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Original Research Article

Effect of Short-Term Smoking Cessation Intervention on Abdominal Operations

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Abstract: Smoking of tobacco has been practiced by people all over the world cutting across national and social barriers. The increasing habit of smoking has resulted in a high incidence of tobacco related diseases all over the developing world. Though smoking of tobacco started centuries ago, the health and environmental hazards posed by it was recognized only in 20th century. Objectives of the study are to assess the effect of short-term preoperative smoking intervention on smoking cessation in the postoperative period and to determine the effect of smoking cessation on the incidence of postoperative complications. The present study recruited the male patients admitted in Sree Siddhartha Medical College and Hospital Tumkur for elective abdominal operations. Smokers prior to surgery were counselled for short term preoperative smoking cessation and measured abstinence from smoking in the preoperative and postoperative period. The maximum number of cases was in the age group of 20-30 years (35%). The youngest patient was 20 years old and oldest was 75 years old. The mean age was 40.04 years ± 14.06 years and the mode was 28 years. A total of 83 cases were studied from November 2008 to September 2010. Maximum cases were in the age group of 20-30 years (35%). The mean age was 40.04 years ± 14.06 years. In the present study 32 (39%) were current smokers, 1 (1%) was recent smoker, 11 (13%) were Ex-smoker and 39 (47%) were non-smokers. After counselling all current smokers were agreed for short term preoperative smoking cessation (2 days prior to surgery till the date of discharge) so all current smokers were considered in the cessation group. Smokers are at greater risk than non-smokers of postoperative complications. Smoking is responsible for broad range of potentially reversible effects that are relevant to postoperative morbidity.
Keywords: smoking, non-smoker, hernia, packs years

INTRODUCTION

Smoking of tobacco has been practiced by people all over the world cutting across national and social barriers. The increasing habit of smoking has resulted in a high incidence of tobacco related diseases all over the developing world. Though smoking of tobacco started centuries ago, the health and environmental hazards posed by it was recognized only in 20th century.

The psychological reinforcing effects of nicotine on the CNS encourage the progression from early experimentation of tobacco to chronic exposure, then addiction. Once addicted, the smoker faces an unacceptable risk for a frightening array of neoplastic and cardiovascular disorders. Even without pulmonary symptoms, the smoker has a chronic inflammatory disease of lower airways.

The greatest responsibility of doctors is to combat smoking, both through their advice to the patients and through their influence in the community through health education.

The addictive effects of nicotine account for most of this persistent personal and public health dilemma. Recognition of tobacco use as an addiction and of nicotine as the addictive drug is essential for effective patient management. The essential criteria for defining drug addiction are compulsive use, psychoactive effects and drug reinforced behavior. Nicotine use fulfills these criteria because it causes a compelling urge to smoke, gives a pleasurable alteration in mood and motivates chronic tobacco seeking. Tolerance and physical dependence, manifested by abstinence mediated withdrawal syndrome, contribute

to the strong control exerted by nicotine on smoking behavior.

Smokers regulate their nicotine dose to obtain desired effects: these include both intrinsic positive effects, such as pleasure and enhanced performance and avoidance of the withdrawal syndrome. This syndrome is characterized by anger, anxiety, and difficulty in concentration, impatience, restlessness and craving for tobacco products. Most of these symptoms peak in 1-2 days and return to baseline within 3-4 weeks of quitting [1].

Objectives of the Study

- To assess the effect of short-term preoperative smoking intervention on smoking cessation in the postoperative period.
- To determine the effect of smoking cessation on the incidence of postoperative complications.

MATERIALS AND METHODS

Source of Data

The present study recruited the male patients admitted in Sree Siddhartha Medical College and Hospital Tumkur for elective abdominal operations. Smokers prior to surgery counselled for short term preoperative smoking cessation and measured abstinence from smoking in the preoperative and post-operative period.

These patients are grouped into

a) nonsmokers
b) smokers

- current smokers (who smoked within 2 weeks prior to surgery)
- recent smokers (whose duration of abstinence from smoking is 2-4weeks prior to surgery)
- ex smokers (whose duration of abstinence from smoking is > 4weeks prior to surgery)

Current smokers offered a smoking cessation intervention and those who agreed for cessation were considered in Short term abstinence group (48-72 hours prior to surgery) and patients are categorized according to pack years and clinically evaluated for postoperative complications.

