



GLOBAL JOURNAL OF HUMAN-SOCIAL SCIENCE: I
SURGERIES AND CARDIOVASCULAR SYSTEM
Volume 14 Issue 2 Version 1.0 Year 2014
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Indications and Outcomes of Abdominoplasty in Sudanese Patients

By Abdulhadi Yagoub Edries Mahamoud & Shadad M.Mahmoud

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Methods: It is a descriptive, prospective, cross sectional study conducted at Soba University Hospital, Khartoum Teaching Hospital, Omdurman Teaching Hospital and Omdurman Military Hospital in the period between 1st of October 2012 to 1st October 2013. Forty four abdominoplasty procedures performed were included. Follow-up period was for one year from time of surgery. Variables studied included patient characteristics, clinical presentation, indications, complications, and patient satisfaction with the final result.

Results: Most of the patients (95%) were female, 76% of them were married. Mean age at the time of operation was $45 \pm$ years. The youngest patient was 28 years old and the oldest was 71 years old. The majority of patients (72.7%) were from central Sudan. Average body mass index (BMI) was 25kg/m². Seventy-seven percent of patients (34 patients) presented with hernia as the main complain. 79% were seeking cosmetic outcome. 54% had pain and 50% reported interference with activities.

GJMR-I Classification: NLMC Code: WI 900



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Indications and Outcomes of Abdominoplasty in Sudanese Patients

Abdulahdi Yagoub Edries Mahamoud ^α & Shadad M.Mahmoud ^σ

Abstract- Objective: This study was designed to evaluate the epidemiology, and outcome of abdominoplasty at four different plastic units in Khartoum state.

Methods: It is a descriptive, prospective, cross sectional study conducted at Soba University Hospital, Khartoum Teaching Hospital, Omdurman Teaching Hospital and Omdurman Military Hospital in the period between 1st of October 2012 to 1st October 2013 . Forty four abdominoplasty procedures performed were included. Follow-up period was for one year from time of surgery. Variables studied included patient characteristics, clinical presentation, indications, complications, and patient satisfaction with the final result.

Results: Most of the patients (95%) were female, 76% of them were married. Mean age at the time of operation was 45 ± years. The youngest patient was 28 years old and the oldest was 71 years old .The majority of patients (72.7%) were from central Sudan. Average body mass index (BMI) was 25kg/m². Seventy-seven percent of patients (34 patients) presented with hernia as the main complain. 79% were seeking cosmetic outcome. 54% had pain and 50% reported interference with activities. The commonest type of procedure performed was mini abdominoplasty in (37) of patients followed by full abdominoplasty in (6) patients and one patient had reverse abdominoplasty. The most common postoperative complications were decreased skin sensation (25%), infection (22.7%), seroma (9.1%), and cutaneous necrosis (6.8%). Vein thromboembolisms (VTE) had not been reported in the studied group patients. Previous surgery and the comorbidity increased incidence of complications. Minor wound complications occurred in young age group(66.6% vs.33.4%), while major in elder. No death encountered.

Average duration of hospital stay was four days. Forty three patients feel satisfied by the results of surgery.

Conclusions: Abdominoplasty is a safe procedure in experienced hands. Selected patients with huge ventral hernia should be offered the procedure before simply attempting herniorrhaphy because it is reconstructive and aesthetic as well.

Results: This is descriptive, prospective, multicentric , cross sectional, study in which forty four patients were admitted to Soba University Hospital, Khartoum Teaching Hospital, Omdurman Teaching Hospital and Omdurman Military Hospital in the period between 1st of October 2012 to 1st October 2013 . 44 patients were enrolled in the study. Forty two patients (95.5%) were female(Figure 1),76% of them were married.

