



CASE REPORT

Persistent Encapsulated Seroma: A Common Early Complication Presenting Late in a Case of Abdominoplasty

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Received date: April 14, 2019; **Accepted date:** August 07, 2019; **Published date:** October 03, 2019

Abstract

Abdominoplasty is a well-known procedure for body contouring in aesthetic plastic surgery. The rise of bariatric surgeries as well as the increase in awareness of cosmetic procedures and availability of resources have all led to a significant increase in the rate of abdominoplasties performed. Seroma formation is the most common complication occurring in these types of procedures. It accounts for at least 5% of the early complications. Seromas usually resolve spontaneously, with repeated aspirations, or by ultrasound-guided drain insertion or aspiration. In a few cases, however, they can become chronic, with the formation of a pseudocapsule. In our case, a 52-year-old patient, who underwent abdominoplasty and remained asymptomatic for over two years, presented with abdominal swelling and fullness. In spite of the repeated non-surgical management, in the form of multiple bedside needle aspirations and ultrasound-guided drain insertions, the seroma did not resolve. Surgical intervention for this patient became mandatory, and the decision to excise the pseudocapsule was done to prevent any recurrence.

Keywords: Abdominoplasty, Bariatric, Complications, Patient, Plastic, Pseudocapsule, Seroma

Introduction

A seroma is defined as a sterile collection of serum underneath the tissue in the region of surgical incision.¹ It is an early and most common complication of surgeries involving large cutaneous flap elevation. Sometimes, patients can develop seromas despite all intra, and post-operative precautions undertaken. The cause of seroma is largely unknown; however, it can be due to flap harvest with associated shearing, which leads to the formation of dead space followed by inflammation. Sometimes, damage of the small blood vessels that run from the underlying connective tissue, may allow the permeability of serum rather than causing significant hematoma.^{1,2} This can also be

attributed to the tissue damage as a result of tissue dissection, leading to cellular death. All these factors (inflammation, cell death, and increased vascular permeability) can cause the accumulation of fluid in the dead space. Treatment involves conservative measures, multiple aspirations, and in some cases, surgical intervention. Long-standing seromas develop a pseudocapsule around them. These are best treated by surgery; a complete excision of the capsule wall is necessary to avoid recurrence.² This case was presented two years after the initial surgery with a seroma. During intervention, a thick pseudocapsule was observed, which was excised. Follow up with the patient has been continued; no complains of recurrence has been reported yet.

Case presentation

A 52-year-old female, not known to have any medical problems, presented to the clinic on July 8, 2014 with a complaint of lower abdominal lipodystrophy and skin laxity. Upon examination, she was observed to have a protruding abdomen and a skin apron in the hypogastria and towards the hips. There was also diastasis of the rectus abdominus muscle (divarication of the recti) with numerous striae, especially at the level of and below the umbilicus. On the hypogastrium, there was an apparent pfannenstiel scar, dating from her lower segment Cesarean section. Above the umbilicus, she had moderate, symmetrically distributed, fat accumulation. Her body mass index was recorded to be 34 kg/m².

The patient was booked for abdominoplasty on August 3, 2014. She was marked preoperatively in the standing position. The marking included the midline sutures, the lower abdominal lazy W shaped incision, the anterior superior iliac spines, and the areas proposed for resection. The flanks were also marked for liposuction. Dissection of the soft tissue from the fascial plane, up to the umbilical level, was done. The abdominal flap was then split in the midline up to the level of the umbilicus and dissection was done around the umbilicus, leaving a generous umbilical stalk. The abdominal flap was then elevated centrally to the xyphoid and laterally to the costal arcus. Tightening of the abdominal wall was then done by plication of the anterior rectus fascial sheath in two layers using interrupted 1-0 Prolene sutures followed by continuous 0-0 double nylon Ethilon suture, running down from the xiphoid process to the superior umbilicus, then another two layers from the inferior umbilicus down to the pubic bone. Redivac drains (2) were inserted bilaterally above the inguinal crease and fixed in position using 2-0 silk stay sutures. The suction drains were kept for at least 10 days, following the operation. Closure was then performed in two layers including the scarpa's fascia after approximation of the skin flap, with medial advancement of the flap to prevent lateral dog-ears. This was followed by running subcuticular sutures using Monocryl 3-0 for skin closure. Compression garment was applied immediately prior to extubation.