RESULTS

The maximum number of cases was in the age group of 20-30 years (35%). The youngest patient was 20 years old and oldest was 75 years old. The mean age was 40.04 years ± 14.06 years and the mode was 28 years.

In the present study out of 83 patients 44 (53%) were smokers and 39 (47%) were non-smokers. Among smokers 32 patients were Current smokers, 11 were ex smokers and 1 patient was a recent smoker. As all current smokers agreed for cessation all were in the cessation group.

Table 1: Pack year's distribution

Pack years	Number of patients	Percentage
0-5 pack years	34	41%
5-10 pack years	7	8%
>10 pack years	3	4%
Non smokers	39	47%

Maximum number of patients belongs to inguinal hernia group (53; 64%) and together with recurrent appendicitis they constitute about 86%. Remaining 14% cases include Para umbilical hernia, Incisional hernia, Epigastric hernia, Gastric outlet obstruction and calculous cholecystitis.

Table 2: Distribution according to Diagnosis

Diagnosis	**Number of patients**	**Percentage**
Inguinal hernia	53	65%
Para umbilical hernia	3	4%
Recurrent appendicitis	18	22%
Incisional hernia	2	2%
Epigastric hernia	3	4%
Gastric outlet obstruction	1	1%
Calculous cholecystitis	2	2%

Inguinal, Grid Iron and Lanz incisions together constitute about 75%. Other incisions were Midline (4%), Paramedian 4%), Kocher (2%), Supraumbilical & Infraumbilical transverse (3%). One case was incisional hernia in Right iliac fossa and a transverse incision was put in that region.

Table 3: Distribution according to Incision

Incisions	Number of patients	Percentage
Inguinal	53	64%
Grid iron	10	12%
Lanz	8	10%
Midline	3	4%
Paramedian	3	4%
Kocher's subcostal	2	2%
Supra umbilical transverse	2	2%
Infraumbilical transverse	1	1%
Other	1	1%

Postoperative Complications

In the present study 16 smokers and 3 non-smokers developed postoperative complications (Odd's ratio = 6.8).

In the present study two patients developed wound related complications one in 20-30 y and other in >60 y age group. Respiratory complications occurred mainly in 41-50 years (3 cases) and >60 years (3 cases) age group. One patient developed cardiovascular (hypertension) complication and belongs to 51-60 y age group. Post operative fever cases seen in 6.9%, 9.1%, 13.3%, 0%, & 18.2% of 20-30 y, 31-40 y, 41-50 y, 51-60 y, and >60 y age groups respectively. Other complications include one case of headache (20-30 y age group) and one case of constipation (>60 y age group).

Table 4: Postoperative complications

	Total patients	Postoperative complications	%
Age			
20-30 yrs	29	5	17.2
31-40 yrs	22	3	13.6
41-50 yrs	15	4	26.7
51-60 yrs	6	1	16.7
>60 yrs	11	6	54.5
Smoking habit			
Smokers	44	16	36.4
Non-smokers	39	3	7.7
Smoking Status			
Current smokers (Cessation group)	32	13	40.6
Recent smoker	1	0	
Ex-smoker	11	3	27.3
Pack years			
0-5 py	34	12	35.3
5-10 py	7	3	42.9
>10 py	3	1	33.3
Anaesthesia			
SA	71	15	21.1
GA	4	1	25
EA	7	2	28.6
LA	1	1	100

Current Smokers (Smoking cessation group):

All wound related complications and majority of respiratory complications (6 out of 9) occurred in smoking cessation group. Only one patient developed cardiovascular complication (hypertension) in the present study and belongs to smoking cessation group. Regarding postoperative fever cases 7(77%) cases observed in smoking cessation group. Other complications include a case of constipation.

Ex smokers and Recent Smoker:

Two ex-smokers developed respiratory complications and one patient developed postoperative fever. Present study included only one recent smoker and no complications seen in postoperative period

Non Smokers:

Three non smokers developed postoperative complications, one respiratory complication, one fever and one postoperative headache.

