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Effect of Perioperative Intravenous Lignocaine Infusion on Haemodynamic Responses and postoperative Analgesia in Laparoscopic Cholecystectomy Surgeries

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Abstract

Background: During general anesthesia, intubation of trachea and extubation of trachea are often associated with increase in haemodynamic response. Laparoscopic cholecystectomy is a minimal access surgery; postoperatively patients may experience moderate to severe pain. It is well known that lignocaine is useful in attenuating haemodynamic response to intubation and extubation. Previous studies also state that perioperative lignocaine infusion provides postoperative analgesia as well. We hypothesize that perioperative intravenous lignocaine infusion can both attenuate haemodynamic responses to intubation and extubation of trachea and also provide good postoperative analgesia in laparoscopic cholecystectomy surgeries.

Methods: Double blinded randomized controlled study was undertaken at the department of anesthesia, Sri Siddartha medical college. In group A, 0.9% normal saline was used as placebo for perioperative intravenous infusion. In group B, preservative free 1.5 mg/kg 2 % lignocaine (Loxicard) diluted with normal saline to 1% given at 10 minutes to induction as bolus, followed by an infusion of 1.5 mg/kg/h. till 1 hour postoperatively.

Results: In Group B there was a statistically less rise in heart rate [HR] and mean blood pressure [MBP] during intubation and extubation of trachea compared to group A. In group B there was a statistically significant increase in the mean pain free period postoperatively compared to group A.

Conclusions: Perioperative intravenous infusion of lignocaine attenuates haemodynamic response during the intubation and extubation of the trachea. In addition, it also increases the mean pain free period postoperatively.

Keywords: Lignocaine Infusion, Haemodynamic Response, Postoperative Analgesia

1. Background

Many drugs have been recommended for the attenuation of haemodynamic response during intubation and extubation of the trachea like remifentanil (1), lidocaine (2), magnesium sulfate (3), clonidine (4) esmolol (5), and dexmedetomidine (6). Recent studies have demonstrated that perioperative lignocaine infusion is also useful in reducing postoperative pain (7-10). Very few previous studies have demonstrated both the effect of lignocaine infusion that is attenuation of haemodynamic response to intubation and extubation of trachea and postoperative analgesia (11-13). Present trend for perioperative analgesia is multimodal (14). Intravenous lignocaine has found to be useful in attenuation of haemodynamic response and for postoperative analgesia as well (15, 16). In our present study we want to evaluate both the effect of perioperative infusion of lignocaine that is attenuation of haemodynamic response to intubation and extubation of trachea and postoperative analgesia for laparoscopic cholecystectomy surgeries.

2. Methods

After obtaining approval of the institutional ethics committee, double blinded randomized controlled study was done on a total 130 patients. Written informed consent was taken from all patients. Patients aged between 30 - 60 years as well as the American society of anaesthesiology class I and class II patients were considered. Patients with cardio-respiratory, renal, hepatic or endocrine disease, those having predicted difficult tracheal intubation, body mass index more than 30, whenever the surgical procedure necessitated the conversion of laparoscopic to open cholecystectomy, or surgical time exceeded 180 minutes were excluded from the study.

Group A (n = 65): 0.9% normal saline was used as placebo for perioperative intravenous infusion. Group B (n = 65): preservative free lignocaine diluted with normal saline and made to 1% used as intravenous infusion started at a dose of 1.5 mg per kg as bolus over 10 minutes to induction and then 1.5 mg/kg/h. infusion till 1 hour postoperatively. Total duration of infusion is limited to 180 minutes as a safeguard against potential lignocaine toxicity. Intraoperative monitoring was done with HR, oxygen saturation, electrocardiogram, MBP, temperature, end tidal carbon dioxide, and minimum alveolar concentration.

Sample size in each group was calculated using the n $= 2\sigma^2 (Z_\alpha + Z_\beta)^2/\Delta^2$ formula. All data were entered in the Windows Microsoft Excel sheet and an analysis was done with SPSS version 16. Continuous variables that met the assumptions of the normality were expressed as median or mean + standard deviation. Categorical variables were expressed as proportion or percentage. Normally distributed continuous variables were compared by "t" test. Based on the number of observations, present categorical comparisons were done by Fisher's exact or Chi square test. All values were considered if $P < 0.05$ significant statistically.

3. Results

Demographic characteristics of both groups were statistically comparable (Table 1).

