



A COMPARATIVE STUDY OF DIAGNOSTIC FIBROPTIC BRONCHOSCOPY UNDER AIRWAY BLOCKS AND BRONCHOSCOPY UNDER SEDATION

Anesthesiology

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ABSTRACT

Introduction: Bronchoscopy allows to examine and visualize the inside of a person's airway and lungs for any abnormality such as foreign bodies, bleeding tumours, or inflammation. Present study was undertaken to study if diagnostic fiberoptic bronchoscopy can be done under airway blocks and to compare the results with airway blocks for conducting diagnostic fiberoptic bronchoscopy under sedation and to find out the ideal way of doing diagnostic fiberoptic bronchoscopy

Material and Methods: This study was undertaken at Yashoda Super speciality Hospital, Malakpet, Hyderabad in the year 2013-2015 after obtaining the scientific and ethical committee approval. A total of 100 subjects coming for diagnostic fiberoptic bronchoscopy were randomly allocated into two groups of 50 member each.

Group No. 1: Received sedation for bronchoscopy with Inj. Zofer 4mg + Inj. Fentanyl 2mcg per Kg + Inj. Propofol 1mg per kg bolus and then intermittent doses of 0.25 to 0.5 mg per kg.

Group No. 2: Received Inj. Zofer 4mg + Airway Blocks of Superior Laryngeal and Recurrent Laryngeal Nerves with 1% and 4% lignocaine respectively.

Results : The groups were examined for ease of procedure, haemodynamic stability and incidence of side effects.

Conclusion : Airway Blocks of Superior Laryngeal and Recurrent Laryngeal Nerves with 1% and 4% lignocaine respectively was found to be much superior and much safer with minimal haemodynamic instability and negligible side effects compared to bronchoscopy with Inj. Zofer 4mg + Inj. Fentanyl 2mcg per Kg + Inj. Propofol 1mg per kg bolus and then intermittent doses of 0.25 to 0.5 mg per kg.

KEYWORDS

Fiberoptic Bronchoscopy, Airway Blocks, Sedation

Introduction.

Bronchoscopy allows to examine the inside of a person's airway and lungs for any abnormality such as foreign bodies, bleeding, tumours, or inflammation. The procedure can be done either by using a rigid bronchoscope or a flexible bronchoscope.

- Gustav Killian, a German laryngologist, performed the first bronchoscopy in 1897. From then until the 1970s, doctors evaluated people's airways using a rigid bronchoscope.
- In the early 1970s, Ikeda introduced the flexible fiberoptic bronchoscope, which greatly enhanced the potential for the procedure. Since then, bronchoscopy has become an increasingly important diagnostic and therapeutic tool for the management of chest diseases. It is now perhaps the most common invasive procedure in the study and care of lungs.
- obtain samples of an abnormality or specimens in undiagnosed infections
- obtain tissue specimens of the lung in a variety of disorders
- evaluate a person who has bleeding in the lungs, possible lung cancer, chronic cough or a collapsed lung
- remove foreign objects lodged in the airway
- open the spaces of a blocked airway
- treat asthma and emphysema
- treat post-operative air leaks in the lung

Although the rigid bronchoscope can scratch or tear the airway or damage the vocal cords, the risk for bronchoscopy is limited. The main risks normally relate to the anesthesia necessary for performing the procedure. These risks depend on the health of the patient at the time of surgery. These risks usually can include a drop in blood pressure cardiac events, stroke and even death.

Complications from fibre optic bronchoscopy remain extremely low.

- Common complications may include shortness of breath, a drop in oxygen level during the procedure, chest pain and cough.
- In addition, if a lung biopsy is necessary, it may cause leakage of air called pneumothorax and bleeding from the lung. Pneumothorax occurs in less than 1% of cases requiring lung biopsy. The vast majority of bleeding stops with local therapy such as wedging the

bronchoscope into the airway that is bleeding and waiting for it to stop. It is an extremely rare event for a patient to need surgery following persistent bleeding and even less common for death.

