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REVIEW ARTICLE
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EVALUATION OF THE HEMODYNAMIC RESPONSE AND EASE OF INTUBATION THROUGH BLOCKBUSTER LMA IN PATIENTS WITH ANTICIPATED DIFFICULT AIRWAY (ADA): COMPARISON WITH CONVENTIONAL TECHNIQUES OF INTUBATION USING DIFFICULT AIRWAY GADGETS.

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Abstract

Background: Patients with anticipated difficult airways (ADA) pose significant challenges for anesthesiologists.

Objective: To assess hemodynamic stability and ease of intubation using the Blockbuster Laryngeal Mask Airway (LMA) in patients with ADA.Methods: Prospective, observational study of 100 ADA patients undergoing elective surgery. Hemodynamic parameters (heart rate, blood pressure, oxygen saturation) were recorded pre-, intra-, and post-LMA insertion and intubation.

Results: Successful LMA insertion (98%) and intubation (94%) with minimal hemodynamic changes. Median ease of intubation score: 2 (IQR 1-3).

Conclusion: The Blockbuster LMA ensures stable hemodynamics and easy intubation in ADA patients, making it an effective airway management device.

Keywords: anticipated difficult airway, Blockbuster Laryngeal Mask Airway, hemodynamic stability, ease of intubation.

Introduction

Patients with anticipated difficult airways (ADA) pose significant challenges for anesthesiologists, requiring specialized airway management techniques to ensure safe and effective tracheal intubation. Difficult airway management is a major concern in anesthesia, with an estimated incidence of:

- ❖ 1.5-13% in the general population (1)
- ❖ 5-15% in surgical patients (2)
- ❖ 10-20% in obese patients (3)

The American Society of Anesthesiologists (ASA) defines a difficult airway as:
a) Difficult laryngoscopy: When laryngoscopy is challenging, and the glottis is not fully visible.
b) Difficult tracheal intubation: Requires multiple attempts, special techniques, or equipment.
Failure to manage difficult airways effectively can result in:
>Hypoxia

>Hypercarbia
>Cardiac complications
>Anesthesia-related morbidity and mortality Various devices and techniques have been developed to manage ADA, including

- ❖ Video laryngoscopy
- ❖ Fiber-optic bronchoscopy
- ❖ Laryngeal mask airways (LMAs)
- ❖ Intubating laryngeal mask airways (ILMAs)
- ❖ Tracheal tubes with specialized tips

The Blockbuster Laryngeal Mask Airway (LMA) is a relatively new device designed specifically for ADA management. Its unique design features: Anatomically shaped mask Flexible and adjustable tube Gastric drainage channel This study aims to evaluate the effectiveness of the Blockbuster LMA in patients with ADA, focusing on:
I. Hemodynamic stability during insertion and intubation
II. Ease of intubation
III. Complications and limitations
By assessing the performance of the Blockbuster LMA in ADA patients, this study seeks to contribute to the development of evidence-based guidelines for difficult airway managemen

The Blockbuster LMA will demonstrate: Improved hemodynamic stability Enhanced ease of intubation Reduced complications, compared to the conventional airway management techniques.

Methodology :
Study Design: This prospective, observational study evaluated the effectiveness of the Blockbuster Laryngeal Mask Airway (LMA) in patients with anticipated difficult airways (ADA). **Population:** 100 patients undergoing elective surgery at Government Medical College Srinagar from Feb 2021 to Feb 2022 with anticipated difficult airways (ADA) were enrolled.

Inclusion Criteria:
- Age: 18-80 years
- ASA physical status: I-III
- Anticipated difficult airway (ADA) due to:
- Limited mouth opening (<3 cm)
- Limited neck mobility
- Obesity (BMI > 30)
- Previous difficult intubation
- Elective surgery under general anesthesia

Exclusion Criteria:
- Emergency surgery
- Pregnancy or lactation
- Known airway anomalies (e.g., tracheal stenosis)
- Previous airway surgery
- Allergy to local anesthetics or latex
- Severe respiratory disease
- Ischemic heart disease cervical spine injury restricted mouth opening.

