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Comparitive Study for Extubation Response with Injection Lidocaine 1mg/Kg Vs Injection Fentanyl 1mcg/Kg in Laparoscopic Surgery at Namo Medical Education & Research Institute, Silvassa

Dr. Anoop Agarwal[1], Dr. Prateek Agrawal[2], Dr Krutika Chaudhari[3], Dr Parth Hada[4]

[1] Professor & HOD, Department of Anaesthesia, Namo Medical Education & Research Institute, Silvassa
[2] Assistant Professor, Department of Anaesthesia, Namo Medical Education & Research Institute, Silvassa
[3, 4] Anaesthesia Resident, Namo Medical Education & Research Institute, Silvassa

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*Corresponding Author:

Dr Krutika Chaudhari
Anaesthesia Resident, Namo Medical Education & Research Institute, Silvassa

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A B S T R A C T

Introduction: Tracheal extubation is the process of removing an endotracheal tube (ETT) from the trachea, typically after it has been used to assist with breathing during or after surgery. Injlidocaine and inj. Fentanyl are supposed to suppress the hemodynamic response to extubation during laparoscopic surgeries.

Objective: To compare the effect of i.v. lidocaine & i.v. fentanyl reduce the hemodynamic response to extubation for laparoscopic surgeries. Patients who were posted for laparoscopic surgeries from ASA I & II age between 18 and 60yrs. p-values of <0.05 were considered as statistically significant with power of 80%. In our study we used the Unpaired T test for the comparison of mean of heart rate & mean arterial B.P., Mann Whitney U test for the distribution of free data. Also chi square test for the analysis of association of categorical independent variables between two groups.

Results: The pulse rate and mean arterial blood pressure were significantly lower in inj fentanyl group at 1 min, 5 min, 10 min and 15 min after extubation with p-values <0.05. There was no significant difference between two groups with decreasing the incidence of coughing in peri- extubation period with p-value of 0.857.

Conclusion: The research of our study shows that Inj fentanyl 1 mcg/kg i.v. if administered 10 min before the end of operation was very effective in reducing the haemodynamic response to tracheal extubation compared with Inj lidocaine 1mg/kg i.v. in patien posted for laparoscopic surgeries. Recommendation We recommend that injfentanyl administered 10 min before the end of laparoscopic surgeries is effective in reducing haemodynamic response to extubation..

Keywords: Tracheal Extubation, ETT, Laparoscopic Surgery, Heart Rate, Mean Arterial Pressure, Anesthesia, ASA Grade.

INTRODUCTION

Laryngeal, tracheal & bronchial receptors are stimulated by mechanical & chemical irritants during tracheal extubation[*1]. Tracheal extubation can be associated with detrimental hemodynamic and airway responses. The reflex increase in sympatho-adrenergic activity caused by these manipulations leads to an increase in catecholamine release, arterial B. P. and H.R[*4,5]. To control the hemodynamic changes during tracheal intubation &extubation, opioids, local anesthetics, calcium channel blockers and beta blockers have been successfully used[*2,3].

Lidocaine 1mg/kg reduces the hemodynamic response to tracheal extubation by its direct action on myocardial muscle and has myocardial depressant effect, central stimulant effect and peripheral vasodilatory effect and it also suppresses the cough reflex, an effect on sympathetic transmission.

Fentanyl is an opioid agonist. Fentanyl is administered clinically in a wide range of doses (0.5 to 2 mcg/kg). Fentanyl 1 mcg/kg may blunt cardiovascular & airway reflexes during emergence without prolonging the timing of recovery. Fentanyl acts on mu receptors. It brings hemodynamic stability during perioperative period. Fentanyl inhibits pituitary adrenal response directly or indirectly via hypothalamus.

Fentanyl decreases sympathetic tone and increases parasympathetic tone. Large doses of fentanyl as the sole anesthetic have the advantage of stable hemodynamic due to principally to the

- Lack of direct myocardial depressant effect
- Absence of histamine release
- Suppression of stress response to surgery, intubation and extubation

MATERIALS AND METHODS -

This prospective study was done at NAMO Medical Institute and Research Center. All adult patients who underwent elective laparoscopic surgeries under general anesthesia with endotracheal tube at NAMO Medical Institute and Research Center.

