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Original Research Paper

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COMPARISION OF HAEMODYNAMIC RESPONSE IN CONVENTIONAL TRACHEAL EXTUBATION AND BAILEY MANOEUVRE USING LMA PROSEAL IN CONTROLLED HYPERTENSIVE PATIENTS: A RANDOMIZED CONTROL TRIAL

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ABSTRACT

AIM AND METHOD :Main aim of the study was to compare haemodynamic responses to the conventional tracheal extubation. and to removal of Proseal Laryngeal mask airway (LMA-Proseal) following Bailey manoeuvre

This randomised single blind controlled trial was conducted on 100 known controlled hypertensive patients of age group 18 – 60 yrs. of ASA grade 11 requiring endotracheal intubation for elective surgery. Group I (GET) – Conventional tracheal extubation technique - 50 patients Group II (GPL) – LMA removal following "Bailey manoeuvre" (ETT/LMA exchange)- 50 patients. The baseline values of HR, BP, MAP, ECG, SPO2, was recorded and compared with values at the time of extubation and post extubation for 10 mins.

RESULT – We observed less fluctuations in mean SBP, DBP, MAP, HR using bailey's manoeuvre as compared to conventional tracheal extubation. There was less incidence of coughing , bucking, tube biting, laryngospasm, desaturation using LMA - proseal for bailey's manoeuvre

CONCLUSION – Bailey's manoeuvre using LMA- Proseal is safer and associated with less hemodynamic and respiratory complications.

KEYWORDS : Bailey manoeuvre, LMA Proseal, hemodynamic response, extubation

Introduction-

Recovery from general anesthesia and extubation is a period of intense stress for patients. Smooth emergence i.e a one free of cough , staining and exaggerated hemodynamic response is always desired esp in patients undergoing neurosurgery, surgical process involving airway, ophthalmic surgery and patients with co existing cardiovascular diseases.

Tracheal intubation receives much attention, especially with regard to management of the difficult airway, tracheal extubation has received relatively little emphasis[1] . Compared to 4.6% respiratory complications in the intubation of elective cases, extubation-related complications arise in 12% in the same group[2]. Various modalities and measures are used to attenuate or prevent exaggerated hemodynamic and airway response. It has been suggested that replacing ETT with LMA may reduce complications and provide more stable hemodynamic profile during emergence from anaesthesia without losing airway control[3,4].

PLMA is a 2nd generation supraglottic airway device with a modified double cuff and drainage tube, designed for a better seal with both the respiratory and gastrointestinal lumen. Thus, it provides higher sealing pressure, facilitates abdominal decompression and prevent risk of aspiration.

In our study we compared the use of bailey technique using PLMA versus conventional endotracheal extubation in terms of hemodynamic changes, coughing, bucking , laryngospasm and any other complication

Materials and methods- After approval from Hospital Ethical Committee and informed written consent, this single blind randomised controlled trial was conducted at SN medical college Agra from january 2015 to june 2016. Based on previous studies keeping alfa error at 0.05 and power of study at 0.8 the calculated sample size was 41 in each group i.e. 82; the study was conducted on 100 adult patients to compensate the drop out. Inclusion criteria was known hypertensive patients under appropriate pharmacological control, ASA II category of either sexes, aged between 18 – 60yrs , undergoing elective surgery requiring endotracheal intubation. Exclusion criteria included patients with predicted difficult airway, obese, pregnant, patients having ASA III – IV, risk of aspiration, surgery involving oral cavity and throat and those with reactive airways.

These patients were randomly divided into two groups of 50 patients each, using randomised computerised table.

Group I (GET) – Conventional tracheal extubation technique.

Group II (GPL) – LMA removal following "Bailey manoeuvre" (ETT/LMA exchange) technique, using LMA-Proseal.

Intraoperative management- All patients were fasted for 6 hrs and received alprazolam 0.25 mg and ranitidine 150 mg orally, the night and on the morning of surgery. In operation theatre baseline Heart Rate (HR), Blood Pressure (BP), Mean Arterial Pressure (MAP), ECG, oxygen saturation (SPO2) were recorded. After preoxygenation patients were premedicated with inj glycopyrrolate 0.2 mg, inj midazolam 1mg i.v and inj fentanyl 2 µg/kg i.v. Induction was done with injection propofol 2mg/kg and tracheal intubation was done with injection vecuronium 0.1mg/kg using cuffed endotracheal tube of appropriate size . Positioning of the tube was checked with 5-point auscultation and capnography. Mechanical ventilation was adjusted to maintain normal end tidal carbon dioxide. Intermittent administration of injection vecuronium .02mg/kg and injection fentanyl 20 ug i.v was given as per requirement. In group II (G group)- 15 min prior to end of surgery, inhalational was continued at 1 MAC. HR, BP, MAP, SPO2, ECG values were recorded and by touching the posterior pharyngeal wall by suction catheter, deep plane of anaesthesia was checked. This was followed by removal of ET tube and Insertion of appropriate size LMA- Proseal. Positive pressure ventilation was continued via LMA- Proseal. In both the groups at the end of surgery, inhalational agents were discontinued and residual neuromuscular blockade was reversed with appropriate dose of neostigmine 0.05mg/kg and glycopyrrolate 0.01mg/kg as per standard protocol. Following parameters were recorded (HR , BP , MAP , SPO2 , ECG), prior to endotracheal tube extubation or LMA proseal removal and at 1,2,3,5 and 10 mins interval. Any episode of desaturation, ventilation difficulties, difficulty in insertion, number of trials for insertion, coughing, bucking and restlessness were also recorded.

