Subcutaneous Drain Versus Abdominal Binder with Percutaneous Aspiration in Repair of abdominal ventral hernia using polypropylene Mesh: A Comparative Study in 60 Egyptian Patients

Ahmed Abd Al Aziz, MD[1], Nader Sh. Zaki, MD[2], Karim G. Moustafa, MD[3], M. Fathy Elshaal

[1]Department of General Surgery,Faculty of Medicine, Cairo University
[2]Department of General Surgery, Faculty of medicine, Fayoum University
[3]National Research Centre, Ministry of Scientific Research, Egypt

ABSTRACT

Abdominal wall (Ventral) hernia is a common problem in Egypt and worldwide. For many decades abdominal wall (ventral hernias) repair represents a challenge for hernia surgeons as regards complex types and recurrence after surgical repair. Postoperative complications are recurrence of the hernia, seroma, hematoma or bleeding into the abdomen, wound infection, bowel injury or temporary decrease of bowel motility, bladder injury, urine retention, pain, heart and breathing problems and death. In our study conducted on 60 patients with non complicated ventral hernia, all hernias were repaired primarily with the use of polypropylene mesh (onlay) with the use of wound drains in 30 patients and the use of combined abdominal binder and repeated percutaneous aspiration in 30 patients. Assessment of the postoperative follow up indicators regarding the presence of significant seroma, hematoma, wound infection, postoperative pain, hospital stay, return to normal activity and patient satisfaction. In our study combined abdominal binder and percutaneous aspiration for selected cases were superior to insertion of wound drains as regards seroma formation, wound infection and postoperative return to normal activity with no significant difference as regards hematoma, postoperative pain, hospital stay and patient satisfaction.

***Keywords**: Ventral hernia, Percutaneous aspiration, Abdominalbinder, Subcutaneous drain.*

INTRODUCTION

The management of ventral hernia (VH) remains a challenging problem for, surgeons, and patients. Wide variation exists in the management of similar VHs in comparable patients. **(1)** Even under optimal conditions, VHs occur in up to 28% of patients undergoing abdominal operations, Recurrence rates ranging from24% to 43% are reported, despite development of new techniquesregardingventral hernia repair (VHR)**(2)**. The placement of permanent prosthetic materials duringventral hernia repair has resulted in a significant reductionin recurrence rates **(3)** use ofa mesh for the repair of incisional hernias hasbeen found in different studies to decrease therecurrence rates by an average of 30%[1–3], whilein a randomized clinical trial involving 289patients in which non-mesh versus mesh repair ofprimary inguinal hernia was compared, it wasfound that recurrence rates were 7% for the non-meshtechnique vs. 1% for mesh repair**(4)**. However, mesh-related complications havebecome increasingly important. Such complicationsinclude seromas, adhesions, chronic severepain, migration and rejection of the mesh, andmesh-related infections **(5)**. One of the most common complications is seroma. Although it can be a self-limited it is a bothersome to both surgeon and patient. The possible causes are interruption of the lymphatic and vascular channels and formation of empty space as a result of wide undermining liponecrosis caused by an excessive use of an electric scalpel and a low serum albumen levels. Seroma may result in large cavities that can lead to dehiscence and chronic wounds **(6)**. When mesh is used for repair of larger and more complex incisional hernias, the risk of seromaformation increases. The mesh onlay technique, which requires more extensive dissection, is associated with an even greater incidence of seroma formation. Previously reported rates of seroma occurrence with different types of mesh range from 4% to 8% with polypropylene (Prolene, Marlex) grafts and 5% to 15% with ePTFE (Gore-Tex) grafts**(7)**. In most instances, these seromas resolve either

spontaneously or with the insertion of drains or serial percutaneous aspirations [8]. This study was conducted to review and assess the difference between insertion of wound drain and the use of abdominal binder and percutaneous aspiration after open repair of ventral hernias and its effect on postoperative outcome.

PATIENTS AND METHODS

Patients

This prospective controlled trial was conducted on 60 patients presented to the surgical department faculty of medicine (KasrAlaini), Cairo University with ventral hernias during the period from July 2015 to July 2016.

All patients with ventral hernias with defect size between 2 and 12 cm in maximal. Patients have infection, skin loss, large ventral hernias are excluded.

Methods of the study

Proper history taking:

The following patient demographics and clinical information were obtained: age, gender, comorbidities, medical history (hypertension,diabetes,cardiac,COPD), surgical history, personal history of smoking or alcohol intake.