Objectives -

- To compare the effect of lidocaine and fentanyl on quality of extubation in laparoscopic surgeries
- To compare the effect of lidocaine and fentanyl on blood pressure to extubation in laparoscopic surgeries
- To compare the effect of lidocaine and fentanyl on heart rate to extubation in laparoscopic surgeries

Inclusion Criteria –

i. Elective laparoscopic surgeries under general anaesthesia with endotracheal tube
ii. Patient age between 18 and 60 yrs
iii. Patient BMI between 18 and 30 kg/m^2
iv. ASA status I and II

Exclusion Criteria –

v. Active upper respiratory tract infection
vi. Patient on Beta blockers/Calcium channel blocker/Opioids
vii. Renal dysfunction
viii. History of allergy of the study drugs
ix. Patient with cardiorespiratory abnormalities such as hypertension, bronchial asthma, NYHA grade 3 and 4, COPD, restrictive lung disease.

DEMOGRAPHIC AND CLINICAL CHARACTERISTICS OF PATIENTS WHO UNDERWENT LAPAROSCOPIC SURGERIES

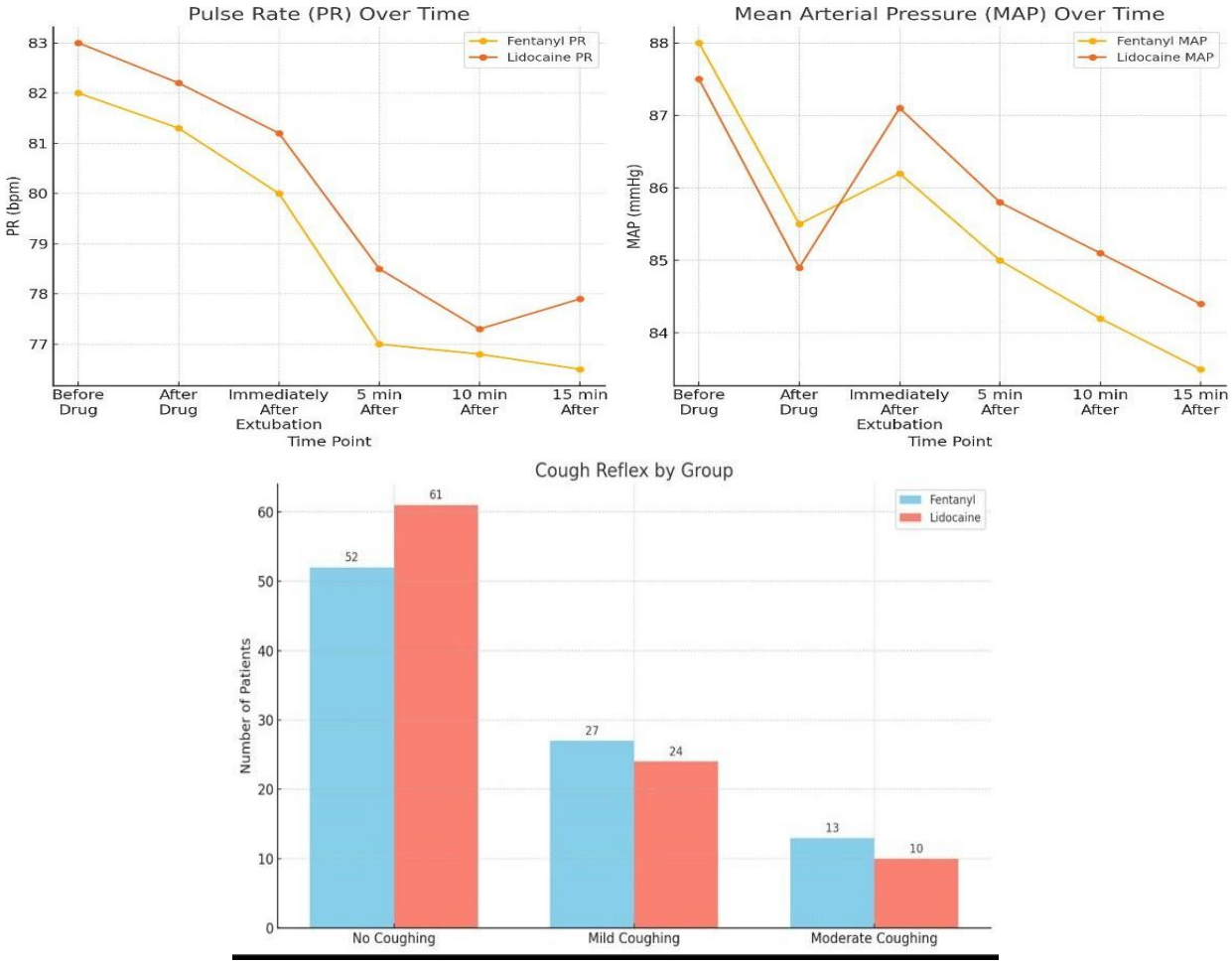
Variable	FentanylGroup(n =100)	LidocaineGroup(n =100)	p-value
Age(years)(mean±SD)	40.34±4.80	40.42±4.00	0.899
Sex			
Male(n,%)	40(40%)	42(42%)	0.765
Female(n,%)	60(60%)	58(58%)	0.765
ASAStatus			
ASAI(n,%)	90(90.0%)	92(92.0%)	0.614
ASAII(n,%)	10(10.0%)	8(8.0%)	0.614
BMI(kg/m^2)(mean±SD)	22.0±1.2	22.1±1.3	0.674
HR before anesthesia(mean±SD)	79.5±4.0	80.1±4.1	0.443
MAPbeforeanesthesia(mean± SD)	87.0±3.9	86.5±4.0	0.521