- Often mild anesthesia referred to as conscious sedation is used to help make the procedure more comfortable. This form of anesthesia also has risks such as a drop in blood pressure or a decrease in breathing. The bronchoscopist or anesthesiologist must have the skill to overcome these issues to assure that the procedure is safe.
- It is important to note that lung tissue has no pain fibers, therefore biopsy and examination is usually painless and often only involves coughing. The outer surface of the lung is known as the pleura and this does contain pain fibers. When this area is inflamed or damaged, a sharp chest pain known as pleurisy develops. This may also be a sign of air leaking from the lung, the pneumothorax.

Material and Methods:

- This study was undertaken at Yashoda Super speciality Hospital, Malakpet, Hyderabad in the year 2013-2015 after obtaining scientific and ethical committee approvals. A total of 100 subjects coming for diagnostic fiberoptic bronchoscopy were randomly allocated into two groups of 50 members each.
- Group No. 1: Received sedation for bronchoscopy with Inj. Zofer 4mg + Inj. Fentanyl 2mcg per Kg + Inj. Propofol 1mg per kg bolus and then intermittent doses of 0.25 to 0.5 mg per kg.
- Group No. 2: Received Inj. Zofer 4mg + Airway Blocks of Superior Laryngeal and Recurrent Laryngeal Nerves with 1% and 4% lignocaine respectively.
- The groups were examined for ease of procedure, haemodynamic stability and incidents of side effects.

RAMSEY SEDATION SCALE

- If Awake
- **Ramsey 1**
- Anxious, agitated, restless
- **Ramsey 2**
- Cooperative, oriented, tranquil
- **Ramsey 3**
- Responsive to commands only If Asleep

- **Ramsey 4**
- Brisk response to light glabellar* tap or loud auditory stimulus
- **Ramsey 5**
- Sluggish response to light glabellar tap or loud auditory stimulus
- **Ramsey 6**

No response to light glabellar tap or loud auditory stimulus

Bronchoscopy Preparation

Prior to the procedure, the following were discussed with the patient:

- The need to do a bronchoscopy
- The hope to achieve (take biopsy and visualize the area)
- The risks of the procedure
- Potential complications
- Obtain an accurate medical history
- Need to examine the patient's lungs and heart
- Take a chest X ray
- Perform appropriate blood tests if the patient had a high risk of bleeding or have significant medical problems.

The patients were asked to fast for at least 6 hours before the procedure.

During the Bronchoscopy

The bronchoscopy was performed in one of these areas:

- A special room designated for bronchoscopies and similar procedures in the operating room
- An intensive care unit
- During the procedure, the patients were monitored during the procedure with periodic blood pressure checks, respiratory rate, continuous ECG monitoring of heart and oxygen measurement. Monitoring was given extremely priority in all forms of bronchoscopy.
- The flexible bronchoscope was passed either through the nose or mouth. The patient was either sitting or lying down.
- Once the bronchoscope was inserted into the patient's upper airway, the vocal cords were examined. Advancing the instrument to the trachea and on down, each area were examined as the bronchoscope was passed.
- If an abnormality was discovered, using a brush, a needle, or forceps sample was obtained and a specimen of lung tissue (transbronchial biopsy) often using a real-time X-ray (fluoroscopy) was obtained. This specimen contained actual lung tissue which include samples of the air sacs, airways, blood vessels, and supporting membranes of the lungs.

After the Bronchoscopy

The patients were closely monitored for 2 to 4 hours following the procedure.

- Most complications occurred early and were readily apparent at the time of the procedure.
- The patient were monitored until the effects of sedative drugs wore off completely and the gag reflex has returned.
- If the patient has had a transbronchial biopsy, a chest X-ray was taken to rule out any evidence of pneumothorax in the lungs after the procedure.
- The patients were planned to be hospitalized if he or she shows persistent bleeding, air leakage, or respiratory distress. Quite often any bleeding stopped on its own and pneumothorax if at all occurred often sealed quickly.
- Once the patient is released to go home, they were not permitted to drive. They were told that effects of the sedative medications may be lingering.