Proper physical examination:

Proper physical examination to confirm the diagnosis of ventral hernia, assess the presence of complication (e.g. obstruction, strangulation).

Preoperative preparation:

Preoperative patient preparation included the correction of fluid and electrolytes imbalance, and the administration of antibiotic in the form of intravenous 3rd generation cephalosporin preoperatively. RoutinePreoperative laboratory investigations (CBC, Coagulation profile, liver function tests, Kidney function tests).

Abdominal ultrasound was done to confirm the diagnosis of ventral hernia, to exclude the possibility of intra-abdominal cause of ventral hernia and to exclude the presence of any condition that needs to be operated upon in the same setting. ECG and Chest X-ray were done to assess the cardio-pulmonary condition.Written informed consent was obtained from all patients included in the study.

Anesthesia:

The decision regarding anesthetic options was left to the anesthetist in charge. The procedure was carried out using local anesthesia in 6 patients, with an anesthetist present to monitor and administer sedation. The local anesthetic used is lidocainehydrochloride (Xylocaine) with a maximum dose as 5 mg/kg. If the cardiovascular condition did not preclude its use, the addition of 1:200,000 epinephrine serve to intensify and prolong the action of local anesthetic with increasing its maximum dose to be 7mg/kg.The procedure was carried out using general anesthesia in 40 patients, intravenous midazolam or propofol infusion was administered by the anesthetist, as appropriate. The procedure was carried out using spinal anesthesia in 14 patients.

Operative technique:

Vertical or transverse incision was done.Meticulous dissection of the hernia sac until its neck proper was clearly identified. The aponeurotic fascia was cleared about 5 cm around the hernia defect. The fundus of the sac was meticulously dissected off the skin. Sac is opened and contents are dealt with according to the condition.

Defect size is measured either preoperatively (admission of fingers or ultrasound) or intraoperatively (sterilized tape).Closure of the defect by approximation of the edges (herniorrhaphy) using non-absorbable 0 or 1 suture material, either transversally or vertically, whichever axis is shorter.Application of polypropylene mesh that extends 5 cm all around the repair (either sutured by prolene sutures 2/0 or mesh tucker).

Drainage of the subcutaneous dead space is indicated if the skin is widely undermined (skin flaps). The subcutaneous tissues are approximated and skin closure is performed, sufficient for perfect hemostasis but non ischemic.Application of abdominal binder immediately postoperatively for 2 weeks in half of patients.

Insertion of wound drains (suction drains) in the other half.

Postoperative follow up:

The patients were closely observed postoperatively for adequate pain control, urine output, bloodgases. Clinical examination and investigations were carried out regularly to follow up the patient general condition.Antibiotics were continued 3 days postoperatively in patients who recovered without complication. In patients who developed complication, the use of antibiotics was continued according to the patient's

condition.Anti-inflammatory agents were used for 14 days postoperatively.

The hernia repair was followed up to detect any complication as seroma, hematoma, and wound infection. Follow up at outpatient clinic after 6 months for hernia recurrence.Percutaneous aspiration of seroma in the follow up visits in the outpatient clinic after skin preparation by bovidone iodine (betadine).Postoperative pain, patient satisfaction and return of normal activity were observed.

RESULTS

The study was conducted during the period from July 2015 to July 2016 at Kasr Al-Ainy surgery department on 60 patients that were randomly selected with non-complicated abdominal wall (ventral) hernia**.**

Patient characteristics

Mean age was 49.2 ±11.6 years (years) ranging from 27 years to 70 years with median age 50 years, shows that that 25% of the age below 39, 50% of age below 50 and 50% of age above 50 and 75% of age below 59.75. Out of 60 patients in our study, there were 41 females representing 68.3% of the study population and 19 males representing 31.7% of the study population.

Medical history of patients shows that the frequency of Diabetes in 17 patients (28.3%), Hypertension 16 patients (26.7%), COPD patients in 17 (28.3%) and Cardiac patients 2 (3.3%). regarding Surgical History 18 patients (30%) ofpatients had previous abdominal surgery**.**

Surgery was performed under general anesthesia in 66.7% of cases and using local anesthesia in 33.3% of cases.

During the operation the hernia content wasintestine in 21 patients (35%)andomentumin patients (65%).

The relation between wound drain insertion versus combined abdominal binder and percutaneous aspiration and postoperative events.