The patient was well-hydrated, peri- and post-operatively. Pneumatic stockings were applied post-operatively to prevent deep vein thrombosis and pulmonary embolism. The patient was kept on intravenous antibiotics (Cefuroxime) as a prophylactic measure. Analgesia was given as necessary. She was kept on bed rest on the day of the operation, used incentive spirometer regularly to avoid the development of atelectasis, and soon started mobilization on the first post-operative day. The patient had an uneventful hospital stay and was discharged in a stable condition on the second post-operative day, with the suction drains.

Regular follow-ups were mandated for the patient since the surgery. Her wound had healed well, and she was started on scar therapy in the form of silicon-based gel around three weeks, post-operation. She did not have any signs of abdominal swelling, seroma formation, wound infection, or dehiscence.

In the course of two years after the operation, patient was observed to be symptom free. She presented to the clinic on November 22, 2016 with a 4-month history of abdominal swelling that has been increasing in size. There was no change in appetite; however, she mentioned occasional nausea but no vomiting, especially after her meals. There was no history of bowel problems. She reported regular menstrual cycles. On examination of her abdomen, the scar-line was observed to be well-healed, with no scar-line asymmetry. There was a supra-umbilical firm, non-tender swelling measuring around 10x20 cm.

Investigations

Pre-operative laboratory investigations were done, and they were within normal limits. Her baseline hemoglobin level was 12 g/L. When the patient first presented post-operatively with abdominal swelling, an abdominal and pelvic CT with IV and oral contrast was done. It was reported as abdominal wall superficial subcutaneous, well-defined, non-enhancing, hypodense, cystic lesion, measuring around 16 x 6 x 15 cm, with no evidence of deep extension, a picture suggestive of large encapsulated seroma along the abdominal wall. During the following six months, the patient underwent multiple abdominal ultrasounds

following drain insertion under radiological guidance. The scans were performed to assess the seroma wall thickness and size, residual collection, and the position of the drain catheter. The aspirated fluid was also sent for microscopy, and culture and sensitivity tests, multiple times, which came positive for *Pseudomonas aeruginosa*. She received the appropriate treatment based on the reported results. After excision of seroma, the specimen was sent for histopathology (Figures 1 and 2). A final ultrasound scan of the abdomen was done after the redo-abdominoplasty and seroma capsule excision, to assess for any residual or persistent collection.

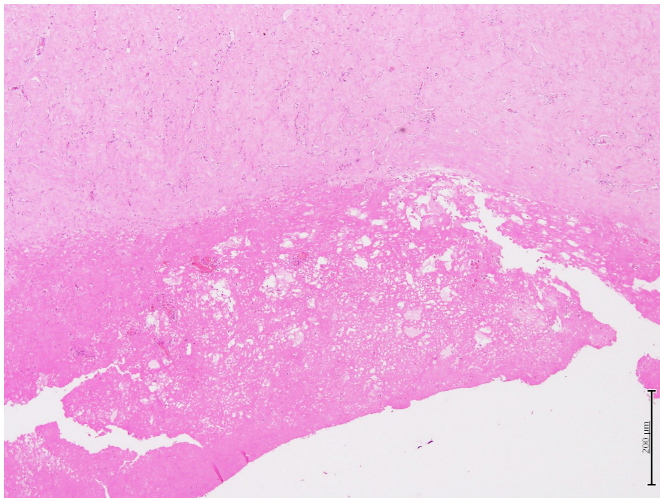


Figure 1: Medium power view of the seroma wall stained with Hematoxylin & Eosin (H&E)

