were unsure about undergoing procedure again but none of the patients responded negatively to the question. Table 6 shows the response of the bronchoscopist to the questionnaire. As per the pulmonologist in majority of procedures (83/100) he had no difficulty in any step. In eight patients he faced difficulty in introduction of the scope, in six patients there was difficulty in needle aspiration and in three patient there was difficulty in target identification. In four patients the reason for the difficulty was patient movement whereas in six patients it was because of cough and in seven patients the difficulty was due to the anatomical factors. In 93 out of 100 procedures the pulmonologist was satisfied with the anaesthesia whereas in 7 patients he expected some improvement but he did not think that it would have been better without anaesthesia in any case.

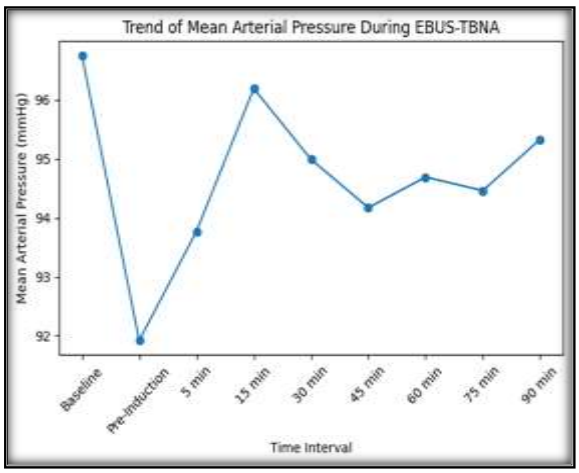
Table 1: Demographic details of patients

Gender Male Female	 57 43
Age (years) Maximum Minimum Average Sd	 82 28 58.06 12.56
Mean duration (minutes) ± sd	65.32 ± 18.67

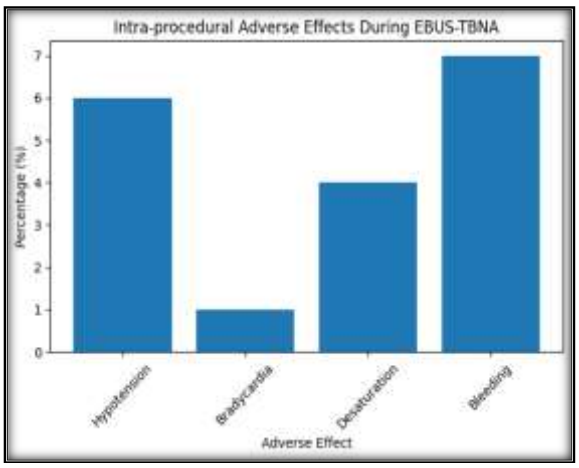
Table 2: hemodynamic parameters

TIME	SBP(mm Hg)MEAN ± SD	P value	DBP(mm Hg)MEAN ± SD	P value	MAP(mmHg)MEAN ± SD	P value	HR (Beats/min)	P value
Baseline	120.22±17.65		80.67±7.68		96.75±8.93		83.28±12.15	
Pre-induction	130.75±13.89	<0.001	73.9±9.37	<0.0001	91.92±11.4	0.0010	78.14±12.01	0.003
5 minute	127.19±10.94	0.0009	77,25±8.21	0.002	93.77±9.14	0.0207	76.25±12.18	0.000
15 minute	123.69±10.09	0.0894	78.53±9.54	0.082	96.19±8.42	0.6487	80.24±13.75	0.099
30 minute	122.94±12.8	0.2137	79.88±10.61	0.547	94.99±9.72	0.1839	77.33±10.84	0.000
45 minute	119.89±12.82	0.8799	77.89±12.68	0.622	94.17±8.78	0.2634	79.95±12.88	0.062
60 minute	121.81±10.28	0.7730	77.76±13.54	0.630	94.69±8.31	0.0928	79.89±12.89	0.057
75 minute	123.67±11.72	0.1050	78.24±10.54	0.639	94.46±8.34	0.0824	80.46±12.21	0.103
90 minute	121.37±13.91	0.6094	79.34±8.54	0.248	95.33±5.34	0.1739	81.76±12.9	0.392