Significant Seroma:

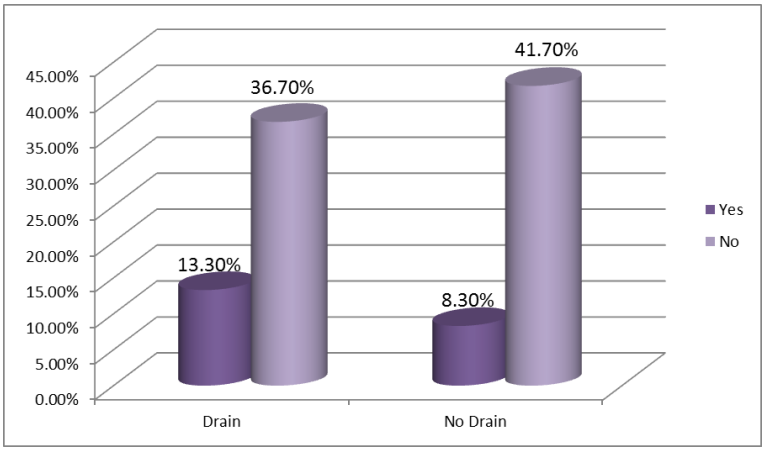
			Drain		Total
			Yes (A)	No (B)	
Significant seroma	Yes	Count	14	4	18
		%	23.3%	6.7%	30.0%
	No	Count	16	26	42
		%	26.7%	43.3%	70.0%
Total		Count	30	30	60
		%	50.0%	50.0%	100.0%

Hematoma:

			Drain		Total
			Yes (A)	No (B)	
Hematoma	Yes	Count	5	5	10
		%	8.3%	8.3%	16.7%
	No	Count	25	25	50
		%	41.7%	41.7%	83.3%
Total		Count	30	30	60
		%	50.0%	50.0%	100.0%

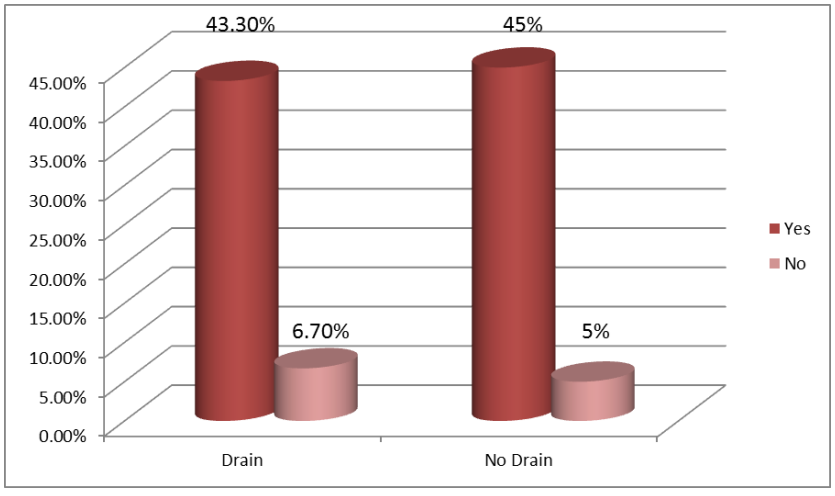
Wound Infection:

			Drain		Total
			Yes (A)	**No (B)**	
Wound Infection	Yes	Count	8	5	13
		%	13.3%	8.3%	21.7%
	No	Count	22	25	47
		%	36.7%	41.7%	78.3%
Total		Count	30	30	60
		%	50.0%	50.0%	100.0%



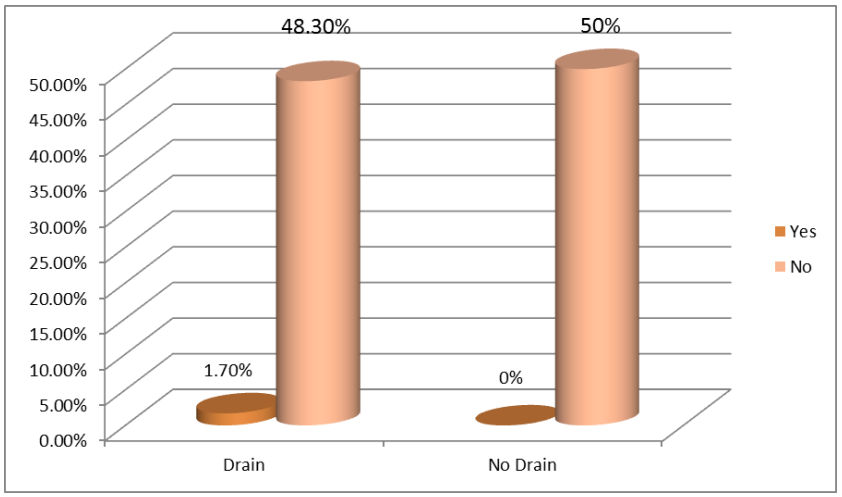
Patient Satisfaction

				Drain	Total
			Yes (A)	**No (B)**	
Patient satisfaction	Yes	Count	26	27	53
		%	43.3%	45.0%	88.3%
	No	Count	4	3	7
		%	6.7%	5.0%	11.7%
Total		Count	30	30	60
		%	50.0%	50.0%	100.0%