I. INTRODUCTION

Abdominoplasty is one of the most commonly performed aesthetic procedures, has undergone a significant evolution over the past several decades. Kelly was one of the first surgeons to attempt to correct excess abdominal skin and fat. The prevalence of obesity in health care settings is increasing to alarming levels. According to the American Society of Bariatric Surgery (ASBS), 200,000 patients will undergo massive weight loss surgery in a year, and 75% of them will seek a plastic surgeon for body contouring after the weight loss surgery^[1, 2].

The number of abdominoplasty procedures performed world-wide has increased, and became the fourth between the plastic surgery procedures as shown on the table below^[3]:

Rank	Surgical Procedure	Total	Percentage
1	Lipoplasty	1,268,287	19.9%
2	Breast augmentation	1,205,251	18.9%
3	Blepharoplasty	703,610	11.0%
4	Abdominoplasty	553,399	8.7%
5	Rhinoplasty	478,023	7.5%
6	Breast lift	444,222	7.0%
7	breast reduction (women)	428,129	6.7%
8	Face lift	308,926	4.8%
9	Gynecomastia treatment (men)	174,806	2.7%
10	Otoplasty	167,772	2.7%

In South Africa abdominoplasty is started to increase but there is no data reflecting that^[4].

In Nigeria it became to include 10% of plastic surgery procedures^[5].

In Arab countries, the Cosmetic surgeries started to be public, especially after advancement in medical equipments and availability of well trained highly qualified Arab Plastic Surgeons, since eighties.

Author ^{α σ} : Sudan Medical Specialization Board (S.M.S.B) Council of General Surgery. e-mail: forngha1979@hotmail.com

Many Centers of plastic surgery are located in the Middle East where women tend to have multiple children, tummy tuck surgery is the second most common operation after liposuction^[6].

In Sudan one retrospective study was carried out to evaluate efficacy of liposuction and transfer in 21 patients^[7].

It is a common in female, according to the American Academy of Plastic Surgeons, in 2001 there were approximately 58,567 abdominoplasties performed in the United States female patients accounted for 97% of all abdominoplasties^[8].

Common age of patients of abdominoplasty range between 30 years to 50 years. Because it is in this age group that the main problem of abdominal flabbiness, surgical scar, and flaccidity are seen as a result of multiple pregnancies^[9].

a) Types of Abdominal Contour Deformity

In 1988 Bozola and colleagues published a classification including five different groups of aesthetic deformities of the abdomen with assigned operative procedures. Group I comprised younger nulliparous women with normal elastic skin and good muscle tone but excess adipose tissue in the subcutaneous layer in the abdominal area. Group II patients usually had at least one pregnancy, mild lower abdominal skin laxity, diastasis recti, and excess adipose tissue most often present inferior to the umbilicus. Group III includes patients with significant infraumbilical skin, excess adiposity, and abdominal muscle laxity with diastasis of the rectus and oblique muscles. In addition, patients often have striae after multiple pregnancies. Patients in group IV and V have severe skin and fat excess superior and inferior to the umbilicus, accompanied by mild to severe diastasis of the rectus and oblique muscles. Group V patients addition they have a hernia^[10, 11].

b) Types of Abdominoplasty

Recent advances in cosmetic surgery have given way to variations of abdominoplasty procedures. However some guiding principles must be noted. First, ensure that the incision and subsequent excision address the deformity^[12,13, 14]. For type I is suction-assisted lipectomy alone, type II and III mini-abdominoplasty, type IV modified abdominoplasty, and type V abdominoplasty with suction-assisted lipectomy^[10, 11].

c) Complications

As with all body contouring procedures, complications can occur. Major complication (Hematoma requiring surgical intervention ,seroma requiring aspiration, or surgical drainage, cellulitis or abscess requiring hospitalization, DVT or PE, and recurrent of hernia). Minor complication (hematoma or seroma requiring no intervention, small wound dehiscence, minor cellulitis and neuropathic pain)^[15].

The average patient age at the time of surgery was 45 years ± SD (range 28-71 years) (Figure 1).