Table 1. Demographic Data[a]

	Group A (n = 65)	Group B (n = 65)	P Value
Age, y	44.3 ± 5.35	45.5 ± 6.80	0.378
Gender, (F/M)	29/36	27/38	0.652
BMI, kg/m²	26.9 ± 4.23	27.1 ± 3.34	0.496.
ASA distribution I/II	38/27	36/29	0.652
Duration of surgery, min	104 ± 8	112 ± 11	0.433

[a]Values are expressed as mean ± standard deviation or No. (%).

Comparison of heart rate (HR) and mean arterial pressure (MAP) at baseline and after intubation are given in Tables 2 and 3, respectively.

Comparison of heart rate (HR) and mean arterial pressure (MAP) between the groups after extubation of trachea are given in Tables 4 and 5.

Comparison of Visual Analog Scale (VAS) and pain free period between the groups are given in Tables 6 and 7.

Table 2. Comparison of Heart Rate (HR) at Baseline and After Intubation of Trachea

	Group A (65)	Group B (65)	P Value
Baseline HR	73.43 ± 4.81	71.78 ± 4.29	0.050
HR 1 min after intubation	112.23 ± 5.98	100.88 ± 6.37	< 0.001
HR 3 min after intubation	102.56 ± 7.21	92.11 ± 4.47	< 0.001
HR 5 min after intubation	91.18 ± 5.28	85.05 ± 4.63	< 0.001

[a]Values are expressed as mean ± standard deviation.

Table 3. Comparison of Mean Arterial Pressure (MAP) at Baseline and After Intubation of Trachea[a]

	Group A (65)	Group B (65)	P Value
Baseline MAP	84.55 ± 5.27	85.96 ± 4.57	0.11
MAP 1 min after intubation	123.18 ± 6.21	110.13 ± 6.16	< 0.001
MAP 3 min after intubation	112.71 ± 9.29	100.98 ± 5.52	< 0.001
MAP 5 min after intubation	100.11 ± 7.37	93.38 ± 4.25	< 0.001

[a]Values are expressed as mean ± standard deviation.

Table 4. Comparison of Heart Rate (HR) after Extubation of Trachea[a]

	Group A (65)	Group B (65)	P Value
HR 1 min after extubation	112.3 ± 6.04	101.11 ± 6.51	< 0.001
HR 3 min after extubation	102.7 ± 7.20	92.2 ± 4.43	< 0.001
HR 5 min after extubation	91.25 ± 5.29	85.11 ± 4.55	< 0.001

[a]Values are expressed as mean ± standard deviation.

Table 5. Comparison of Mean Arterial Pressure (MAP) After Extubation of Trachea[a]

	Group A (65)	Group B (65)	P Value
MAP 1 min after extubation	123.11 ± 6.23	110.2 ± 6.1	< 0.001
MAP 3 min after extubation	112.8 ± 9.21	101.1 ± 5.4	< 0.001
MAP 5 min after extubation	100.18 ± 7.35	93.43 ± 4.23	< 0.001

[a]Values are expressed as mean ± standard deviation.

Table 6. Comparison of Visual Analog Scale (VAS) Between the Groups[a]

	Group A (65)	Group B (65)	P Value
VAS at 30 minute	1.32 ± 0.54	0.38 ± 0.49	< 0.001
VAS at 1 hour	4.38 ± 0.55	1.17 ± 0.668	< 0.001

[a]Values are expressed as mean ± standard deviation.

Table 7. Comparison of Pain Free Period[a]

	Group A (65)	Group B (65)	P Value
Pain free period	49.85 ± 6.37	227.36 ± 11.62	< 0.001

[a]Values are expressed as mean ± standard deviation.

4. Discussion

Our study has found no statistically significant rise in mean MAP and mean HR during intubation of tracheal and extubation of the trachea between the study groups. Previous studies have found that intravenous infusion of ligno-

caine attenuates haemodynamic response associated with intubation and extubation of trachea (1, 5-8). The combination of verapamil with lignocaine (7) and also drugs like diltiazem (6) have also found to attenuate haemodynamic response. Many previous studies show lignocaine infusion being used for postoperative pain relief (9-11). Our study also shows that the postoperative pain free period was significantly more in the Group B. A systemic review on intravenous lignocaine infusion preoperatively concluded that there was a decreased anaesthetic drug requirement intraoperatively, decreased requirement of postoperative analgesics, and also had lower pain scores (12).

4.1. Conclusions

Perioperative intravenous infusion of lignocaine attenuates haemodynamic response during intubation and extubation of trachea and also postoperatively was an increase in the mean pain free period.

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Footnote

Conflict of Interest: No conflict of interest.

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