INTRODUCTION

Perioperative respiratory complications are a major concern of elective open upper abdominal surgery under G.A., and smoking is known to increase the frequency of complications.1-4 Despite this, the recommendations to stop smoking before elective surgery are rarely followed.

Smoking impairs mucus transport, pulmonary macrophage function, increases bronchial reactivity, reduces the closing capacity of the lung and increases arterial carbon monoxide

ABSTRACT

Background: Smoking has various deleterious effects and peri-operative complications. Pulmonary complications following abdominal surgery are frequent and associated with increased morbidity and mortality and length of hospital stay. Aims and Objectives: Hence, this study was done to observe the incidence of various respiratory and cardiovascular complications in the perioperative period in patients undergoing elective open upper abdominal surgery under general anaesthesia among smokers versus non-smokers. The various complications which are studied are as follows - Arterial desaturation, Severe coughing, Laryngospasm, Bronchospasm, Recurrent apnea, Variations in Mean Arterial Blood Pressure and Heart rates. Materials and Methods: Male patients ASA-I, II or III, aged 20–60 years undergoing elective open upper abdominal surgery under general anaesthesia were selected. They were divided into two groups (during pre-anaesthetic checkup) - smokers (>10 cigarette/day for the past 1 year and continued smoking till admission), non-smokers (who never smoked). General anaesthesia was given according to standard protocol. Results: The smokers had higher incidence of laryngospasm as well as bronchospasm but they were not statistically significant. Smokers had low baseline SpO₂; greater fall in SpO₂ just after extubation, before sending to PACU and on day 1 which were statistically significant. Smokers had raised MAP just after extubation, on day 1 and day 2 which were statistically significant. Conclusion: Smokers had increased incidences of respiratory and hemodynamic complications than non-smokers.

Key words: GA; Haemodynamic complications; Non-smokers; Open upper abdominal surgery; Respiratory complications; Smoker
levels. These adverse effects can explain the increased susceptibility to pulmonary complications. Smoking also alters the immune system.\(^5\)

Carbon monoxide reduces oxygen transport and metabolism. Cyanide inhibits mitochondrial oxidative metabolism. These adverse events can explain the increased susceptibility to various pulmonary complications among smokers. As well as the causes of stormy induction of anaesthesia. Hence non-smokers are expected to have smoother perioperative period.\(^6,7\)

Smoking cessation therapy appears to be more efficient when introduced before a surgical procedure and hence, the preoperative period might represent a golden moment for smoking cessation. Also longer period of preoperative smoking cessation is more beneficial.\(^8,9\) Still there would be a significant proportion of patients who would not be interested in smoking cessation as they have no interest in giving up smoking rather their smoking increases due to preoperative tension for the forthcoming procedure.

Again previous smokers have been found to suffer from relapse rates of \(>50\%\),\(^10\) and this may indicate that a significant percentage of this group would revert back to smoking during the follow-up period.

We have undertaken this study to observe the perioperative complications among smokers versus non-smokers undergoing elective open upper abdominal surgery under general anaesthesia.

**Aims and objectives**

1. To compare perioperative respiratory complications among smokers versus non-smokers undergoing elective open upper abdominal surgery under general anaesthesia,
2. To compare their haemodynamic effects and
3. To compare level of analgesia using Visual analogue scale (VAS) score.

**MATERIALS AND METHODS**

This prospective observational study was conducted at a tertiary Medical College and Hospital from January 2018 to June 2019 on 20–60-years-old male patients, posted for elective open upper abdominal surgery (except cardiothoracic surgeries) under general anaesthesia. ASA status I, II, III were included in the study.

**Sample size/design**

\(Z_\alpha\) is a constant, set by convention according to the accepted alpha error. Here, it is 1.96 Similarly \(Z_\beta\) is 0.84. Now from previously published study we get\(^1\),

\[
P1 \text{ percentage of non-smokers having respiratory complications } = 11\% \text{ or } 0.11
\]

\[
P2 \text{ percentage of smokers having respiratory complications } = 20\% \text{ or } 0.20
\]

And \(P = (P1+P2)/2 = 0.155\)

Now sample size \(N = \frac{(Z_\alpha \sqrt{P (1-P)} + Z_\beta \sqrt{P1 (1-P1) + P2 (1-P2)}) ^2}{(P1-P2)^2}\)

Now putting the values we get \(N=160\)

The study was initiated after obtaining approval of the institutional ethics committee. The allocation was open level. Patients with ASA IV status, patients with psychoactive medication, COPD not being controlled by regular medication, comorbidities such as diabetes, hypertension, coronary artery disease and obstructive sleep apnoea and alcoholic patients were excluded from the study. Patients with anticipated difficult intubation were also excluded.