Out of 2 wound related complications one occurred in 0-5 pack year group and another in 5-10 pack year groups. Respiratory complications observed in 0-5 pack year (5 cases), 5-10 pack year (3 cases), and in non-smokers (1 case). One patient developed cardiovascular complication (hypertension) in the present study and he belongs to >10 pack year group. Majority of fever cases occurred in 0-5 pack year group (7 out of 9). Other cases include a case of constipation (0-5 pack year) and a case of headache (non-smoker).

All Wound related complications occurred in smokers. Majority of respiratory complications occurred in smokers than non smokers (OR - 8.44). Only one cardiovascular complication (Hypertension) observed in the present study belongs to smokers group. Postoperative fever cases observed mainly in smokers (OR – 8.44). Overall 16 smokers and 3 nonsmokers developed postoperative complications (OR-6.8,)

DISCUSSION

A total of 83 cases were studied from November 2008 to September 2010. Maximum cases were in the age group of 20-30 years (35%). The mean age was 40.04 years ± 14.06 years. In the present study 32 (39%) were current smokers, 1 (1%) was recent smoker, 11 (13%) were Ex-smoker and 39 (47%) were non-smokers. After counselling all current smokers were agreed for short term preoperative smoking cessation (2 days prior to surgery till the date of discharge) so all current smokers were considered in the cessation group.

74% of non-smokers and 53% of current smokers were between 20-40 years age group. In the present study 34 patients (41%) belongs to 0-5 pack years group, 7 patients (8%) to 5-10 pack years, and 3 patients (4%) to >10 pack years.

In the present study 75% were clean (Inguinal hernia, Para umbilical hernia, incisional hernia, epigastric hernia), 3% were clean contaminated (Calculous cholecystitis, Gastric outlet obstruction), 22% were contaminated surgeries (Recurrent appendicitis). In the present study 86% of the surgeries done under Spinal anaesthesia, 5% under General anaesthesia, and 8% under Epidural anaesthesia. One hernioplasty was done under Local anaesthesia.

Efficacy of Counselling:

Physicians have unique opportunities and effective tool to promote smoking cessation. Even brief, physician-delivered-stop smoking-messages may double the spontaneous cessation rate. Abstinence from smoking in relation to surgery might further motivate long term cessation. Perioperative period represents a 'teachable moment' for smoking cessation, and if patients use this opportunity to give up smoking permanently this will have tremendous benefit for their long term health.

In the present study, all 32 current smokers counselled for short term smoking cessation (two days prior to surgery till the date of discharge) and cessation was observed by self reported point prevalence or self reported continuous abstinence. 84% of these patients maintained abstinence from smoking during their hospital stay and only 16% smoked in the postoperative period.

Postoperative Complications:

In the present study 16 smokers and 3 non-smokers developed postoperative complications (OR 6.8). Wound Related Complications: A well studied side effect of smoking is poor and delayed wound healing. Smokers were 2.5 times more likely than non smokers to develop wound related complications [2]. Smoking decreases partial pressure of oxygen by 22-48%, which causes chronic oxygen deficiency in the peripheral tissue. Carbon monoxide occupies the binding sites of oxygen in the haemoglobin molecule and the extent of this is dependent on the amount of tobacco consumed and the time elapsed since last cigarette. Carbon monoxide also shifts oxygen dissociation curve to the left there by causes decreased tissue oxygenation. Smokers have a distinctly lowered production of collagen which is of great importance in wound healing [3].

Some physician question whether giving up smoking, especially if it occur only a short-time before surgery, will improve outcomes. Although many questions remain, there is good reason to believe that even a brief abstinence may improve cardiac and wound related outcomes. Half life of carbon monoxide is about 4-6 hours such that smoke free interval of 12-18 hours should result in substantial decrease in carboxy haemoglobin levels [4].

In the present study two patients developed wound related complications, both belonged to Current smokers (2 out of 32, 6.3%), one in 0-5 pack years and another in 5-10 pack years group. Both are clean wounds (hernia repair). Compared to the other series, who studied incidence of postoperative wound complications among smokers, the present study is comparable with Sorenson all other series showed higher incidence.

Respiratory complications:

Cigarette smoking is a significant preoperative risk factor for postoperative pulmonary complications. This effect is primarily related to the resulting chronic lung disease. Current cigarette smokers have an increased risk for PPCs even in the absence of chronic lung disease. There is six fold increases in the postoperative respiratory morbidity in patients who

smoke more than 10 cigarettes per day. The responsible factors include small airway disease, hypersecretion of a thick viscid mucus and impairment of tracheobronchial clearance [5]. The effects on immune function include decreased neutrophil activity, immunoglobulin concentration and natural killer activity. These effects take at least 6 weeks of abstinence from smoking to return to normal.