ISSN (O): 2687-5365; ISSN (P): 2753-6556



Hemodynamic Trend (MAP)



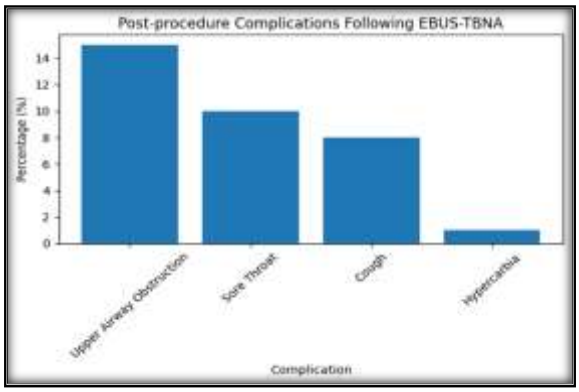
Intra-procedural Adverse Effects

Table 3. Intraprocedure adverse effects

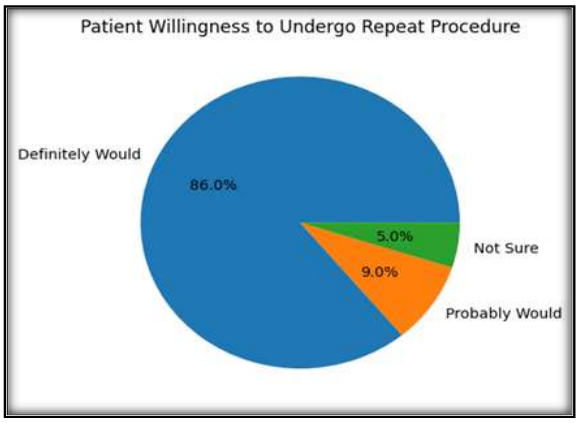
Adverse effect	Number	Percentage
Hypotension	6	6
Bradycardia	1	1
Desaturation	4	4
Bleeding	7	7

Table 4: post procedure complications

Complication	Number	Percentage
Bronchospasm	0	0
Laryngospasm	0	0
Upper airway Obstruction	15	15
Hypercarbia	1	1
Sore throat/pain	10	10
Chest pain	0	0
Cough	8	8
Bleeding	0	0



Post-procedure Complications



Patient Satisfaction (Pie Chart)

Table 5: patient satisfaction or willingness to undergo procedure again

Response	Number
Definitely not	0
Probably not	0
Not sure	5
Probably would	9
Definitely would	86

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Table 6: bronchoscopist satisfaction

Question	Response	Number
Difficult step	EBUS introduction	8
	Target identification	3
	TBNA	6
	Other	0
	None	83
Contributing factor to above difficulty	Patient movement	4
	Cough	6
	Anatomical factors	7
	None	83
Repeat procedure	Similar anaesthesia	93
	Better anaesthesia	7
	Without anaesthesia	0

DISCUSSION

A recently added tool in the diagnosis and staging of pulmonary and mediastinal diseases is the endobronchial ultrasound guided transbronchial needle aspiration (EBUS-TBNA). It is evident from the recent literature that mediastinoscopy has been replaced by EBUS-TBNA as the diagnostic modality for hilar and mediastinal malignant lesions8 as well as inflammatory granulomatous diseases like tuberculosis and sarcoidosis with a specificity of 100% and negative predictive value of 92.9%.[9,10]