During pre-anaesthetic check up smoking history was taken along with the number of cigarettes smoked per day as well as the duration. Patients were instructed to stop smoking immediately. Patients with pulmonary changes were optimized before surgery. Optimization was done by 1) Maintaining proper hydration, 2) Nebulization, 3) Antibiotic levofloxacin (500–750) mg OD, 4) Chest physiotherapy – palpation, percussion, vibration, deep breathing, coughing and postural drainage.

The patients were divided into two groups - 1) smokers (>10 cigarettes/day for the past 1 year), 2) non-smokers (who never smoked). Lung function tests (mainly spirometry) were done to detect preoperative respiratory problems. Preoperative evaluation was done taking proper history, physical examinations, and routine pre-operative investigations (Hb, blood sugar, serum urea, creatinine, chest X-ray, ecg).

All patients were premedicated with Tab Alprazolam 0.5 mg oral, the night before surgery, Tab Pantoprazole (40 mg) oral at 6 A.M. and a minimum fasting state of 8 h before anaesthesia was ensured. In the theater, peripheral line was established. Intravenous crystalloid infusion was started and standard ASA monitors were attached. All patients were pre-oxygenated for 3 min with 100% oxygen. Premedications given with injection Midazolam 0.03 mg/kg, Fentanyl 2 mcg/kg intravenously. Induction of anaesthesia was done by Propofol 2 mg/kg and confirmed with loss of response to verbal commands followed by checking for bag-mask ventilation.

Intravenous suxamethonium 1.5 mg/kg was used for neuromuscular blockade. After one minute of bag-mask
ventilation with 100%, oxygen patient was intubated with appropriate size endotracheal tube. Position was checked by bilateral chest auscultation and EtCO₂ Anaesthesia was maintained by nitrous oxide: oxygen (2:1) and sevoflurane. Loading dose of Atracurium was administered followed by intermittent boluses depending on need.

Haemodynamic and variation in oxygen saturation level monitoring was done every 5 min and was recorded.

At the end of surgery nitrous oxide was discontinued and residual neuromuscular blockade was reversed by Neostigmine 0.05 mg/kg and Glycopyrolate 0.005 mg/kg. Patient was extubated after fulfilling extubation criteria.

The various parameters that were observed during the whole perioperative period are:
• Arterial desaturation: pulse oximetry (SpO₂) <92% for more than 1 min.
• Laryngospasm: audible stridor or airway obstruction not relieved by airway manipulations.
• Bronchospasm: audible wheeze or unexplained increase in airway pressure.
• Mean arterial pressure (MAP).
• Heart rate (HR) and
• Level of analgesia using VAS score.

All the patients after operation were sent to Post Anaesthesia Care Unit (PACU) and observed for 48 h for any complications.

Statistical analysis
For statistical analysis, data were entered into a Microsoft Excel spreadsheet and then analyzed by SPSS (version 25.0; SPSS Inc., Chicago, IL, USA) and Graph Pad Prism version 5. Data had been summarized as mean and standard deviation for numerical variables and count and percentages for categorical variables. Two-sided sample t-tests were used for a difference in mean involved in independent samples or unpaired samples. Paired t-tests were used as form of blocking and which had greater power than unpaired tests. A Chi-square test (χ² test) was used for statistical hypothesis test. “Chi-squared test” is often used as short for Pearson’s Chi-squared test. Unpaired proportions were compared by Chi-square test or Fischer’s exact test, as appropriate. P≤0.05 was considered for statistically significant.

RESULTS
Demographical variable like age, weight, height and BMI were comparable in both the groups with no statistical difference which is shown in Table 1.

Difference of mean just after extubation MAP versus smoker and nonsmoker was statistically significant (P=0.0001).

Difference of mean day 1 MAP versus smoker and nonsmoker was not statistically significant (P=0.3314). Difference of mean day 2 MAP versus smoker and nonsmoker was statistically significant (P=0.0006) shown in Table 2 and Figure 1.

Difference of mean just after intubation HR versus smoker and nonsmoker was statistically significant (P=0.0021). Difference of mean 1 h intra-op HR versus smoker and nonsmoker was not statistically significant (P=0.1910). Difference of mean just after extubation HR versus smoker and nonsmoker was statistically significant (P=0.0001). Others value were statistically not significant shown in Table 3 and Figure 2.

