

Incidence of Haematoma Formation in Relation to Smoking in Abdominoplasty Cases

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Abstract

Objective: This study aims at assessing the relation between smoking and the incidence of haematoma formation in abdominoplasty surgery cases. **Patients and Methods:** This is a 4 years retrospective study involving the patients who underwent abdominoplasty surgery between the period of May 2015 and April 2019 in Zayed Military Hospital, Abu Dhabi, United Arab of Emirates. The incidence of haematoma formation was assessed in relation to tobacco use in these patients. **Results:** 164 patients met the inclusion criteria of the study. 35 patients were smokers (21.3%) and 129 patients were non-smokers (78.7%). The mean age was 38.4 (21 - 59 years). The mean BMI was 27 kg/m² (21.4 - 34.7 kg/m²) and the mean hospital stay was 6.5 days (4 - 19). 23 patients in the study developed haematoma (14%). 11 of them had surgical evacuation of the haematoma (6.7%) while the rest were aspirated in the out-patient clinic. Out of the 23 patients who developed haematoma, 17 patients were smokers and 6 were non-smokers. The incidence of haematoma among smokers was 48.6% (17 out of 35 cases) while its incidence among nonsmokers was 4.7% (6 out of 129 cases) showing a clear relationship between smoking and hematoma formation ($p < 0.005$). Haematoma significantly occurred more in males ($p < 0.005$) with 17 males developing hematoma (37%) compared to 6 females (5.1%). Combining liposuction of the lower flanks and/or plication of the recti muscles to the abdominoplasty procedure did not result in significant increase in the haematoma formation incidence ($p = 0.248$). **Conclusion:** Our study shows a direct relationship between smoking and haematoma formation in abdominoplasty cases. Cessation of smoking during the perioperative period is required before embarking on such a procedure.

Keywords

Haematoma, Smoking, Abdominoplasty Surgery, Tobacco Use

1. Introduction

Tobacco smoking represents the most preventable cause of several fatal and disabling diseases worldwide. A significant proportion of cardiovascular diseases, various oral and pulmonary neoplasms, nonmalignant respiratory diseases, and peripheral vascular disorders can be attributed to the use of cigarettes. [1] Several ingredients in tobacco have been suspected to cause changes in the arterial wall leading to instability of blood vessels with increased risk of major bleeding. [2] [3] This study is aimed at assessing the relationship between smoking and the incidence of haematoma formation in patients who underwent abdominoplasty surgery.

2. Patients and Methods

This is a 4 years retrospective study conducted on patients who underwent abdominoplasty procedures in the Plastic Surgery Department at Zayed Military Hospital, Abu Dhabi, UAE from beginning of May 2015 till end of April 2019.

The aim of the study was to review hematoma incidence in relation to smoking habits in abdominoplasty patients. The data of the patients were analyzed retrospectively from the patients' files and through the computer system and kept in Excel sheet.

2.1. Patient Selection Criteria

The patients who underwent full abdominoplasty procedure during the selected period were included in the study. Those who underwent dermatolipectomy, in the form of excision of the redundant skin below the umbilicus level without dissection above the umbilicus, or those who had preexisting haematological diseases were excluded from the study.

The medical records of each patient were reviewed to identify characteristics such as age, sex, body mass index (in kilograms per square meter) and the smoking status. The minimum follow up period was determined to be 30 days postoperatively for the assessment of development of postoperative haematoma. The diagnosis of haematoma was made by clinical examination in the form of swelling and tenderness of the abdomen, needle aspiration and ultrasound examination.

2.2. Statistical Analysis

The data collected was stored in a simple manner for comparison. Descriptive and frequency statistics were performed to understand the population. Then, a series of statistic tests were conducted Using SSPS to determine if an association between smoking status and hematoma incidence was evident. Fischer's exact test was used for independent variables. Finally, the alpha was set at $\alpha = 0.05$.

2.3. Operative Technique

The procedure is done under the effect of general anaesthesia in the supine posi-

tion with preload of one dose of intravenous antibiotic cover. The incision is performed following an upward concave line 7 cm from the anterior vulvar commissure in females or root of the penis in males. This is carried out above the anterior rectus fascia centrally, and above the external oblique aponeurosis laterally. The dissection is continued in a cephalic direction to the umbilicus. The umbilical stalk is preserved and dissected circumferentially from the elevated abdominal flap with continuation of the dissection in the cephalic direction mostly in the midline region till the xiphisternum. If there is divarication of the recti muscles, plication is done in 2 layers using permanent sutures. If there is excessive fat accumulation at the lower part of the flank region, liposuction of that area is done. Excision of the lower part of the skin flap is done. Haemostasis is ensured. The umbilicus is extruded through the overlying skin and sutured with half horizontal mattress non absorbable sutures to its new location about 9 - 11 cm from the incision line. The Scarpa's fascia is repaired with 2/0 inverted absorbable sutures. The skin is sutured in two layers using 3/0 absorbable inverted interrupted dermal sutures and continuous subcuticular sutures. The wound drained with two negative pressure drains kept at the supra and infraumbilical regions. Dressing is applied with overlying compressive garment. (Figure 1)