EBUS is a day care procedure with high accuracy, patient safety and rapid evaluation on site by the pathologist. But, still there are very few centres providing this facility in India. Introduction of this facility in our institute has minimised the referral of patients to metro cities for the procedure. There are some concerns for the anaesthesiologist in this procedure like sharing of airway with the operator, a large diameter of scope causing patient discomfort demanding adequate depth of anaesthesia to prevent coughing and/or bronchospasm and laryngospasm. Different centers perform this procedure in different ways ranging from local anaesthesia, mild to moderate sedation to deep sedation and general anaesthesia. General anaesthesia provides maximal safety and comfort to the patient and as well as to the new pulmonologists with their learning curve and ensures good diagnostic yield.[11] The choice varies depending upon the operator and the location. In our institute this diagnostic technique has been introduced recently and keeping our beginner status in mind it was decided mutually by the pulmonologist and anaesthesiologist to perform this procedure in deep sedation with intravenous drugs with LMA for securing airway. Other advantages of LMA are secure airway, adequate ventilation through catheter mount and access to higher mediastinal lymph nodes. In a study by Yu Ping Li and colleagues also they chose general anaesthesia with LMA for the procedure.[12] Here, in this study we will be describing our experience as a beginner.

During our study period a total of 100 patients were posted for EBUS- TBNA. Out of 100 patients 57 were males and 43 were females. The mean age of the patients was 58.06 years with a standard deviation of 12.56 years, with the youngest patient aged 28 years and oldest patient aged 81 years. The mean duration of the procedure in our study was 65.32 minutes (SD = 18.67 minutes). The procedure takes 30 – 45 minutes depending upon the experience of the operator. In a randomised controlled trial by Casal RF et al,[5] the EBUS duration was 23.2 ± 14.6 minutes in GA group and 16.1 ± 9.4 minutes in moderate sedation group. In a study by F J F Herth et al the mean procedure time was 12.5 minutes with range between 8 to 21 minutes[13]. Yarmus,[14] and coworkers found that the duration of procedure was 46.9 minutes. Duration of procedure in our study was longer as compared to above studies. This can be explained by the fact that the procedure was newly started and both the pulmonologist and anaesthesiologist are in the initial phase of their learning curve. Similar to our study, the mean duration of procedure was 67.0 ± 17.6 minutes in a study conducted by Arpana Kedlaya et al.[15] This maybe because it is also an Indian study in an institute where the technique was newly introduced.

In our study, we used propofol for induction at a dose of 2 -2.5 mg/kg with subsequent intermittent boluses of 30 -40 mg as per need. Propofol has been used for giving anaesthesia for EBUS – TBNA by Kedlaya A et al and Sarkisset al.[15,16]

The primary objective in our study was evaluation of haemodynamic stability. It was observed that all patients remained haemodynamically stable for most of the duration of procedure except during initial five minutes when there was a significant fall in Blood pressure and heart rate. This fall in blood pressure can be explained by the vasodilatory effect of propofol and fasting state of the patient causing relative hypovolemia. It was easily resolved by fluid bolus. Similar to our study, Kedlaya A et al,[15] also observed minimal haemodynamic fluctuations with a MAP variation of less than 20% from baseline values. Study by Casal R F et al,[5] also found minimal hypotension in the general anaesthesia group. In our study 6 out of 100 patients developed hypotension that required treatment with bolus mephentermine and only 1 patient required injection atropine for bradycardia.

In our study, 4 patients experienced desaturation during procedure that required positive pressure

ISSN (O): 2687-5365; ISSN (P): 2753-6556

ventilation and removal of bronchoscope temporarily. In contrast, there were no episodes of desaturation in studies by Casal R F et al,[5] and Kedlaya A et al.[15] In our study, intra procedure bleeding was observed in 7 out of 100 patients which was readily stopped by cold saline lavage. Similar to our study, Oztas S et al,[17] Schlatter et al,[18] and Stolz D et al19 also observed minor complications like temporary desaturation, hypotension and self restricting bleeding in patients with sedation. In the study by Casal R F et al,[5] 2 patients had hypoxemia, 14 patients had cough and 3 patients developed arrythmia.