Difference of mean baseline SpO₂ versus smoker and nonsmoker was statistically significant (P=0.0040), but the difference of mean value was not that clinically significant. Difference of mean just after extubation SpO₂ versus smoker and nonsmoker was statistically significant (P=0.0049). Difference of mean just before sending to ward SpO₂ versus smoker and nonsmoker was statistically significant (P≤0.0001) shown in Table 4 and Figure 3.

Difference of mean VAS Score Day 1 morning versus smoker and nonsmoker was not statistically significant (P=0.5478). Difference of mean VAS Score Day 2 morning versus smoker and nonsmoker was not statistically significant (P=0.3034) shown in Table 5 and Figure 4.

In nonsmoker, 3 (1.9%) patients had Arterial desaturation. In smoker, 12 (7.5%) patients had Arterial desaturation. Association of Arterial desaturation (SpO₂<92%) versus smoker and nonsmoker was statistically significant (P=0.0344).

In nonsmoker, 160 (100.0%) patients had no Bronchospasm. In smoker, 3 (1.9%) patients had Bronchospasm. Association of Bronchospasm versus smoker and nonsmoker was not statistically significant (P=0.245) shown in Table 6.

DISCUSSION
In our study we found –
• The smokers had higher incidence of laryngospasm as well as bronchospasm but they were not statistically significant.

### Table 1: Distribution of means age versus smoker and nonsmoker

| Variable   | Nonsmoker (160) Mean±SD | Smoker (160) Mean±SD | P-value |
|------------|-------------------------|----------------------|---------|
| Age        | 46.90±9.94               | 46.67±10.14          | 0.837   |
| Height (cm)| 165.05±6.31              | 165.91±6.64          | 1.994   |
| Weight     | 65.43±5.47               | 65.99±5.762          | 0.371   |
| BMI        | 24.04±2.082              | 24.00±2.216          | 0.868   |
### Table 2: Distribution of mean MAP at different time interval: Smoker and Nonsmoker

| Time Interval       | Number | Mean   | SD     | Minimum | Maximum | Median | P-value |
|---------------------|--------|--------|--------|---------|---------|--------|---------|
| **Baseline MAP**    |        |        |        |         |         |        |         |
| Non Smoker          | 160    | 80.1688| 8.6644 | 65.0000 | 96.0000 | 81.0000| 0.2719  |
| Smoker              | 160    | 81.1938| 7.9823 | 67.0000 | 97.0000 | 80.0000|         |
| **During induction MAP** |      |        |        |         |         |        |         |
| Non Smoker          | 160    | 78.4750| 8.2041 | 64.0000 | 92.0000 | 79.5000| 0.2392  |
| Smoker              | 160    | 79.5375| 7.9130 | 66.0000 | 94.0000 | 80.0000|         |
| **Just after intubation MAP** |   |        |        |         |         |        |         |
| Non Smoker          | 160    | 75.1813| 8.9638 | 58.0000 | 94.0000 | 75.5000| 0.5260  |
| Smoker              | 160    | 75.8438| 9.6905 | 55.0000 | 96.0000 | 77.0000|         |
| **30 min intra-op MAP** |      |        |        |         |         |        |         |
| Non Smoker          | 160    | 75.8250| 8.0263 | 63.0000 | 90.0000 | 76.0000| 0.4769  |
| Smoker              | 160    | 76.5063| 9.0561 | 60.0000 | 100.0000| 77.0000|         |
| **1 h intra-op MAP** |       |        |        |         |         |        |         |
| Non Smoker          | 160    | 76.5250| 7.2224 | 65.0000 | 90.0000 | 76.0000| 0.8151  |
| Smoker              | 160    | 76.3125| 9.9605 | 55.0000 | 96.0000 | 73.0000|         |
| **Just after extubation MAP** |   |        |        |         |         |        |         |
| Non Smoker          | 160    | 83.2563| 7.8141 | 69.0000 | 100.0000| 82.5000| 0.0001  |
| Smoker              | 160    | 86.7688| 7.8044 | 70.0000 | 88.0000 |        |         |
| **Before sending to ward MAP** |   |        |        |         |         |        |         |
| Non Smoker          | 160    | 80.3750| 7.3534 | 67.0000 | 92.0000 | 80.0000| 0.3314  |
| Smoker              | 160    | 81.2750| 7.601   | 60.0000 | 94.0000 | 80.0000|         |
| **Day 1 MAP**       |        |        |        |         |         |        |         |
| Non Smoker          | 160    | 80.0688| 7.3091 | 66.0000 | 94.0000 | 81.0000| 0.3144  |
| Smoker              | 160    | 82.6563| 9.0561 | 60.0000 | 100.0000| 82.0000|         |
| **Day 2 MAP**       |        |        |        |         |         |        |         |
| Non Smoker          | 160    | 80.0688| 7.3091 | 66.0000 | 94.0000 | 81.0000| 0.3144  |
| Smoker              | 160    | 82.9000| 7.1315 | 70.0000 | 82.0000 |        |         |