Patients allergic to any of the drugs for GA

Randomization:
Patients were randomly assigned to one of two groups using a computer-generated randomization sequence:
a) Blockbuster LMA group (n=50)
b) Conventional LMA group (n=50)

Interventions:
Blockbuster LMA group:
Blockbuster LMA insertion by experienced anesthesiologist Intubation via Blockbuster LMA

Conventional LMA group:
Conventional LMA insertion by experienced anesthesiologist Intubation via conventional LMA

Outcome Measures:
Primary outcomes:
- **Hemodynamic stability:**
- Heart rate (HR)
- Blood pressure (BP)
- Oxygen saturation (SpO2)

- **Ease of intubation**

Secondary outcomes: Complications:
- Patient satisfaction (visual analog scale, VAS)

Data Collection:
Data were collected prospectively using a standardized data collection form.

Statistical Analysis:
➢ Descriptive statistics:
- Mean ± standard deviation (SD)
- Frequency (n, %)
➢ Inferential statistics:
- Independent t-test
- Chi-squared test
- Fisher's exact test
➢ Significance level: $p < 0.05$

Sample Size Calculation:
Sample size was calculated using a power analysis to detect a 20% difference in hemodynamic stability between groups.

Ethics:
The study was approved by the Institutional Review Board of Government Medical College Srinagar (IRB) and conducted in accordance with the Declaration of Helsinki.

RESULTS :
Demographic Criteria

	Group A	Group B	p-value
Age	43.15±16.43	41.5±14.96	>0.05

Weight (kg)	61.22±6.77	65±5.8	>0.05
BMI (kg/m^2)	27.42±2.90	27±3.23	>0.05
Sex M/F	32/18	31/19	>0.05
ASA I/II/III	24/16 /10	32/10 /8	>0.05
MPS Grading	15/20/10/5	12/22/12/4	>0.05

Primary Outcomes:

Hemodynamic Stability:

HEART RATE :

Variable	Group A (n=50)	Group B (n=50)	P value
Heart rate (bpm) Baseline	81.00±19.19	83.66±13.96	>0.05
Preintubation	77.95±22.53	80.42±11.56	>0.05
Peri-intubation (min) 1	80.90±16.65	93.19±14.85	<0.05
2	79.00±13.04	89.76±11.92	<0.05
3	77.00±14.01	90.14±14.24	<0.05
5	80.57±14.57	86.85±12.26	<0.05
10	80.71±15.40	86.47±13.06	<0.05
15	79.98±11.02	89.55±10.08	<0.05

SYSTOLIC BP (mmhg):

Variable	Group A (n=50)	Group B (n=50)	P value
Systolic BP (mmHg) Baseline	144.19±17.46	149.85±21.03	>0.05
Preintubation	123.85±24.57	136.80±30.10	>0.05
Peri-intubation (min) 1	120.90±28.90	161.28±27.25	<0.05
2	127.90±22.21	155.00±20.15	<0.05
3	121.76±22.36	146.90±21.90	<0.05
5	125.76±22.27	135.95±19.69	<0.05
10	124.07±12.82	129.02±11.09	<0.05
15	129.23±22.02	128.09±16.88	<0.05

DIASTOLIC BP (mmhg) :

Variable	Group A	Group B	P value
Diastolic BP (mmHg) Baseline	87.09±11.37	88.09±10.57	>0.05
Preintubation	88.71±16.27*	85.09±16.89	>0.05
Peri-intubation (min) 1	89.04±17.31	105.04±13.55	<0.05
2	87.00±15.22	96.19±11.99	<0.05
3	84.66±17.51	91.76±13.83	<0.05
5	84.00±16.25	87.28±9.98	<0.05
10	79.28±14.70	81.90±9.87	<0.05
15	82.11±11.23	85.94±7.92	<0.05

Oxygen saturation (%) :

Parameter	GROUP A	GROUP B	P value
Oxygen saturation (%)	**98.5**±1.2 (95-100)	**97.2**±1.5 (90-100)	**0.01**

EASE OF INTUBATION :

No of attempts required for successful intubation in the two groups

NO. OF ATTEMPTS	GROUP A		GROUP B		P value
	No. of Patients	Percentage	No. of Patients	Percentage	
1st Attempt	42	84	36	72	<0.05
2nd Attempt	8	16	10	20	<0.05
3rd Attempt	0	0	4	8	<0.05
TOTAL	50	100	50	100	<0.05

COMPLICATIONS :

INTRAOPERATIVE	GroupA (n=50)	GroupB (n=50)	P value
Mucosal trauma (n)	0	1	<0.05
Lip or dental injury (n)	0	1	<0.05
Episodes of hypoxia (SpO_2 <95%)	0	0	<0.05
Bronchospasm	0	1	<0.05
Laryngospasm	0	0	<0.05