Some physicians expressed concern that brief preoperative abstinence might actually be harmful. The results of some prior studies have been interpreted as showing that pulmonary complications are actually increased in patients who give up smoking within the last few days or weeks before surgery. However, more recent studies have shown that abstinence starting within a few weeks of surgery doesn't significantly increase the rate of complications.

In the present study total 9 patients developed respiratory complications (6 current smokers, 2 ex smokers and 1 non smoker). ⅓ Cases observed in >60 years age group and ⅓ in 41-50 years age group. 43% of complications observed in 5-10 pack years group. Compared to the other series [8-11], the present study is comparable with Sorenson (18.8% and 16% respectively)[9]. Moller and Lindstrom series showed decreased incidence (2%)[8,10] whereas Thomsen 2009 series showed increased incidence (34%)[11].

Cardiovascular complications:

Smoking increases the risk of Postoperative cardiovascular complications. Carbon monoxide and nicotine are responsible for the immediate cardiovascular effects. Consequent on the formation of carboxy haemoglobin, carbon monoxide reduces amount of haemoglobin available for combination with oxygen and alters oxygen dissociation curve, such that affinity of haemoglobin for oxygen enhanced. It also has a weak inotropic action on heart [5]. Nicotine being a neurotransmitter at sympathetic ganglia increases heart rate, blood pressure and systemic vascular resistance. Thus it enhances the demand of myocardium for oxygen while carbon monoxide decreases the supply. Elimination of both carbon monoxide and nicotine with improvement in the cardiovascular fitness is complete following 12 -24 hour abstinence from smoking [5].

In the present study only one patient developed cardiovascular complication (hypertension), belonged to current smoker, 51-60 y age group and >10 pack years group. Compared to the other series, the present study is comparable with Lindstrom and Thomsen series (3.1% and 2%, 2% respectively)[10,11]. Moller series showed increased incidence (10%)[8].

Fever:

Previous studies reveal that incidence of postoperative fever ranges from 13-40%. Galicier C [6] reported an incidence of 13.5% and Frieschlag J [7] reported an incidence of 15%. There are many causes for development of postoperative fever and cigarette smoking is one of the risk factor. In the present study, total 9 patients (10.8%) developed postoperative fever among which 8 are current smokers with short term cessation (21.9%).

Overall complications:

Smokers are at greater risk than non-smokers of postoperative wound healing complications, as well as postoperative pulmonary and cardiovascular complications. Smoking is responsible for broad range of potentially reversible effects that are relevant to perioperative morbidity.

5-10% of the population may annually undergo surgery and anaesthesia. Lung or cardiovascular complications occur in upto 10% of the cases, with people who smoke having a considerably increased risk of intra and postoperative complications. Logic supports a strong recommendation to patients to cease cigarette smoking before undergoing elective surgery.

To gain all possible benefits in respect of perioperative morbidity, smoking should stop at least 6 weeks before operation. Those who find it impossible to stop smoking for this period will derive some benefit in terms of improved cardiovascular function from a short period of abstinence (12-24 hours before their operation) [5].

Compared to the other studies, regarding overall complications, the present study is comparable with Sorenson and Lindstrom (40%, 43%, and41% respectively). Moller and Thomsen studies showed increased incidence (52%, and 61% respectively)

CONCLUSION

- Smokers are at greater risk than non-smokers of postoperative complications. Smoking is responsible for broad range of potentially reversible effects that are relevant to postoperative morbidity.
- Counselling for short term smoking cessation prior to surgery resulted high abstinence frequency in postoperative period.
- Smokers with short period of abstinence from smoking (48 hours prior to surgery) will derive some benefit in terms of improved cardiovascular and wound related outcomes. For this reason, perioperative physician should strongly recommend abstinence and should help their patients to achieve this goal.
- Perioperative period represents a 'teachable moment' for smoking cessation, and if patients use this opportunity to give up smoking permanently, this will have tremendous benefit for their long

term health. It could be an excellent opportunity for smokers to achieve permanent abstinence.

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