SPO_2beforeanesthesia	98(97–99)	99(97–99)	0.693
Diclofenacdose(mg)	60(10)	60(10)	0.807
Parameter	**FentanylGroup**	**LidocaineGroup**	**p-value**
InductionAgent			
Propofol(n,%)	100(100.0%)	100(100.0%)	—
AnesthetistExperience	>5yrs	>5yrs	1.00
BloodLoss(ml)	120(100)	130(100)	0.521
DurationofSurgery (minutes)	100(30)	100(30)	1
DurationofAnesthesia (minutes)	120(40)	110(40)	0.098
Procedure Type			
Lap.Cholecystectomy(n%)	48(48.0%)	46(46.0%)	1.000
Lap.Total hysterectomy(n%)	22(22.0%)	24(24.0%)	
Lap.Appendectomy(n%)	30(30.0%)	30(30%)	
SurgeonExperience	>5 yrs	>5 yrs	1.00

COMPARISION OF HEMODYNAMICS PARAMETER FOR PATIENTS WHO UNDERWENT LAPAROSCOPIC SURGERIES

VitalSign	**FentanylGroup(n =100)**	**LidocaineGroup(n =100)**	**p-value**
Vital signs beforestudy drug administration			
PRinbpm(mean±SD)	82±4.2	83±3.9	0.083
MAPinmmHg(mean±SD)	88.0±3.8	87.5±3.5	0.545
SPO_2 before anesthesia	98(97–99)	99(97–99)	0.693
Vitalsign after study Drug administration			
PRinbpm(mean ±SD)	81.3±3.8	82.2±3.7	0.091
MAPinmmHg(mean±SD)	85.5±4.0	84.9±3.8	0.0071
SpO_2in%	99(99–100)	99(98–100)	0.732
Vitalsigns Immediately after extubation			
PRinbpm(mean±SD)	80.0±3.5	81.2±3.6	0.030
MAPinmmHg(mean±SD)	86.2±3.7	87.1±4.2	0.045
SpO_2in%	98(97–99)	98(97–99)	0.674
Vital sign 5 min after Extubation			
PRinbpm(mean±SD)	77.0±3.1	78.5±3.3	0.020
MAPinmmHg(mean±SD)	85.0±3.U	85.8±4.1	0.032
SpO_2in%	98(97–99)	98(97–99)	0.762
Vitalsigns10 min after Extubation			
PRinbpm(mean±SD)	76.8±3.2	77.3±3.0	0.018