Results

Table 1: Sedation score analysis

Sedation score	No. of patients		total	p-value
	airway block	sedation		
0	50(100 %)	0(0 %)	50	0.000001 (highly significant)
2	0(0 %)	6(100 %)	6	
3	0(0 %)	30(100 %)	30	
4	0(0%)	14(100%)	14	
total	50	50	100	

Table 2: Complication analysis

Side effects	No. of patients		total	p-value
	Airway block	Sedation		
bronchospasm	0(0 %)	1(100 %)	1	0.0000005 (Highly significant)
nausea	0(0 %)	8(100 %)	8	
Sedated	0(0 %)	14(100 %)	14	
throat pain	0(0 %)	10(100 %)	10	
NIL	50(75 %)	17(25 %)	67	
total	50	50	100	

S. No	Age/ Sex	Anesthesia	HR					SPO2				sedation score		
			pre	5min	15min	30min	post	pre	5min	15min	30min	pre	post	side effects
1	82/M	Airway Block	64	78	74	70	66	88	92	94	95	0	0	nil
2	43/M	Sedation	84	96	88	80	78	94	96	97	98	0	3	nausea
3	65/F	Sedation	72	82	76	72	70	95	92	96	97	0	3	throat pain
4	66/F	Airway Block	70	74	64	62	62	92	94	97	99	0	0	nil
5	73/M	Sedation	64	60	68	74	72	87	92	96	97	0	3	nausea
6	86/M	Airway Block	82	86	80	78	74	85	84	88	90	0	0	nil
7	11/F	Sedation	112	108	102	92	96	90	92	95	97	0	2	nil
8	37/F	Sedation	92	88	84	90	92	88	92	94	96	0	3	throat pain
9	56/M	Airway Block	84	92	88	82	78	90	90	92	95	0	0	nil
10	69/M	Sedation	74	82	76	72	70	90	88	92	96	0	3	throat pain
11	83/F	Airway Block	86	88	82	78	74	84	85	88	90	0	0	nil
12	39/F	Sedation	84	80	92	86	84	90	94	95	96	0	3	nausea
13	31/F	Sedation	88	92	96	96	98	94	98	100	100	0	4	Sedated
14	48/M	Airway Block	90	94	90	84	80	96	96	98	99	0	0	nil
15	44/M	Airway Block	80	84	82	80	78	97	99	100	98	0	0	nil
16	59/F	Sedation	76	72	84	88	86	94	96	98	97	0	3	throat pain
17	27/F	Airway Block	102	106	100	98	94	97	98	99	99	0	0	nil
18	60/F	Sedation	84	92	96	96	98	94	98	98	99	0	4	Sedated
19	54/M	Airway Block	68	74	66	64	66	98	97	99	100	0	0	nil
20	32/M	Airway Block	100	102	96	94	92	95	96	99	100	0	0	nil
21	49/F	Airway Block	84	88	82	80	78	96	97	99	99	0	0	nil
22	19/F	Sedation	88	80	98	94	98	99	94	100	100	0	4	Sedated
23	36/M	Airway Block	84	88	84	80	80	94	97	99	99	0	0	nil