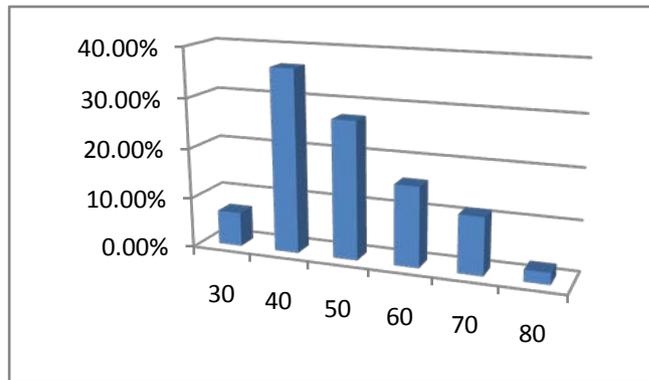


Figure 1 : Age Distribution of the Patients

Number of pregnancies preceding surgery ranged between (0 to 8 pregnancies) with mean (4 pregnancies).

All patients were non smokers.

Thirty two patients (72.7%) reside in the middle of Sudan, while six patients from West (13.6%), three patients from East (6.8%), two patients from North (4.5%) and one patient from South (2.3%).

Patient's weights ranged between (70-155kg) with a mean of 95.4 kg± SD, and average body mass index (BMI) of 25kg/ m² (Table 1).

Table 1 : Complications of Abdominoplasty (N=44)

Complication	Number(percentage)
Infection	10 (22.7%)
Seroma	4 (9.1%)
Cutaneous necrosis	3 (6.8%)
Decrease skin sensitivity	11(25%)
Recurrent of hernia	1 (2.2%)
VTE	0(0%)
Hematoma	0(0%)

Regarding patients complaints, 77% of patients (34 patients) presented with hernia as a main complain, and all of them have previous surgeries. Thirty two of them were female, from these 26 have previous Cesarean section(C/S) and six have other surgeries. 79% were seeking abdominoplasty for body contouring, 54% had pain and 50% interference with activities.

Mesh was used for hernioplasty in twenty one of patients with hernia (62%), while anatomical repair was

preferred in thirteen of them (38%). An incidental finding of another hernia encountered in one patient.

Thirty five patients had type V abdominal wall deformity (79.5%), four type 1V (9.1%), four type 111 (9.1%) and one type 11 (2.3%) (Figure 2).

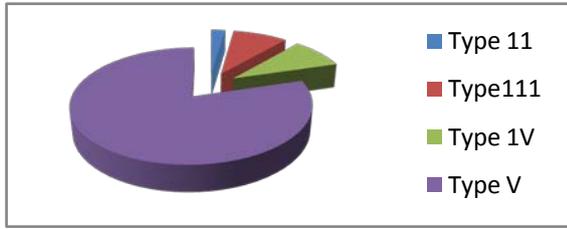


Figure 2 : Types of Abdominal Wall Contour of the Patients

The commonest type of the procedure performed was mini abdominoplasty in 37 of patients

(84.1%) , followed by complete abominoplasty in 6 patients (13.6%) and one reverse abdominoplasty (2.3%).

The most common postoperative wound complications were infection in ten patients (22.7%), all of these were superficial.seroma in four patients (9.1%),one patient needed admission for surgical drain. cutaneous necrosis in three patients (6.8%), all were minor necrosis. and decreased skin sensation in eleven patients (25%). Veinous thromboembolisms (VTE) had not been encountered in studied group (Table 1). Readmission done for one patient with large seroma. Recurrent of hernia occur in one patient. No deaths encountered.

There was no correlation between (BMI) and seroma formation(Figure 3).