In our study, 15 out of 100 patients had upper airway obstruction requiring oropharyngeal airway at the end of the procedure because of excess sedation or the procedure ending immediately after a bolus of propofol. Out of 100 patients 10 complained of sore throat and 8 patients complained of cough in the post procedure period. Only one patient needed prolonged care in the post procedure period in the form of non invasive ventilation because of development of hypercarbia due to respiratory depression as a result of over sedation. In the study by Casal R F et al,[5] 9 patients out of 75 (12%) and 14 patients (18.7%)developed cough in the post procedure period which is a little higher than in our study. In their study they also observed shortness of breath in 9.3% and chest pain in 8 % patients though these complications were not observed in our study.

In our study, 86 out of 100 patients were satisfied and responded that they would definitely undergo the procedure again if required, 9 out of 100 said probably they would undergo the procedure and 5 were not sure but none responded in negative. Thus we can conclude that the patients were highly satisfied by the procedure. Very few studies have evaluated patient satisfaction about the procedure. Jeyabalan et al,[2] in their study observed that 61 out of 70 patients (87%) would definitely/probably undergo a repeat procedure while 5 of 70 (7%) stated that they would definitely/probably not undergo the procedure again if required and only 4/70 (6%) were unsure. Similarly, Steinfort and Irving3 also reported high level of patient satisfaction in 28 out of 41 patients with EBUS – TBNA for lung cancer staging.

During any procedure, the successful outcome depends on the comfort level of both the patient and the operator. So in this study we also tried to assess the comfort level or the difficulties faced by the pulmonologist while performing EBUS guided TBNA. The questionnaire was given to the pulmonologist immediately after the procedure. As is evident from Table 6, the pulmonologist had no difficulty in majority of cases (83%) and whatever difficulties observed were due to anatomical factors, cough or patient movement. The pulmonologist was very much satisfied with the anaesthesia and was willing to repeat the procedure under similar anaesthesia. Similar to our study, in the study done by Gabriela O et al,[20] to compare endobronchial ultrasound under moderate sedation versus general anaesthesia, the bronchoscopist experienced difficulty in 24 out of 56 patients (42.9%) done under moderate sedation. Thus the level of satisfaction of the bronchoscopist was higher in our study which maybe attributed to deeper level of anaesthesia with secured airway in our study.

Most of the centres do not have an easy access to general anaesthesia as well as higher cost associated with general anaesthesia has made mild to moderate sedation as the anaesthesia of choice for EBUS – TBNA in most setups.

CONCLUSION

Endobronchial ultrasound guided transbronchial needle aspiration when done under total intravenous anaesthesia with laryngeal mask airway in situ not only ensures good haemodynamic stability during the procedure but also secures the airway and thus alleviating the problem of shared airway. It is associated with satisfactory working conditions for the bronchoscopist as well as provides good comfort to the patient. It may add a little cost to the procedure compared to that done under local anaesthesia or mild sedation but is definitely worth the price for a clinician who is in the initial phase of the learning curve.

REFERENCES

1. Boujaoude Z, Arya R, Shrivastava A, et al. Impact of moderate sedation versus monitored anaesthesia care on outcomes and cost of endo bronchial ultrasound transbronchial needle aspiration. Pulmonary medicine. 2019 May ; 4347852.
2. Jeyabalan A, Medford AR. Endo bronchial ultrasound guided trans bronchial needle aspiration patients' satisfaction under light conscious sedation. Respiration 2014; 88: 244-50.
3. Steinfort DP, Irving LB. Patient satisfaction during endo bronchial ultrasound guided trans bronchial needle aspiration performed under conscious sedation. Respiratory care. 2010; 55: 702 -6.
4. Cornellissen CG, Dapper J,Dreher M, et al. Endo bronchial ultrasound guided needle aspiration under general anaesthesia versus bronchoscopist directed Deep sedation a retrospective analysis. Endoscope ultrasound 2019; 8: 204- 8.
5. Casal RF, Lazarus DR, Kuhl K, et al. Randomised trial of endobronchial ultrasound guided trans bronchial needle aspiration under general anaesthesia versus moderate sedation. American journal of respiratory critical care medicine 2015; 191 :796- 803.
6. Aswanetmanee P, Limsuwat C, Kabach M, et al. The role of sedation in endobronchial ultrasound guided needle aspiration schematic review. Endoscopy ultrasound 2016; 5: 300- 6.
7. Zamparelli E, Fiorelli A, La Cerra G, et al. LMA protector versus traditional LMA to perform endo bronchial ultrasound guided transbronchial needle aspiration a retrospective analysis. Minerva Anestesiol 2019; 85 : 756- 62.
8. Yasufuku K, Pierre A, Darling G, et al. Prospective controlled trial of endo bronchial ultrasound guided transbronchial needle aspiration compared with mediastinoscopy for mediastinal lymph node staging of lung cancer. J journal thoracic cardiovascular surgery 2011; 142: 1393 -400.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