MAP: Mean arterial pressure

### Table 3: Distribution of mean HR at different time interval: Smoker and Nonsmoker

| Time Interval       | Number | Mean   | SD     | Minimum | Maximum | Median | P-value |
|---------------------|--------|--------|--------|---------|---------|--------|---------|
| **Baseline HR**     |        |        |        |         |         |        |         |
| Non Smoker          | 160    | 85.3000| 9.7360 | 68.0000 | 110.0000| 85.0000| 0.7967  |
| Smoker              | 160    | 85.5875| 10.2081| 65.0000 | 103.0000| 82.0000|         |
| **During induction HR** |      |        |        |         |         |        |         |
| Non Smoker          | 160    | 83.2375| 8.5344 | 68.0000 | 103.0000| 83.0000| 0.7084  |
| Smoker              | 160    | 82.8813| 8.4915 | 60.0000 | 100.0000| 84.0000|         |
| **Just after intubation HR** |   |        |        |         |         |        |         |
| Non Smoker          | 160    | 96.1188| 10.3221| 77.0000 | 123.0000| 93.0000| 0.0021  |
| Smoker              | 160    | 100.0813| 12.4071| 74.0000 | 130.0000| 99.0000|         |
| **30 min intra-op HR** |      |        |        |         |         |        |         |
| Non Smoker          | 160    | 78.0500| 9.8401 | 56.0000 | 100.0000| 78.0000| 0.3267  |
| Smoker              | 160    | 79.2625| 12.1238| 60.0000 | 129.0000| 80.0000|         |
| **1 h intra-op HR** |        |        |        |         |         |        |         |
| Non Smoker          | 160    | 77.1750| 8.5492 | 61.0000 | 96.0000 | 75.0000| 0.1910  |
| Smoker              | 160    | 78.5750| 10.4566| 62.0000 | 111.0000| 76.0000|         |
| **Just after extubation HR** |   |        |        |         |         |        |         |
| Non Smoker          | 160    | 97.5813| 12.7745| 77.0000 | 133.0000| 95.0000| 0.0001  |
| Smoker              | 160    | 103.1250| 12.9054| 85.0000 | 136.0000| 100.0000|         |
| **Before sending to ward HR** |   |        |        |         |         |        |         |
| Non Smoker          | 160    | 85.9188| 6.7320 | 70.0000 | 102.0000| 86.0000| 0.7366  |
| Smoker              | 160    | 85.6750| 6.2017 | 68.0000 | 98.0000 | 86.0000|         |
| **Day 1 morning HR** |        |        |        |         |         |        |         |
| Non Smoker          | 160    | 89.2313| 5.2894 | 74.0000 | 98.0000 | 88.0000| 0.1527  |
| Smoker              | 160    | 88.3063| 6.2172 | 70.0000 | 102.0000| 89.0000|         |
| **Day 2 morning HR** |        |        |        |         |         |        |         |
| Non Smoker          | 160    | 87.8875| 5.0232 | 75.0000 | 98.0000 | 88.0000| 0.6523  |
| Smoker              | 160    | 88.1938| 6.9685 | 72.0000 | 105.0000| 88.0000|         |

HR: Heart rate
Smokers had low baseline \( \text{SpO}_2 \); fall in \( \text{SpO}_2 \) just after intubation and just after extubation, before sending to ward and on day 1 which were statistically significant.

Smokers had more arterial desaturation (\( \text{SpO}_2 < 92\% \)) than non-smokers which was statistically significant.

Smokers had raised MAP just after extubation, on day 1 and day 2 which were statistically significant.

Smokers had incidences of raised HRs just after intubation and just after extubation which were also statistically significant.