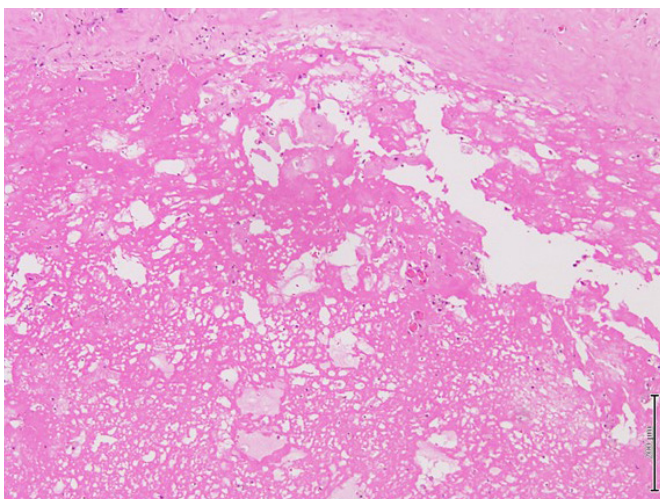


Figure 2: High power view of the fibrinous spaces containing serous fluid (H&E)

Differential diagnosis

When the patient presented two years after the surgery to the clinic with swelling of her upper abdomen, our initial diagnosis was seroma, based on the history and clinical presentation. It was a

soft, boggy, painless swelling with no signs of inflammation. The patient had no hypotension or tachycardia, so hematoma was not a probable diagnosis. Hematomas usually occur in the first few days following surgery, which is why we thought of it to be unlikely. Moreover, the patient was stable and afebrile, and her laboratory parameters were normal; hence an abscess was unlikely. Benign tumor was another differential diagnosis, but the presence of soft swelling was not indicative of it. The diagnosis of seroma was confirmed by the radiological findings.

Treatment

After confirmation of the seroma on CT scan, the patient underwent a bedside aspiration of the seroma in the clinic. Around 60 ml of serosanguinous fluid was aspirated. She was then advised for better aspiration, under radiological guidance.

She underwent multiple ultrasound-guided aspirations over the course of six months. During this course, the compressive garment was kept for the whole time. The patient was reluctant for another surgical intervention and continued conservative management, for a period. She received multiple oral antibiotics according to her culture and sensitivity results. Table 1 summarizes the sequence of events. However, no complete resolution of the seroma was noted.

The patient was thoroughly explained that all forms of conservative management have been exhausted, thus surgical intervention was the only acceptable mode of management for complete resolution. On June 14, 2017, the patient underwent redo-abdominoplasty and seroma excision. The incision was taken over the previous scar line, and the abdominal flap was raised. There was a thick encapsulated seroma just above the rectus sheet, encircling the umbilicus. It was drained and the capsule was excised fully along with the posterior wall. The site was washed with acetic acid, and then it was irrigated with diluted triamcinolone. Re-do abdominoplasty was then carried out similar to her previous operation. The patient was reviewed by the infectious disease team, following the operation. They had advised intravenous Piperacillin-Tazobactam and Metronidazole as an inpatient.