9. Geaka J, Hammerschlag G, Nguyen P, Wallbridge P, Jenkin GA, Korman TM. Utility of EBUS-TBNA for diagnosis of mediastinal tuberculosis lymphadenitis: A multicenter Australian experience. J Thorac Dis. 2015;7(3):439-48.
10. Bussy SF, Labacra G, Canals S, Caviedes I, Folch E, Majid A. Diagnostic yield of endobronchial ultrasound guided transbronchial needle aspiration for mediastinal staging in lung cancer. J Bras Pneumo. 2015;41(3): 219-24.
11. Canneto Barbara, Ferraroli G, Falezza G, Infante MV. Ideal conditions to perform EBUS _ TBNA. J Thorac Dis. 2017; 9(5): S 414-17.
12. Li Y P, Yang J, Duan RW, Jiang GN, Fan J, Zhao RM. Application of modified laryngeal mask airway in Endobronchial ultrasound guided transbronchial needle aspiration. Acta Medica Mediterranea. 2013; 29 : 625.
13. F J F Herth, R Eberhardt, P Vilmann, M Krasnik and A Ernst. Real time endobronchial ultrasound guided transbronchial needle aspiration for sampling mediastinal lymph nodes. Thorax. 2006; 61(9) : 795 – 98.
14. Yarmus LB, Akulian JA, Gilbert C, Mathai SC, Sathiyamoorthy S, Sahetya S, Harris K, Gillespie C, Haa A, Feller- Kopman D et al. Comparison of moderate versus deep sedation for endobronchial ultrasound transbronchial needle aspiration. Ann Am Thorac Soc.2013;10 : 121 -126.
15. Kedlaya A, Rani R, Devraj U, Ramchandran P, Maheshwari U. Anaesthetic management of endobronchial ultrasound guided transbronchial needle aspiration: our experience with laryngeal mask airway. Indian J Clin Anaesth.2018;5(4):479-485.
16. Sarkiss M, Kennedy M, Riedel B, Norman P, Morice R, Jilmenez, Eapen G. Anaesthesia technique for Endobronchial ultrasound guided transbronchial aspiration of mediastinal lymph nodes. J Cardiothoracic and Vasc Anesth.2007;21(6):892-6.
17. Oztas S, Akturk U A, Alpay L A, et al. A comparison of propofol-midazolam and midazolam alone for sedation in endobronchial ultrasound guided transbronchial needle aspiration : A retrospective cohort study. Clin Respir J 2017;11: 935-41.
18. Stolz D, Kurer G, Meyer A et al. Propofol versus combined sedation in flexible bronchoscopy: A randomised non-inferiority trial. Respir J 2009 ;34 : 1024 -b30.
19. Schlatter L ,PflimlinE ,Fehrke B, et al. Propofol versus Propofol plus hydrocodone for flexible bronchoscopy: a randomised study. Eur Respir J 2011 ;38 : 529 -37.
20. Gabriela O, Fernandes , Santos F , Natalia Martins, Sucena C, Passos et al. Endobronchial ultrasound under moderate sedation versus general anaesthesia. J Clin Med. 2018 ; 7 (11): 421.

ISSN (O): 2687-5365; ISSN (P): 2753-6556