MAPinmmHg(mean±SD)	84.2±3.6	85.1±3.5	0.040
SpO_2In%	98(97–99)	98(97–99)	0.659
Vitalsigns15minafter extubation			
PRinbpm(mean±SD)	76.5±3.4	77.9±3.5	0.025
MAPinmmHg(mean±SD)	83.5±3.7	84.4±3.8	0.038
SpO_2In%	98(97–99)	98(97–99)	0.702
Cough reflex category			
No coughing	52% (52 Patients)	61% (61 Patients)	~0.075
Mild coughing	27% (27 Patients)	24% (24 Patients)	
Moderate coughing	13% (13 Patients)	10% (10 Patients)	



DISCUSSION

In our study we took patients who are going to elective surgeries under GA, which includes patient scheduled for laparoscopic general and gynaecological surgeries. Extubation should be devoid of major changes in hemodynamic parameters and adverse events, such as coughing or laryngospasm. Extubation also stimulates receptors, particularly in larynx, trachea & bronchi. The plasma concentration of noradrenaline and adrenaline increases during extubation. This causes tachycardia and hypertension, which can lead to complications such as cardiac failure, pulmonary edema and cerebrovascular haemorrhage*[6]. Recovering from anesthesia often results in elevated catecholamine concentration following anaesthetic withdrawal which is further aggravated by laryngeal manipulation occurring during extubation.

Lidocaine 1 mg/kg reduces the hemodynamic response to tracheal extubation. There is one study conducted by savita et al[*7]. The authors found that lignocaine 1 mg/kg was superior to 0.5mg/kg in attenuating the hemodynamic responses to tracheal extubation. Similarly Bidwai et al[*8] observed the heart rate and blood pressure response to endotracheal extubation with i.v. lidocaine 1mg/kg and control group (saline). They found out that patients who received lignocaine did not have an elevation in HR or BP at or after extubation when compared to saline group.

Fentanyl acts on Mu receptors. Low doses of fentanyl were used in practice because large doses may cause muscle rigidity and respiratory depression[*9]. Fentanyl has better sedative action than lidocaine[*10].

In a randomized, Kautto et al[*12] double-blind study to examine the effects of intravenous fentanyl (1 mcg/kg) on hemodynamic changes during tracheal extubation and emergence from anesthesia in 60 ASA physical status I or II patients undergoing elective gynecological surgery.

In otherstudy, Nishina& colleagues[*13] observed that a bolus dose of i.v. fentanyl 1 mcg/kg given at time before the peritoneal closure was of value of attenuating the cardiovascular changes associated with tracheal extubation.

The findings of our study demonstrate the fentanyl 1 mcg/kg administered intravenously 10 min before the end of operation might be an effective in attenuating hemodynamic response to tracheal extubation compared to lidocaine 1mg/kg IV in patients underwent laparoscopic surgeries[*11].

Our study shows that there was statistically significant difference in mean heart rate immediately after extubation with p value 0.030. Also a statistically significant difference 5 minutes after extubation with p value 0.020 and difference in mean pulse rate and mean arterial pressure at 10 minute and 15 minute after extubation with p value 0.018 and 0.025 respectively that is <0.05. Our study observed that heart rate was significantly greater in lidocaine group than in fentanyl group ($p<0.05$).

BP was also statistically significant in lidocaine group than in fentanyl group ($p<0.05$). More research needs to be conducted in this field for proper dosing and increasing sample size.

Conclusion

Our findings observed that fentanyl 1 mcg/kgi.v. administered 10 minutes before end of operation was effective in reducing hemodynamic response to tracheal extubation when compared to lidocaine 1mg/kg i.v. in patients with laparoscopic general and gynaecological surgeries.

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