The primary outcome variable was haemodynamic responses in both the groups. The sample size was calculated to be 41 which was rounded off to 50 to compensate the drop outs.

Statistical analysis

Statistical testing was conducted with the statistical package for for social science system version (SPSS) 17.0. Continuous variables are presented as Mean ± SD and categorical variables are presented as absolute numbers and percentage. The comparison of normally distributed continuous variables between the groups was performed using Student's t test. Within the group comparisons were done using Paired t test. Nominal categorical data between the groups were compared using Chi-squared test or Fisher's exact test as appropriate. For all statistical tests a p value less than 0.05 was taken to indicate a significant difference.

Results – patients in the two groups were similar on the basis of their age , sex, height and weight (table 1). Baseline hemodynamic parameters i.e. pulse rate , systolic blood pressure, diastolic blood pressure and mean arterial pressure ; of the two groups were similar with no statistically significant difference (p>0.05).

An exaggerated sympathetic response was seen in Get group as compare to Gpl group with significant increase in all 4 parameters post extubation. Statistically significant (p<0.05) difference was observed in SBP, DBP and MAP (graphs- 1-3) at extubation, 1 min , 2 min, 3 min and 5 mins post extubation. Values were statistically insignificant at 10 mins.

Sympathetic response to HR (graph- 4) was even more exaggerated in Get group as compared to Gpl group. Rise in mean heart rate was maximum at 1 min (52% in Get vs 16 % ion Gpl). Values were statistically significant on all observation intervals till 10 mins.

While comparing the adverse or undesirable events (Table- II) in the two group it was found that Incidences of coughing (7 vs 1) bucking (4 vs 0), tube biting (6 vs 1) , restlessness (7 vs 0), and laryngospasm (1 vs 0) were significantly higher in Get group as compared to Gpl group. No patient in either group demonstrated significant desaturation (spo2 <92%) or had any abnormal ECG changes at any time during the surgery.

Discussion –

Endotracheal extubation is a critical step during emergence from general anesthesia . It is associated with significant hemodynamic changes, coughing, bucking, laryngospasm and tube biting[5]. Sudden exaggerated sympathetic response during extubation may lead to increased morbidity and mortality esp in hypertensive patients. Extubation in deeper plane avoids hemodynamic responses but causes cardiovascular and respiratory depression and inability to regain protective reflexes[6] . Various pharmacological drugs such as Beta bockers, calcium channel blockers, lignocaine, dexmedometotidine i/v prior to extubation are also effective in controlling hemodynamic responses but do not abolishes coughing, bucking, laryngospasm[7-10]

Bailey manoeuvre i.e. the swapping of the endotracheal tube with laryngeal mask airway (LMA) before emergence from anaesthesia is an effective methods for attenuation of pressor response at extubation[11-14].

LMA is a supraglottic airway device providing a oval seal around the laryngeal inlet and maintaining the airway and its insertion doesn't require visualisation or penetration of cords, making its placement less stimulating than tracheal tube insertion or extubation[15]. Previous studies[12] used classic LMA or AMBU LMA for the exchange process but we used LMA proseal in our study ,which provides better seal pressure than clssic LMA, no finger support technique is required for insertion of proseal LMA which further decreased sympathetic stimulation. other advantage of LMA proseal is that it has a gastric drain port which prevents the risk of aspiration.

In our study we observed that the pressor response (causing increase in heart rate, blood pressure), coughing , bucking, laryngospasm was much less as compared to the conventional tracheal extubation. Similar results were found in previous study on neurosurgical patients[16], which found exaggerated sympathetic response and increased norepinephrine levels in patient extubated with ETT as compared to bailey's manoeuvre using proceal.

Yohitaka Fujii[14] et al found that HR.,MAP increases significantly in association with extubation in healthy normotensive adults and this increase was greater than after the removal of LMA. In a meta-analysis conducted by Brimacombe et al[15] (1995) it was reported that the LMA has several advantages compared with ETT, including better hemodynamic stability at the time of LMA removal, these studies were in line with our results.