2.4. Postoperative Care

The patient is kept in the bed in the modified Fowler's position postoperatively and mobilization is started on the first postoperative day. Low molecular weight heparin 40 mg is started 6 hours postoperatively and continued once daily for 5 days. Antithrombotic pneumatic compression stockings are started in the operation theatre and continued till discharge. The drains are kept on negative pressure and removed when the drainage is less than 20 ml of fluid in 24 hours for each drain. The patients are usually discharged by the fifth postoperative day. The umbilical sutures are removed after 2 weeks. The patient continues to wear the abdominal pressure garment after the abdominoplasty surgery for a period of one month. If plication of the recti muscles is done during the abdominoplasty procedure, the duration is extended to 3 months postoperatively.



Figure 1. Pre and post operative photos of abdominoplasty case.

3. Results

During the period from the beginning of May 2015 till the end of April 2019, 173 patients underwent abdominoplasty surgery. Nine patients were excluded from the study; eight of them had dermatolipectomy and one patient had haematological disorder of Klinefilter syndrome. Accordingly, only 164 patients met the inclusion criteria; 46 of them were males and 118 were females.

The mean age of the patients included in the study was 38.4 (21 - 59 years). The mean BMI was 27 kg/m² (21.4 - 34.7 kg/m²). The mean hospital stay was 6.5 days (4 - 19). The patient who stayed for 19 days had haematoma with complications.

Out of the 164 patients included in the study, 35 patients were smokers 21.3% (31 males and 4 females) and 129 patients were non-smokers 78.7% (15 males and 114 females). (**Table 1**)

23 patients in the study developed haematoma 14% (17 males and 6 females).

11 of the patients who developed postoperative haematoma had to undergo exploration and evacuation of the haematoma surgically (6.7% of the total number of abdominoplasty patients) (**Figure 2**), while the other 12 patients were managed by repeated aspirations of small amount of blood in the out-patient department. (7.3% of the total number of abdominoplasty patients)

Table 1. Variables among smokers and non-smokers in the study.

Variable	Smokers 35 (21.3%)			Nonsmokers 129 (78.7%)			Total 164 (100%)
	No. of Pt.	% from Smokers	% from Total	No. of Pt.	% from Non smokers	% from Total	No. & %
Males	31	88.6%	18.9%	15	11.6%	9.1%	46 (28%)
Females	4	11.4%	2.4%	114	88.4%	69.6%	118 (72%)
Haema.	17	48.6%	10.4%	6	4.7%	3.6%	23 (14%)
Haem. in Males	16	45.7%	9.8%	1	0.8%	0.6%	17 (10.4%)
Haem. in Females	1	2.9%	0.6%	5	3.9%	3%	6 (3.6%)
No Haem.	18	51.4%	11.0%	123	95.3%	75%	141 (86%)
Haema. operated	8	22.9%	4.9%	3	2.35%	1.8%	11 (6.7%)
Haema. operated M.	8	22.9%	4.9%	1	0.8%	0.6%	9 (5.5%)
Haema. operated F.	0	0%	0%	2	1.55%	1.2%	2 (1.2%)
Haema. aspirated	9	25.7%	5.5%	3	2.35%	1.8%	12 (7.3%)
Haema. aspirated M	8	22.85%	4.9%	0	0%	0%	8 (4.9%)
Haema. aspirated F	1	2.85%	0.6%	3	2.35%	1.8%	4 (2.4%)
Abd. With C.P. in M.	2	5.7%	1.2%	3	2.35%	1.8%	5 (3%)
Abd. With C.P. in F.	1	2.9%	0.6%	75	58.1%	45.7%	76 (46.3%)
Haem. Abd. C.P. M.	1	2.9%	0.6%	0	0%	0%	1 (0.6%)
Haem. Abd. C.P. F.	1	2.9%	0.6%	0	0%	0%	1 (0.6%)

Pt.: Patient; M.: Male; F.: Female; Haem.: Haematoma; Abd.: Abdominoplasty; C.P.: Combined Procedure (Plication of Rectus abdominus muscles/Liposuction).