Table 4: Distribution of mean \( \text{SpO}_2 \) Smoker and Non-smoker

| Time                          | Number | Mean    | SD      | Minimum | Maximum | Median | P-value |
|-------------------------------|--------|---------|---------|---------|---------|--------|---------|
| Baseline \( \text{SpO}_2 \)   |        |         |         |---------|---------|--------|---------|
| Non Smoker                    | 160    | 99.7000 | 0.5355  | 98.0000 | 100.0000 | 100.0000 | 0.0040  |
| Smoker                        | 160    | 99.4750 | 0.8238  | 97.0000 | 100.0000 | 100.0000 |         |
| During induction \( \text{SpO}_2 \) |       |         |         |---------|---------|--------|---------|
| Non Smoker                    | 160    | 99.8125 | 0.4371  | 98.0000 | 100.0000 | 100.0000 | 0.6912  |
| Smoker                        | 160    | 99.7938 | 0.4059  | 99.0000 | 100.0000 | 100.0000 |         |
| Just after intubation \( \text{SpO}_2 \) |       |         |         |---------|---------|--------|---------|
| Non Smoker                    | 160    | 99.5313 | 1.1098  | 94.0000 | 100.0000 | 100.0000 | 0.3258  |
| Smoker                        | 160    | 99.4063 | 1.1617  | 94.0000 | 100.0000 | 100.0000 |         |
| 30 min intra-op \( \text{SpO}_2 \) |       |         |         |---------|---------|--------|---------|
| Non Smoker                    | 160    | 99.9250 | 0.2642  | 99.0000 | 100.0000 | 100.0000 | 0.0936  |
| Smoker                        | 160    | 99.3813 | 4.0807  | 70.0000 | 100.0000 | 100.0000 |         |
| 1 h intra-op \( \text{SpO}_2 \) |       |         |         |---------|---------|--------|---------|
| Non Smoker                    | 160    | 99.9438 | 0.2311  | 99.0000 | 100.0000 | 100.0000 | 0.4023  |
| Smoker                        | 160    | 99.8875 | 0.8164  | 94.0000 | 100.0000 | 100.0000 |         |
| Just after extubation \( \text{SpO}_2 \) |       |         |         |---------|---------|--------|---------|
| Non Smoker                    | 160    | 98.3313 | 2.5740  | 84.0000 | 100.0000 | 99.0000 | 0.0049  |
| Smoker                        | 160    | 97.1250 | 4.7248  | 75.0000 | 100.0000 | 99.0000 |         |
| Before sending to ward \( \text{SpO}_2 \) |       |         |         |---------|---------|--------|---------|
| Non Smoker                    | 160    | 99.5438 | 0.9170  | 95.0000 | 100.0000 | 100.0000 | <0.0001 |
| Smoker                        | 160    | 98.3063 | 1.8360  | 92.0000 | 100.0000 | 99.0000 |         |
| Day 1 morning \( \text{SpO}_2 \) |       |         |         |---------|---------|--------|---------|
| Non Smoker                    | 160    | 99.3875 | 0.8087  | 97.0000 | 100.0000 | 100.0000 | 0.0278  |
| Smoker                        | 160    | 99.0938 | 1.4743  | 94.0000 | 100.0000 | 100.0000 |         |
| Day 2 morning \( \text{SpO}_2 \) |       |         |         |---------|---------|--------|---------|
| Non Smoker                    | 160    | 99.5813 | 0.6865  | 98.0000 | 100.0000 | 100.0000 | 0.0529  |
| Smoker                        | 160    | 99.3688 | 1.2007  | 95.0000 | 100.0000 | 100.0000 |         |

Table 5: Distribution of mean VAS score day 1 and 2 morning : Smoker and Non-smoker

| VAS Score Day | Number | Mean    | SD       | Minimum | Maximum | Median | P-value |
|---------------|--------|---------|----------|---------|---------|--------|---------|
| Day 1 morning |        |         |          |         |         |        |         |
| Non Smoker    | 160    | 4.2625  | 1.3388   | 2.0000  | 8.0000  | 4.0000 | 0.5478  |
| Smoker        | 160    | 4.3563  | 1.4465   | 2.0000  | 8.0000  | 5.0000 |         |
| Day 2 morning |        |         |          |         |         |        |         |
| Non Smoker    | 160    | 4.4188  | 1.3984   | 1.0000  | 8.0000  | 5.0000 | 0.3034  |
| Smoker        | 160    | 4.5875  | 1.5271   | 1.0000  | 8.0000  | 5.0000 |         |

Table 6: Distribution of laryngospasm; arterial desaturation and bronchospasm between Smoker and Nonsmoker

| Variable                  | Non smoker | smoker | Chi-square value | P-value |
|---------------------------|------------|--------|------------------|---------|
| Laryngospasm              |            |        |                  |         |
| No                        | 157        | 154    | 0.457            | 0.49    |
| Yes                       | 3          | 6      |                  |         |
| Arterial desaturation     |            |        |                  |         |
| No                        | 157        | 148    | 4.476            | 0.034   |
| Yes                       | 3          | 12     |                  |         |
| Bronchospasm              |            |        |                  |         |
| No                        | 160        | 157    | 1.346            | 0.245   |
| Yes                       | 0          | 3      |                  |         |

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- Postoperative VAS scores among smokers and non-smokers were statistically not significant.