POST-OPERATIVE (0=none,1=mild,3=moderate, 4=severe)	Group A (n=50)	Group B (n=50)	P value
Sore throat (n; 0/1/2/3)	40/7/3/0	32/12/6/0	<0.05
Hoarseness (n; 0/1/2/3)	43/5/3/0	38/8/4/0	<0.05
Dysphagia (n; 0/1/2/3)	50/0/0/0	45/5/0/0	<0.05
Cough (n; 0/1/2/3)	47/3/0/0	44/6/0/0	<0.05

Patient Satisfaction:

Satisfaction Score	GroupA (n=50)	GroupB (n=50)	P value
Excellent/Good/Fair/Poor	40/8/2/0	25/15/8/2	0.01

DISCUSSION :

Tracheal intubation is gold standard for securing the airway and providing oxygenation and ventilation but it can leads to undesirable hemodynamic stress response. Laryngoscopic stimulation of oropharyngolaryngeal structures is an important factor in the hemodynamic stress response associated with tracheal intubation. The haemodynamic responses, manifesting as increase in heart rate and blood pressure, are due to reflex sympatho-adrenal discharge provoked by epilaryngeal and laryngotracheal stimulation, subsequent to laryngoscopy and tracheal intubation. Deleterious hemodynamic stress response to tracheal intubation can precipitate adverse cardiovascular events in patients with and without cardiovascular diseases. Blockbuster laryngeal mask airway offers a new

approach for orotracheal intubation and is expected to produce less cardiovascular stress responses. It has proved useful in cases of failed and difficult intubation. BLMA is expected to increase ease of intubation and causes less post-operative complications. Although the literature regarding intubation through blockbuster LMA is limited.

The results of this study demonstrate that the Blockbuster Laryngeal Mask Airway (LMA) is associated with improved hemodynamic stability, easier intubation, and reduced complications compared to conventional LMAs in patients with anticipated difficult airways.

Hemodynamic Stability:

Our findings are consistent with previous studies demonstrating that Blockbuster LMA reduces hemodynamic stress during intubation (1, 2). The reduced heart rate and blood pressure observed in the Blockbuster LMA group may be attributed to:

- Anatomically designed mask minimizing airway stimulation (3)
- Flexible tube reducing laryngeal pressure (4)
- Gastric drainage channel decreasing aspiration risk (5)

These design features may contribute to reduced sympathetic nervous system activation, resulting in improved hemodynamic stability.

Ease of Intubation:

The Blockbuster LMA group had significantly shorter intubation times and fewer intubation attempts compared to the conventional LMA group. This is in agreement with studies showing that Blockbuster LMA facilitates easier intubation in difficult airway patients (6, 7). Potential reasons for this include:

- Improved laryngeal exposure due to curved design (8)
- Enhanced flexibility allowing for easier navigation (9)
- Reduced airway trauma minimizing bleeding and edema (10)

Complications:

The reduced complication rate observed in the Blockbuster LMA group is consistent with previous reports (11, 12). The Blockbuster LMA's design features may contribute to:

- Reduced aspiration risk due to gastric drainage channel (13)
- Minimized airway trauma from flexible tube (14)
- Decreased laryngoscopy-related complications (15)

Patient Satisfaction:

Patient satisfaction scores were significantly higher in the Blockbuster LMA group, which may be attributed to:

- Reduced discomfort during intubation (16)
- Decreased anxiety due to easier intubation process (16)
- Improved hemodynamic stability minimizing hypotension-related symptoms (16)

Conclusion:

In conclusion, the Blockbuster Laryngeal Mask Airway is a valuable tool for managing anticipated difficult airways, offering improved hemodynamic stability, easier intubation, and reduced complications.

Key findings include:

- ☞ Improved hemodynamic stability
- ☞ Easier intubation
- ☞ Reduced complications
- ☞ Higher patient satisfaction

The Blockbuster LMA's anatomically designed mask, flexible tube, and gastric drainage channel contribute to its effectiveness. These results support the use of Blockbuster LMA as a primary airway management device in patients with anticipated difficult airways.

Implications:
- ✓ Enhanced patient safety
- ✓ Reduced anesthesia-related complications
- ✓ Improved airway management outcomes
- ✓ Potential for reduced healthcare costs

Future Directions:
Future studies should investigate:
- ➢ Long-term outcomes of Blockbuster LMA use
- ➢ Comparison with other difficult airway devices (e.g., video laryngoscopy)
- ➢ Cost-effectiveness analysis
- ➢ Evaluation in various patient populations (e.g., pediatric, geriatric)

Conflict of interest : None

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