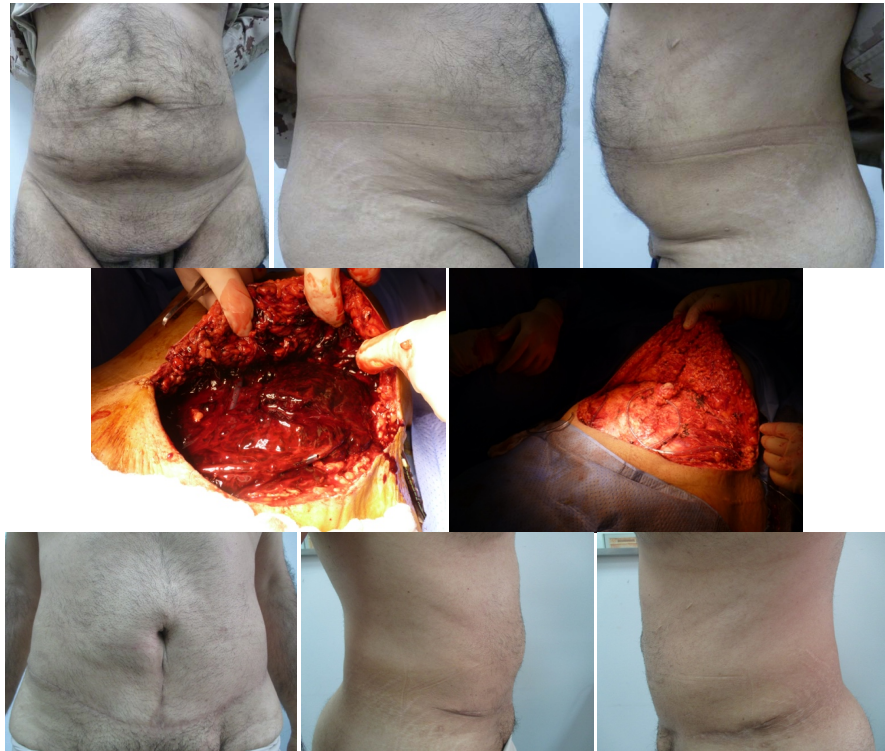


Figure 2. Smoker patient who developed haematoma postoperatively which required surgical evacuation. Pre and post operative photos.

As mentioned before, out of the 23 patients who developed haematoma, 17 patients were smokers (16 males and 1 female) and 6 were non-smokers (1 male and 5 females).

So out of the 35 patients who were smokers in the study 17 patients developed haematoma formation (Incidence 48.6% among smokers) while out of the 129 patients who were non-smokers only 6 patients developed haematoma formation (Incidence 4.7% among non-smokers). Smokers have statistically significant score in developing hematoma, suggesting smoking as major risk factor for haematoma formation ($p < 0.005$).

The patients who developed haematoma among smokers and required surgical evacuation were 8 patients (22.9% of the number of smokers and 4.9% of the total number of the patients). On the other hand, the number of non-smoker patients who developed haematoma and required surgical evacuation were 3 patients (2.35% of the number of non-smokers and 1.8% of the total number of the patients).

There were 18 smokers who did not develop haematoma postoperatively (51.4% of the smokers). On the other hand, 95.3% of the non-smokers did not develop haematoma postoperatively.

The incidence of haematoma was higher in males (17 patients out of 46 male patients included in the study (37%) compared to females (6 patients out of 118 female patients included in the study (5.1%). 31 cases out of total 46 male patients were smokers (67.4%) while 114 cases out of total 118 female patients were

non-smokers (96.6%). (**Table 2**) Male smokers had the highest significant risk in developing Hematoma ($p < 0.005$).

81 patients underwent plication of the recti/liposuction of the lower part of the flanks along with the abdominoplasty operation (5 males and 76 females). Out of them, only one male and one female developed haematoma and both were smokers. No statistical significance was found when comparing haematoma development in patients that underwent combined procedure with abdominoplasty to patients who underwent abdominoplasty only ($p = 0.248$).

4. Discussion

The relationship between smoking and postoperative complications cannot be overemphasized.

On their systematic review and meta-analysis of 107 studies, Grønkjær, M. *et al.*, confirmed that preoperative smoking was associated with an increased risk of postoperative complications. [4] This fact was also stated before by Sørensen, L.T. on his review and meta-analysis of 140 cohort studies including 479,150 patients. [5] While both of these studies discussed the postoperative complications in general, Winocour J. *et al.* on their retrospective cohort study on 25,478 patients who underwent abdominoplasty surgery, found that haematoma was the commonest complication [6]. Our study aimed to discuss the relationship between smoking and the incidence of haematoma formation in patients who underwent abdominoplasty procedure.