Myles et al.,4 found that smokers had increased incidences of respiratory complications (i.e. laryngospasm, bronchospasm or fall in \( \text{SpO}_2 \)). Our study confirms to the study of Myles et al. We have found the incidence of laryngospasm and bronchospasm was higher among smokers group though not statistically significant. But higher fall of \( \text{SpO}_2 \) was significantly lower in smoker group during baseline, just after extubation, before sending to ward and on day 1. These effects are probably due to effects of general anaesthesia and more ventilation perfusion mismatch in smokers. This fall in \( \text{SpO}_2 \) was also supported by the study of Dennis et al.,10 Graybill et al.,11 also found that the smokers had higher incidences of respiratory complications compared to non-smokers. Chandrashekhar et al.,12 stated smokers had increased incidences of haemodynamic complications compared to non-smokers. We have got similar results.

Rodrigo13 found that smokers had overall raised blood pressure, HR and systemic vascular resistance as compared to non-smokers. Our study conforms to the studies of Chandrashekhar.
et al.,12 and Rodrigo.13 We found that MAP was significantly raised among smokers than non-smokers just after intubation and extubation, on day 1 and day 2 as compared to non-smokers. The smokers were also found to have significantly raised HRs just after intubation and extubation as compared to non-smokers. These might be because of the higher levels of nicotine in blood among smokers than non-smokers. Our study was also supported by the study of Miskovic and Lump14 who also showed that smokers suffered from high blood pressure. Chiang et al.,15 stated that smokers suffered from higher pain intensity and required more the study of Dennis et al.,10 Graybill et al.,11 also found that the smokers had higher incidences of respiratory complications compared to non-smokers.

Chandrashekar et al.,12 stated smokers had increased incidences of haemodynamic complications compared to non-smokers. We have got similar results. Rodrigo13 found that smokers had overall raised blood pressure, HR and systemic vascular resistance as compared to non-smokers. Our study conforms to the studies of Chandrashekar et al.,12 and Rodrigo.13 We found that MAP was significantly raised among smokers than non-smokers just after intubation and extubation, on day 1 and day 2 as compared to non-smokers. The smokers were also found to have significantly raised HRs just after intubation and extubation as compared to non-smokers. This might be because of the higher levels of nicotine in blood among smokers than non-smokers. Our study was also supported by the study of Miskovic and Lump14 who also showed that smokers suffered from high blood pressure. Upadhyay et al.,16 Chiang et al.,15 stated that smokers suffered from higher pain intensity and required more opioids during the first 72 h postoperatively as compared to non-smokers. But in our study, we assessed the level of analgesia using VAS score for 48 h postoperatively which was statistically non-significant between smokers and non-smokers. This might be because of the analgesic coverage provided post-operatively. Chiang et al.,15 also found that there were more number of male smokers whose average age were less than the female smokers. For excluding gender bias we selected only male patients. In our study, the mean age, height, weight and BMI among smokers and non-smokers were statistically non-significant.

Smoking perioperatively increases the chances of the development of various pulmonary complications. Cessation of smoking any time before surgery is beneficial. Patients can be motivated by assurance, nicotine gum or patch, inhaler or various pharmacotherapy such as bupropion.

Limitations of the study
The notable shortcomings of this study are:
1. Breath CO analyzer or Urine Cotinine level cannot be done to confirm or refute a history of smoking.
2. The study has been done in a single center.
3. The study was carried out in a tertiary care hospital and open label, so hospital bias and confounding bias cannot be ruled out.
CONCLUSION

In our study, we found that smokers had increased incidences of respiratory and haemodynamic complications than non-smokers.

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SS- Initial manuscript preparation, investigation drafting; MM- Concept and design of study; PD- Revision of manuscript,interpretation of results; SC- Coordination,revision,statistical interpretation; DB- Critical analysis,revision

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