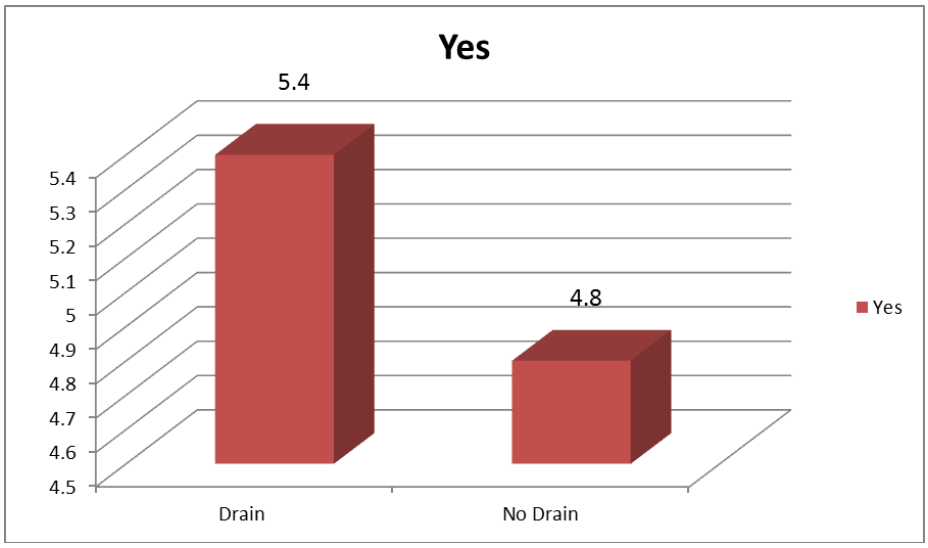
Early recurrence:

			Drain		Total
			Yes (A)	No (B)	
Early recurrence	Yes	Count	1	0	1
		% o	1.7%	0.0%	1.7%
	No	Count	29	30	59
		%	48.3%	50.0%	98.3%
Total		Count	30	30	60
		%	50.0%	50.0%	100.0%



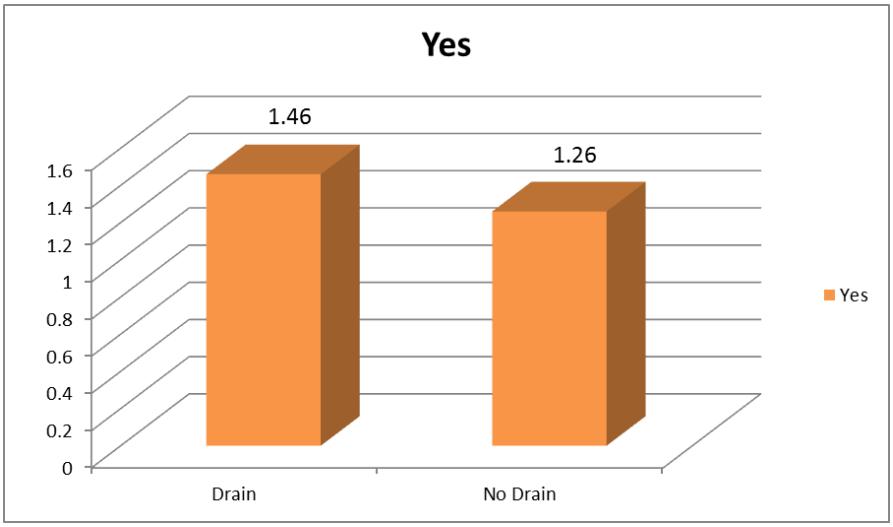
Postopertive pain:

	Drain	N	Mean	Std. Deviation	Std. Error Mean
Postoperative Pain	Yes (A)	30	5.4000	1.42877	.26086
	No (B)	30	4.8333	1.48750	.27158