However , a similar study using proceal in 60 hypertensive patient didn't found any beneficial hemodynamic effect of replacing ETT with proceal[16]. The difference could be due to difference in sample size, average age of the study population. Antihypertensive medication could also be a confounding factor.

From our study, we infer that although Bailey manoeuvre is an efficient method for attenuating the pressor response at extubation. Our results indicate that proceal is an appropriate supraglottic device for Bailey manoeuvre for reducing the haemodynamic response at extubation.

There were certain limitations in our study. The effect was observed in controlled hypertensive patients though its usefulness will be of immense help in high risk cardiac patients, whom we could not study due to the absence of advanced cardiac set up at our institute. Effect of ETT/LMA exchange can be further studied in ASA III & IV cardiac or neurosurgical patients, where good haemodynamic control is required. A multi device comparison study like ETT vs proceal or I GEL or AMBU auragain etc can be done.

Thus in our study we concluded that ETT / LMA- Proseal exchange (Bailey maonoeuvre) is a safe and easy procedure and is associated with better haemodynamic response or respiratory events as compared to conventional extubation , provided adequate depth of anaesthesia is maintained.

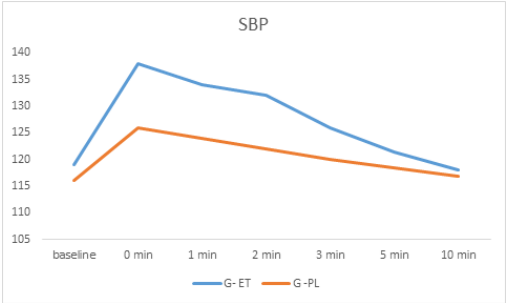
TABLE I

	GROUP I(G_{ET} Group) n = 50	GROUP II(G_P L Group) n = 50
Sex (F:M)	24:26	22:28
Age(in yrs.)	32.17 ± 4.22	34 ± 3.98
Weight (in kgs)	56.34 ± 8.211	58.84 ± 8.293
Height (in cms)	157.59 ± 12.71	163.01 ± 12.24

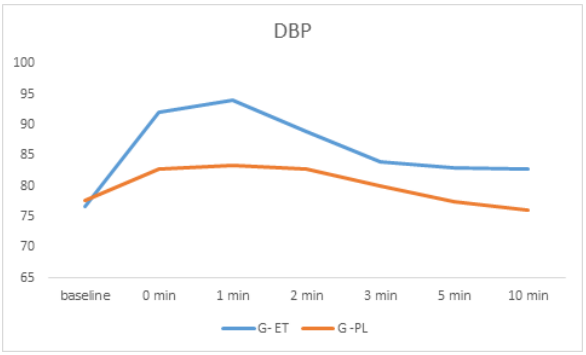
TABLE II . SHOWING CASES OF COUGHING, BUCKING, RESTLESSNESS LARYNGOSPASM AND DESATURATION

PARAMETER	GET (n = 50)	GPL (n = 50)
COUGHING	7	1
TUBE BITTING	6	1
BUCKING	4	0
RESTLESSNESS	7	0
LARYNGOSPASM	1	0
DESATURATION	0	0
TOTAL	**25**	**2**

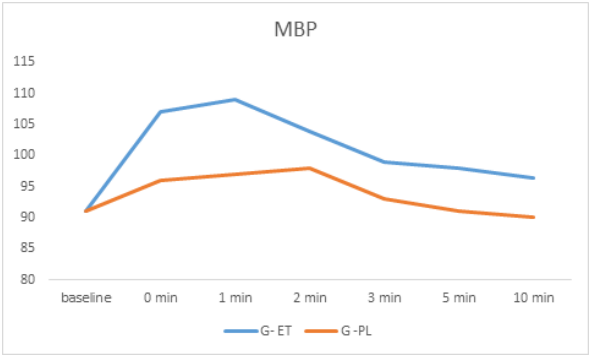
GRAPH-1 INTERGROUP COMAPARISON OF MEAN SBP



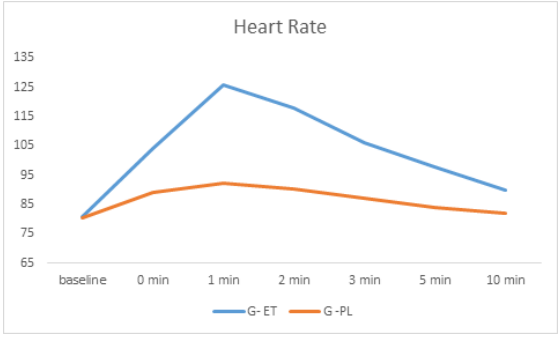
GRAPH-2 INTERGROUP COMPARISION OF MEAN DBP



GRAPH-3 INTERGROUP COMPARISION OF MEAN MAP



GRAPH-3 INTERGROUP COMPARISON OF HR



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