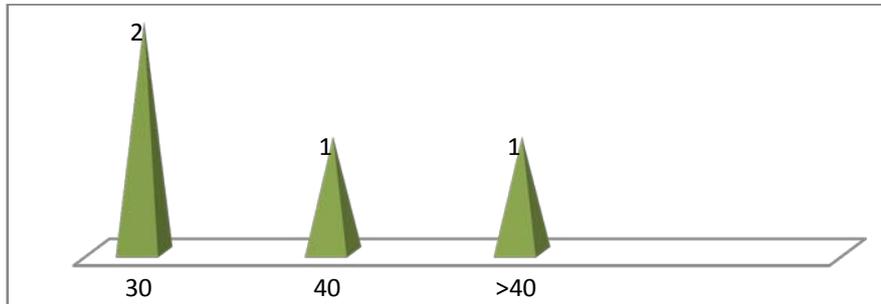


Figure 3 : Relation between BMI and Seroma Formation (N=44)

Patients previous surgery displayed an increased major complication rate(6.8% vs.0.0% $p < 0.05$), while for minor (62.2% vs.31% ; $p < 0.05$). About the comorbidity, four of patients have co morbid

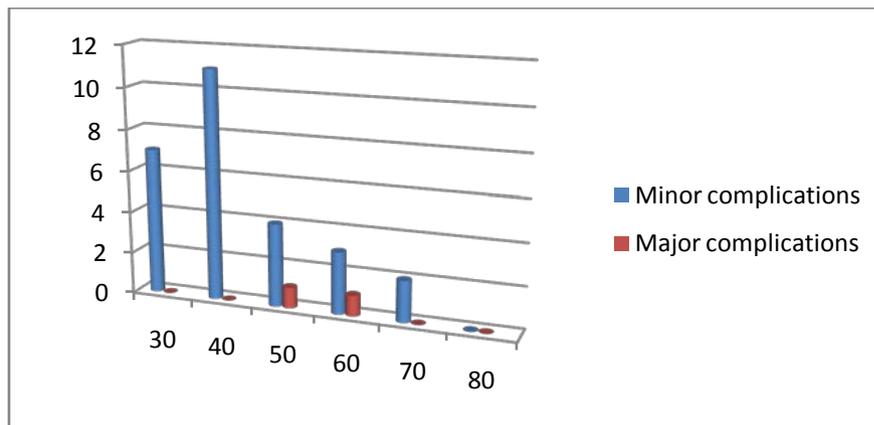
disease, two of them developed major complications (6.8%), while the remaining two developed minor complications (6.8%) (Table2).

Table 2 : Relation between Minor and Major Complications with Previous Surgery and Comorbidity

	Previous surgery		PV	Co morbidity		PV
	Yes	No		Yes	No	
Minor	18(62.2%)	9(31%)	<0.05	2(6.8%)	25(86.2%)	<0.05
Major	2 (6.8%)	0(0.0%)	<0.05	2(6.8%)	0(0.0%)	<0.05

About the relation between the age and wound complications minor complications occurred in patients younger than 50years(66.6% vs.33.4% $p < 0.05$),but major complications occurred exclusively in elder 50 years (Figure 4).

Figure 4 : Relation between Age and Complications
(N=44)



Average duration of hospital stay was four days.

Predominant resumed full activities after 6 weeks.

All patients satisfied by their operations except one whose her hernia recurred.

II. DISCUSSION

Abdominoplasty is a well-established operation to remove abdominal wall tissue excess, that improve quality of life, both functionally and psychologically^[16]. As in other studies in western countries there is a female preponderance for aesthetic surgery^[8], (95%) of our patients were female, because females are more concern about their body appearance than males. Obesity and excess body fat is more common among females^[1, 4, 17].

Hormonal effect on laxity of abdominal wall of female, and majority of our patients were multiparas with previous caesarian sections that weakening their abdominal wall. Pregnancy also induce significant fluctuations in weight that prone diastasis recti, wherein the left and right abdominal muscles separate along their midline^[9]. All these contribute to the domination of the females.

Generally, patients who want a flat and attractive contour of the abdomen are women between the ages of 30 to 60 years^[8]. The mean age of the patients in this study sample was 45 years \pm SD. In study done in USA was found that mean age of abdominoplasty was 44.5 years, which was comparable to our study^[9, 18]. Because it is in this age group that the main problem of abdominal laxity, and surgical scar are seen as a result of multiple pregnancies.