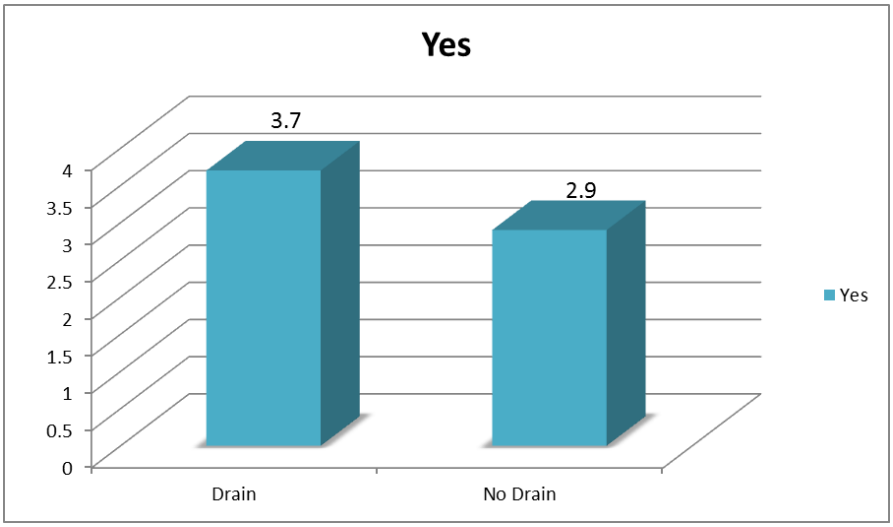
Postoperative hospital stay:

	Drain	N	Mean	Std. Deviation	Std. Error Mean
Postoperative Hospitalstay	Yes (A)	30	1.4667	.73030	.13333
	No (B)	30	1.2667	.52083	.09509



Postoperative return to normal activity

	Drain	N	Mean	Std. Deviation	Std. Error Mean
Return to normal activity	Yes (A)	30	3.7667	1.16511	.21272
	No (B)	30	2.9667	.96431	.17606



DISCUSSION

Gurusamy et al. found that There were no randomized trials identified that compared wound drainage with no wound drainage after incisional hernia repair [(9)].

Four patients from the corrugated drain group developed infection as defined by wound culture, none of the patients from the suction drain group developed infection. There was no statistically significant difference between the two groups for this outcome (RR 0.11, 95% CI 0.01 to 1.86) (Analysis 1.1). In our study with the use of suction drains still high infection rate (13.3%) which may be multifactorial for associated comorbidity as 28.3% of patients in whom we inserted wound drains were diabetics. Infection rate in patients without drains (abdominal binders and repeated percutaneous aspirations) was 8.3%.

The use of drains after incisional hernia repair is controversial. However, we did not find any randomized trial evidence to enable us to recommend or advice against the use of drains. However, randomized trials are necessary to justify the continued use of drains in incisional hernia. In our study wound drain did not alter seroma amount nor did infection rate on contrary abdominal binder and percutaneous aspiration have low rate of infection and seroma formation.

Roglini et al. many candidates for dermolipectomy surgery are extremely obese people, who have experienced a massive weight loss in a short period of time.

The possibility has arisen to successfully reduce a remarkable accumulation of liquid using a simple but efficient protocol. In our study we did not comment on obesity as comorbidity as morbidly obese patients undergone bariatric procedures before hernia repair and were not included in this study[(10)].

When a significant amount of seroma is formed, multiple aspirations are necessary in the postoperative period. These procedures cause discomfort for the patient and, if not treated, a capsule may develop around the seroma. Eventually, this capsule will contract, leading to a deformity of the anterior region of the abdomen. In our study frequent aspirations were needed in 5 patients till the amount was less than 20 cc and the procedure was discomfort as the result of [(11)].

Ninety-eight percent of surgeons performing full abdominoplasty report using drains for prevention of developing seroma, with the drains removed an average of 8 days later. In our study suction drains were removed in 7^{th} to 10^{th} postoperative day with amount collected less than 20 cc [(12)].

Seroma formation is the most common complication after abdominoplasty. Its incidence following abdominoplasty ranges from 1% to 38%. The incidence appears to increase with patient obesity, wide undermining, extensive use of cautery dissection, use of sharp liposuction cannulas and the weight of skin excised. Pathophysiology for seroma formation is thought to be related to the disruption of lymphatic and vascular channels. In our study seroma formation in general occurred in 30% of patients (23.3% in patients with drains and 7.6% in patients with binders and percutaneous aspiration[(13)].