24	45/M	Airway Block	78	88	80	76	78	96	95	97	99	0	0	nil
25	73/F	Airway Block	66	74	72	70	72	90	94	97	96	0	0	nil
26	61/M	Sedation	76	84	80	94	96	94	98	99	100	0	3	bronchospasm
27	30/F	Sedation	78	88	92	90	98	96	99	98	100	0	2	nil
28	47/F	Airway Block	68	84	76	74	70	98	95	97	96	0	0	nil
29	71/F	Airway Block	68	62	60	64	62	92	90	94	92	0	0	nil
30	66/M	Airway Block	54	60	56	56	54	95	96	96	98	0	0	nil
31	35/M	Airway Block	74	88	82	82	80	98	99	99	98	0	0	nil
32	41/F	Sedation	76	84	80	94	96	94	98	99	100	0	2	nil
33	29/M	Sedation	78	88	92	90	98	96	99	98	100	0	3	nil
34	45/M	Airway Block	68	74	66	64	66	98	97	99	100	0	0	nil
35	51/F	Airway Block	100	102	96	94	92	95	96	99	100	0	0	nil
36	75/F	Sedation	88	80	98	94	98	99	94	100	100	0	4	Sedated
37	63/F	Airway Block	90	94	90	84	80	96	96	98	99	0	0	nil
38	61/M	Airway Block	80	84	82	80	78	97	99	100	98	0	0	nil
39	55/M	Sedation	84	80	92	86	84	90	94	95	96	0	4	Sedated
40	26/M	Sedation	88	92	96	96	98	94	98	100	100	0	3	nil
41	34/F	Airway Block	90	94	90	84	80	96	96	98	99	0	0	nil
42	41/M	Sedation	80	84	82	80	78	97	99	100	98	0	3	nausea
43	26/F	Airway Block	90	94	90	84	80	96	96	98	99	0	0	nil
44	62/F	Airway Block	80	84	82	80	78	97	99	100	98	0	0	nil
45	59/F	Sedation	112	108	102	92	96	90	92	95	97	0	3	nil
46	50/M	Sedation	92	88	84	90	92	88	92	94	96	0	4	Sedated
47	31/F	Airway Block	90	94	90	84	80	96	96	98	99	0	0	nil
48	46/F	Airway Block	80	84	82	80	78	97	99	100	98	0	0	nil
49	35/M	Sedation	84	92	96	96	98	94	98	98	99	0	2	nil
50	71/F	Airway Block	90	94	90	84	80	96	96	98	99	0	0	nil
51	53/M	Airway Block	80	84	82	80	78	97	99	100	98	0	0	nil
52	47/M	Sedation	84	92	96	96	98	94	98	98	99	0	3	nil
53	59/F	Airway Block	90	94	90	84	80	96	96	98	99	0	0	nil
54	33/F	Airway Block	80	84	82	80	78	97	99	100	98	0	0	nil
55	40/M	Sedation	112	108	102	92	96	90	92	95	97	0	3	nil
56	21/F	Sedation	92	88	84	90	92	88	92	94	96	0	4	Sedated
57	57/M	Airway Block	64	78	74	70	66	88	92	94	95	0	0	nil
58	37/F	Sedation	84	96	88	80	78	94	96	97	98	0	3	nausea
59	41/F	Airway Block	72	82	76	72	70	95	92	96	97	0	0	nil
60	58/M	Sedation	84	80	92	86	84	90	94	95	96	0	3	nil
61	44/F	Sedation	88	92	96	96	98	94	98	100	100	0	4	Sedated
62	29/M	Airway Block	64	78	74	70	66	88	92	94	95	0	0	nil
63	72/F	Sedation	84	96	88	80	78	94	96	97	98	0	3	throat pain
64	68/M	Airway Block	72	82	76	72	70	95	92	96	97	0	0	nil
65	39/F	Sedation	84	80	92	86	84	90	94	95	96	0	3	nausea
66	46/M	Sedation	88	92	96	96	98	94	98	100	100	0	4	Sedated
67	28/M	Sedation	84	92	96	96	98	94	98	98	99	0	3	nil
68	56/F	Airway Block	102	106	100	98	94	97	98	99	99	0	0	nil
69	43/F	Sedation	112	108	102	92	96	90	92	95	97	0	4	Sedated
70	38/M	Sedation	92	88	84	90	92	88	92	94	96	0	3	throat pain
71	14/M	Sedation	84	92	96	96	98	94	98	98	99	0	4	Sedated
72	56/F	Airway Block	84	92	88	82	78	90	90	92	95	0	0	nil
73	72/F	Airway Block	74	82	76	72	70	90	88	92	96	0	0	nil
74	47/F	Sedation	86	88	82	78	74	84	85	88	90	0	3	throat pain
75	34/M	Airway Block	68	84	76	74	70	98	95	97	96	0	0	nil
76	28/F	Airway Block	68	62	60	64	62	92	90	94	92	0	0	nil
77	40/M	Sedation	54	60	56	56	54	95	96	96	98	0	3	nausea
78	53/M	Airway Block	84	92	88	82	78	90	90	92	95	0	0	nil
79	40/F	Airway Block	74	82	76	72	70	90	88	92	96	0	0	nil
80	60/F	Airway Block	86	88	82	78	74	84	85	88	90	0	0	nil
81	5/M	Sedation	84	92	96	96	98	94	98	98	99	0	3	throat pain
82	69/F	Airway Block	64	78	74	70	66	88	92	94	95	0	0	nil
83	67/F	Airway Block	84	96	88	80	78	94	96	97	98	0	0	nil