In our series the average (BMI) was 25kg/ m², that fall in category of healthy and overweight. The prevalence of the obesity in developing countries as Sudan is one of them, is not like in the developed countries with the highest global incidence of obesity^[1,2].

There are certainly patients that fall outside the range of BMI for abdominoplasty, but this is not thought to be a problem unless other medical problems coexist^[19, 20, 21]

The majority of the patients were from central region of the Sudan (including capital) (72.7%), this distribution may be explained by accessibility to the health services. The level of awareness among the Sudanese at the peripheries about the availability of aesthetic surgery within the country even among doctors is low.

Good candidates for abdominoplasty are individuals in good health who have tried to address their issues with diet, exercise and other means with little or no results^[4]. Despite 20% of patients used exercise with average duration of seven months, while 30% used abdominal belt with average duration of twelve months, for solving their abdominal contour deformity. But majority of patients were not satisfied by with these means, because most of them have a hernia, that need operative intervention. While remainders have poor compliance by these methods, as diet and exercise need for long period.

The pattern of requests here differs in some respects from western centers, seventy-seven percent of patients (34 patients) who seeked abdominal contouring procedures presented with abdominal hernias in addition to abdominal contour defect, this common indication in our environment is uncommon as in western populations, that range between 12% to 35%^[13, 14, 22, 23]. This may be attributed to that majority of our patients were female with multiple pregnancies, and most of them had Cesarean section. Delivery via Cesarean section adds weakness to the lower abdominal wall muscles^[24, 25].

Also abdominal hernia frequently occurs along with an excess of skin and subcutaneous tissue^[26].

The type of abdominoplasty is selected in the context of abdominal wall contour, that address complexity of abdomen anatomical types, deformities and type of procedure that is suitable to deal with^[10, 11].

In spite of majority our patients body contour was type V deformity in (79.5%) of patients, that suitable for complete abdominoplasty, but mini abdominoplasty was the main surgical procedure done to the studied group (84.1%), this may be attributed to that patients were overweight not obese and, majority of patients seeking for their hernia repair, so they have minimal expectation about contouring.

In our series we never encountered other types of abdominoplasty except mini abdominoplasty, complete abdominoplasty and one reverse abdominoplasty this may be due to surgeons prefer.

There are complications with any major surgery, and a bdominoplasty procedure is no exception.

The most common postoperative complication in this studied population was infection (22.7%). This correlates with previously published literatures on abdominoplasty, also correlated to two studies one done in Egypt^[27], and another in Italy^[28], with wound infection developed in 20% and 25% respectively.

Although seroma is often cited as the most common complication, incidence varies greatly from 10% to 42%^[29, 30, 31, 32]. In this study seroma occurred in (9.1%) of patients. All our patients had one or two drainage catheters placed, which were removed when the total daily output was 50ml or less. The main procedure performed was mini abdominoplasty which has less tissue dissection, and creates small dead space for collection of seroma.

Liposuction is not performed to patients in studied group, as concomitant liposuction of the flanks and abdomen with the addition of aggressive undermining leads to higher seroma rates. This association is likely multifactorial and may be secondary to increased resorptive demands placed on the abdominal lymphatics in the setting of greater dead space and larger fluid shifts as a result of liposuction.

There is no correlation between seroma formation and increase BMI, which reverse to study conducted by Kim and Steven that correlated increase risk of seroma with increase BMI^[31], also another study done in Jordan between June 1997 and June 2007 which support that^[33] this may be owing to the above mentioned factors.

Cutaneous necrosis occurred in three of patients (6.8%), in one study conduct in Egypt post abdominoplasty skin necrosis found in 12% of patients^[27]. All our patients were not smoking and their average weight was 95.4 kg, which all contribute to tissue oxygenation, enhancing of wound healing and prevention of skin necrosis^[15, 34].