The need for multiple aspirations requires a larger the number of visits to the physician's office, increasing postoperative costs, and above all, discomfort to the patient [(14)]. In our study the need for repeated percutaneous aspiration required a larger number of postoperative outpatient clinic visits but did not increase the postoperative costs.

In a study on the formation of seroma in abdominoplasty patients reported that overweight and obese patients have a higher rate of seroma formation (38%) than normal-weight patients (19%)[(15)].

The absence of detachment or reduced detachments, the wearing of compression garments during the postoperative period, and use of quilting sutures are efficient alternative measures for prevention of seromas after abdominoplasty. In our study abdominal binder with percutaneous aspiration were superior to wound drains as regards seroma formation, wound infection and postoperative return to normal activity with no significance as regards hematoma.

In most of the studies, the diagnosis of seroma after abdominoplasty is made clinically; therefore, non-palpable small-volume seromas are not diagnosed. However, small-volume chronic seromas can lead to the formation of pseudobursas.

In our study, there was a significant difference in the rate of seromaformationdetermined by clinical examination (23.8%)

The presence of fluid collections is not a complication, but a natural process that occurs after abdominoplasty. Small fluid collections are reabsorbed by the body without interfering with the results of surgery. Although the volume of fluid collection that does not require aspiration has not been determined, in the present study, 20 ml was considered to be the maximum volume of fluid collection allowing a more conservative treatment (no aspiration).

REFERENCES

1. Wechter ME, Pearlman MD, Hartmann KE, Wechter ME, Pearlman MD, Hartmann KE (2005) Reclosure of the disrupted laparotomy wound: a systematic review. ObstetGynecol 106(2):376–383.
2. Pans A, Elen P, Dewe W, Desaive C (1998) Long-term results of polyglactin mesh for the prevention of incisional hernias in obese patients. World J Surg 22(5):479–482, discussion 82–83.
3. Trunzo JA, Ponsky JL, Jin J, Williams CP, Rosen MJ. A novel approach for salvaging infected prosthetic mesh after ventral hernia repair. Hernia. 2009 Oct 1;13(5):545.
4. Vrijland WW, van den Tol MP, Luijendijk RW et al. Randomized clinical trial of non-mesh versus mesh repairof primary inguinal hernia. Br J Surg 2002; 89: 293–297.
5. Falagas ME, Kasiakou SK. Mesh-related infections after hernia repair surgery. Clinical microbiology and infection. 2005 Jan 1;11(1):3-8.
6. Rogliani M, Gentile P, Cervelli V. Seroma treatment after dermolipectomy. InAnnales de chirurgieplastiqueesthetique 2008 Dec 31 (Vol. 53, No. 6, pp. 534-536). Elsevier Masson.
7. Lehr SC, Schuricht AL. A minimally invasive approach for treating postoperative seromas after incisional hernia repair. JSLS: Journal of the Society of Laparoendoscopic Surgeons. 2001 Jul;5(3):267.
8. White TJ, Santos MC, Thompson JS. Factors affecting wound complications in repair of ventral hernias. *Am Surg*. 1998;64:276-280.
9. Gurusamy KS, Samraj K. Wound drains after incisional hernia repair. Cochrane Database Syst Rev. 2007 Jan 1;1.
10. Gurusamy KS, Allen VB, Samraj K. Wound drains after incisional hernia repair. Cochrane Database Syst Rev. 2012 Feb;2(CD005570).
11. Srivastava V, Basu S, Shukla VK. Seroma formation after breast cancer surgery: what we have learned in the last two decades. Journal of breast cancer. 2012 Dec 1;15(4):373-80.
12. Khan UD. Risk of seroma with simultaneous liposuction and abdominoplasty and the role of progressive tension sutures. Aesthetic plastic surgery. 2008 Jan 1;32(1):93-9.
13. Smith MM, Hovsepian RV, Markarian MK, et al. Continuous infusion local anesthetic pain pump use and seroma formation with abdominal procedures: is there a correlation? PlastReconstrSurg 2008; 122:1425-30.
14. Di Martino M, Nahas FX, Barbosa MV, Ayaviri NA, Kimura AK, Barella SM, Novo NF, Ferreira LM. Seroma in lipoabdominoplasty and abdominoplasty: a comparative study using ultrasound. Plastic and reconstructive surgery. 2010 Nov 1;126(5):1742-51.
15. Kim J, Stevenson TR. Abdominoplasty, liposuction of the flanks, and obesity: Analyzing risk factors for seroma formation. PlastReconstrSurg 2006; 117:773.