84	55/F	Airway Block	72	82	76	72	70	95	92	96	97	0	0	nil
85	19/M	Sedation	84	92	96	96	98	94	98	98	99	0	3	nil
86	45/M	Sedation	84	92	96	96	98	94	98	98	99	0	4	Sedated
87	60/M	Airway Block	102	106	100	98	94	97	98	99	99	0	0	nil
88	22/M	Sedation	84	92	96	96	98	94	98	98	99	0	3	nil
89	42/M	Sedation	64	78	74	70	66	88	92	94	95	0	3	throat pain
90	58/M	Airway Block	84	96	88	80	78	94	96	97	98	0	0	nil
91	66/M	Airway Block	72	82	76	72	70	95	92	96	97	0	0	nil
92	64/M	Sedation	112	108	102	92	96	90	92	95	97	0	4	Sedated
93	45/F	Sedation	92	88	84	90	92	88	92	94	96	0	3	nil
94	51/F	Sedation	76	84	80	94	96	94	98	99	100	0	2	nil
95	25/F	Sedation	78	88	92	90	98	96	99	98	100	0	2	nil
96	13/M	Sedation	76	84	80	94	96	94	98	99	100	0	3	nil
97	15/M	Sedation	78	88	92	90	98	96	99	98	100	0	3	nausea
98	37/F	Airway Block	64	78	74	70	66	88	92	94	95	0	0	nil
99	45/F	Sedation	84	96	88	80	78	94	96	97	98	0	3	throat pain
100	23/F	Sedation	84	92	96	96	98	94	98	98	99	0	4	Sedated

Discussion

The groups were examined for ease of procedure, haemodynamic stability and incidence of side effects. Tables and charts were made as shown. Airway Blocks of Superior Laryngeal and Recurrent Laryngeal Nerves with 1% and 4% lignocaine respectively was found to be much superior. Fiberoptic diagnostic bronchoscopy done under sedation with Inj Propofol and Inj Fentanyl showed sedation and side effects after the procedure. Side effects were highly significant as shown in the table and side effects of bronchospasm, nausea and throat pain also were highly significant while using fiberoptic diagnostic bronchoscopy under sedation method. Sedation score P-value was 0.000001 which is highly significant. P-value of side effects of bronchospasm, throat pain and nausea after sedation method was highly significant 0.0000005.

Conclusion :

Airway Blocks of Superior Laryngeal and Recurrent Laryngeal Nerves with 1% and 4% lignocaine respectively was found to be much superior and much safer with minimal haemodynamic instability and negligible side effects compared to bronchoscopy with Inj. Zofer 4mg + Inj. Fentanyl 2mcg per Kg + Inj. Propofol 1mg per kg bolus and then intermittent doses of 0.25 to 0.5 mg per kg.

Footnotes :

Source of Support: Nil

Conflict of Interest: None declared

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