The incidence of haematoma in our study was found to be 14%. Smokers presented 21.3% of the total number of the patients. The incidence of haematoma among them was 48.6% while the incidence of haematoma among non-smokers was 4.7% which shows the great impact of smoking as a risk factor on the incidence of haematoma formation in abdominoplasty cases.

Neaman K.C. *et al.*; on their retrospective review analysis of 1008 patients reported an incidence of haematoma which required surgical evacuation of 2.6%. This was somewhat comparable to our study in which haematomas were evacuated surgically in 6.7% of the cases taking into consideration that the smokers in their study represented 10.7% of the total number of the patients which is almost half of those in our study. [7] Nearly half of our cases who developed haematoma required surgical evacuation 11 out of 23 patients.

Dutot *et al.*; reported that haematoma was the most frequent complication in

Table 2. Haematoma and smoking prevalence among male and female patients.

Variable	Males (46 Patients)		Females (118 Patients)	
	Number	Percentage	Number	Percentage
Haematoma	17	37%	6	5.1%
Smokers	31	67.4%	4	3.4%
Non-Smokers	15	32.6%	114	96.6%

their retrospective review of 1128 cases who underwent abdominoplasty surgery (5.7%). Their study included only female patients. [8] In our study we had nearly same value as 6 patients out of the 118 female patients developed haematoma (5.1%). This shows the low incidence of haematoma in female patients as compared to male patients in whom we reported an incidence of 37% (17 out of 46 patients). This can be contributed to the fact that most of the male patients included in the study were smokers; 31 cases out of total 46 male patients (67.4%) while on the other hand most of the female patients included in the study were nonsmokers 114 cases out of total 118 female patients (96.6%). This is matching with other studies which showed that smoking was one of the risk factors of having higher incidence of postabdominoplasty complications in males compared to females. [9]

81 patients out of the 164 patients included in our study had liposuction of the lower part of the flanks, plication of the recti muscles or both during the abdominoplasty procedure (49.3%) of the cases. Only two patients of them developed haematoma and both were smokers. This did not significantly show in our study that combining these procedures with abdominoplasty surgery significantly increases the incidence of haematoma formation contrary to what is mentioned in other studies which showed increased incidence of complications. [6]

To reduce the incidence of haematoma and other complications postoperatively many centers advised to stop smoking in the perioperative period. [10] In a meta-analysis study done by Mills *et al.*, they demonstrated that cessation of smoking caused a relative risk reduction of 41% for prevention of postoperative complications and each week of cessation increases the magnitude of effect by 19% [11]. While some centers advise judicious patient selection and preoperative smoking counseling [12] with the help of nicotine replacement therapy and smoking cessation medications [13], others feel that it seems impossible to turn smokers into nonsmokers and they continue performing abdominoplasty in smokers. [14]

In our center, we recently started a protocol of advising patients to stop smoking for at least 3 months preoperatively and we refer them to the smoking clinic for medication management. Despite advising stopping tobacco use preoperatively, still there will be some patients who will deny smoking to get the procedure performed [15].

Quilting sutures are used intraoperatively in some centers to reduce mostly seroma and to some extent haematoma formation by application of about 10 - 18 sutures. [16] This can be time consuming. In addition, puckering of the skin can occur in some areas of the abdominal flap so it needs a learning curve for proper placement of the sutures. Another tool used intraoperatively to reduce mainly seroma and possible haematoma is the fibrin glue as a tissue adhesive agent [17] [18]. In a systematic review and Meta-Analysis study done by Nasr M.W. *et al.*, they found that patients who received tissue adhesives had a similar incidence of seroma compared with patients who did not receive adhesives [19].

We feel that intraoperative application of quilting sutures or tissue adhesives should be taken into consideration for further work study.

5. Conclusions

Our study shows that there is a direct relationship between smoking and the incidence of haematoma formation. The incidence of haematoma in males was much higher than in females. Combining liposuction of the lower flanks or plication of the recti muscles to the abdominoplasty procedure did not result significantly in increased risk of haematoma formation.

We recommend stopping smoking of about 3 months preoperatively before getting abdominoplasty surgery done in addition to other measures aiming to reduce the incidence of haematoma formation.

Compliance with Ethical Standards

This study was approved by Abu Dhabi Region Ethics and research Committee, Zayed Military Hospital Abu Dhabi.

Surgical consent was obtained from all the patients before surgery. Consents for photography and publication were also signed.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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