Regarding patient's wound infection, seroma and cutaneous necrosis patients were put on oral antibiotics and the wound edges were debrided of

devitalized tissue as needed. All suspected infections resolved with this treatment, except one patient was hospitalized because of massive seroma after two months of operation, that was evacuated about seven liters, and admitted for ten days with IV antibiotics (third generation cephalosporin), then secondary suturing done for her.

Recurrence of hernia occur in one patient (2.3%), in compare to (9%) in different studies^[35, 36]. Mesh repair done to (62%) of patients, which has low recurrent rate that range between 0.5% to 1%^[37].

Also our duration of follow up was short (one year), that was not enough to accurate estimate recurrence rate.

Majority of our patients were overweight not obese and their mobilization postoperatively was early, no one was smoker and most of them they had active mobile life style, due to all these may be the cause of non reported any case of VTE, as found in 0.8%- 8% of abdominoplasty^[36].

Van Uchelen et al, reported on his study, a much higher incidence of wound complications in men when compared with women^[8]. Our results may be biased because of the small number of male patients in our series.

Patients with previous history of abdominal surgery seem to be at risk for minor and major complications 6.8% and 62.2%, respectively. Seventy seven percent of our patients (34 patients) have previous surgeries. Thirty two of them were female, from these 26 have previous Cesarean section (C/S). Previous operations lead to more tissue damage (to nerve decrease sensation, to vessels impair wound healing, to muscle and fascia wall defect)^[34, 38]. This is reverse to the study done between June 1994 to April 2004, study included 139 patients. Showed that patients without previous surgery displayed a significantly increased complication rate (43.2% vs. 22.1% for minor and 25% vs. 5.3% for major complications)^[39].

About the co morbidity, four of patients have co morbid disease, two of them developed major complications (6.8%), while the remaining two developed minor complications (6.8%). Comorbid factors play a significant role, patients who smoke or have diabetes, hypertension, a (BMI) greater than category I, or asthma have significantly higher complication rates^[34].

In compare between the age and wound complications rate, minor complications occurred in young age groups (66.6%), while major complications occurred exclusively in old age groups.

Elder age group have comorbid disease more than young age, so they are more vulnerable to major complications^[36]. More than 70% of our patients were Younger than 50 years, these contribute on their domination the minor complications.

In relation to hospital stay, the overall average in this series was four days, compared with the previously reported that vary from 1 to 6 days^[29, 40].

Regarding the duration of resuming full activities after operation was six weeks in the predominant of the patients.

Concerning patients satisfaction the majority of patients (97.7%) satisfied with operation because they felt that their chief symptoms were improved.

Those patients with and without complications satisfaction was seems that post operative complications do not negatively affect all patients satisfaction.

The limitations of our study were the low number of patients, this may be due to fact that prevalence of obesity in africa was estimated to be 10%^[41],and Sudan is integral part of it. While in USA 2007,33% of men and 36% of women were obese^[42].

Abdominoplasty has successful rate in Sudan, but success is determined by the qualifications and experience of the surgeon performing the procedure, and the health and lifestyle of the patient.

Awareness of our community to abdominoplasty is low, and number of plastic surgeon are few, and they are present mainly in the center, all these play role in the limitation of the procedure.

III. RECOMMENDATION

- Abdominoplasty approach with mesh hernia repair is extremely helpful, that reduce the incidence of recurrence of hernia. Other hernias, which may have not been detected can be found.
- The objectives of the abdominoplasty hernia repair are to reconstruct the structural integrity of the abdominal wall, while improving the contour of the trunk.
- Using of drains decrease seroma formation, and post operative wound infection.
- Type of abdominoplasty should be individualized to accommodate the patient's anatomy and desires. So different types of abdominoplasty need to be familiar by all plastic surgeons.
- Training of surgeons and increase awareness of community about abdominoplasty surgery, as it is reconstructive and cosmetic,with satisfied results, will assist in improved turnout and outcomes.

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