Table 1. Sequence of events with their respective dates and outcomes

Date	Event	Investigations	Outcome
01/12/16	U/S guided drainage of approximately ml of 600 brown frothy fluid	Sample was sent for microscopic analysis	Reported back as negative culture
20/12/16	Clinic visit	Ultrasound scan	Reported as mild residual abdominal wall seroma. Drain is in situ, draining serous fluid of approximately 100 ml/ day.
24/12/16	Emergency Room visit: patient accidentally closed the cannula of the drain. She noticed no drain output for the past 2 days. She developed abdominal swelling, pain and fever. She came to the emergency room and the drain was checked and cannula opened, which drained around 100 ml of turbid fluid.	The fluid was sent for culture and sensitivity.	<ul style="list-style-type: none"> - Paracetamol IV was given and fever settled - She received one dose of intravenous cefuroxime - Discharged on oral augmentin with close follow- up. - Garment was reapplied.
26/12/16	Clinic visit: There was no more abdominal swelling, and drain output was minimal	fluid culture and sensitivity showed acinobacter which was sensitive to Augmentin.	<ul style="list-style-type: none"> - Advised to continue on oral antibiotics - Drain was removed
06/01/17	Follow-up with radiology: Patient developed abdominal swelling again	Ultrasound scan of the abdomen	<ul style="list-style-type: none"> - The results showed residual seroma - Drain catheter was inserted again under radiological guidance. - It drained around 100 ml of serous fluid daily.
19/01/17	Radiology visit	Follow-up ultrasound scan	<ul style="list-style-type: none"> - Findings showed thickening at the site of the previously noted anterior abdominal wall seroma. Drain was intact. - The drain was still draining around 100 ml of clear serous fluid daily.
06/03/17	Radiology visit	Follow-up ultrasound scan	<ul style="list-style-type: none"> - Findings showed persistent thick wall seroma. There was no residual fluid - Drain catheter was changed during this session. - The daily drain measurement was around 50 ml of clear serous fluid.
13/06/17	Clinic Visit	CT Abdomen and Pelvis with oral, rectal and IV contrast	Reported as anterior abdominal wall seroma that has almost completely collapsed with draining catheter seen in place. No sizable residual collection.
17/04/17	Clinic visit: The patient accidentally pulled the drain out. She presented to the clinic with increasing abdominal swelling. There was no fever	US guided Drain insertion (4th time) was arranged and done on the same day.	<ul style="list-style-type: none"> - Drain outcome was < 100 ml of clear serous fluid - The possibility of surgical intervention was discussed with the patient; however she was reluctant to proceed with surgical management
23/05/17	Clinic follow-up: Her abdomen was distended and non-tender. Drain outcome < 50ml of serous fluid for the past week.	Follow-up ultrasound of the abdomen was done the following day and the fluid was sent for analysis.	<ul style="list-style-type: none"> - Drain catheter was changed (5th time). It was draining Turbid fluid. - Fluid culture results reported as pseudomonas, klebsiella, and enterococci. - She was discharged on Ciprofloxacin and ampicillin.
05/06/17	Clinic visit: Her drain was blocked again. It was not draining for most days, and her abdominal swelling had been persistent.		<ul style="list-style-type: none"> - Patient agreed for operation

She was discharged on Ciprofloxacin, based on the recommendations of the infectious team, given the positive culture results.

At the follow-up assessment, there was no evidence of the recurrence of the seroma or collection. Her redivac drains were removed after 10 days, post-operatively. Upon review in the clinic, there was no more abdominal distention or swelling. Her wounds had healed completely, and the patient was started on scar therapy in the form of silicon-based gel application. Her scar matured with no hypertrophy formation. An ultrasound study was done, and it was unremarkable for any persistent collections.

Outcome and follow-up

Following the redo-abdominoplasty, the patient was started on intravenous antibiotics as per infectious disease advise. She stayed in the hospital for two days, had an uneventful course of admission, and was discharged with drains on oral ciprofloxacin. A new compressive garment was prescribed for the patient, which was kept for two months, thereafter.

Her drains were removed around 10 days post-operatively. She was reviewed regularly in clinic with close intervals. The biopsy results were also discussed with the patient during an early visit. It was reported as thick fibro-inflammatory tissue with adipose tissue and fibrinous material in the center. There were no granulomas or malignant cells seen.

On recent follow-up, the patient was complaining of on- and off-, non-specific abdominal pain, usually following meals. An ultrasound scan of the abdomen was done which was unremarkable for any intra-abdominal pathology or fluid collection. She was referred to the appropriate specialty for further investigations.

Discussion

Abdominoplasty is among the top frequent cosmetic procedures.³ Major post-operative complications include hematoma, seroma, wound dehiscence, cellulitis or abscess formation, as well as deep vein thrombosis and pulmonary embolism.⁴ Seroma is the most common early complication after abdominoplasty; typically, in surgeries involving large cutaneous flaps.² Eventually, in a healthy person, complete resolution of the accumulated

seroma will occur over time by natural drainage or sufficient circulation to the area.¹ If not detected early or treated timely, a fibrous pseudocapsule can develop, making it a chronic encapsulated form.³ Seroma formation may be associated with a risk of infection and disruption of the surgical site. Risk factors include obesity (high BMI), hypertension, diabetes mellitus, smoking, extensive dissection, previous supra-umbilical scars, and concomitant liposuction.^{2,4}

Eliminating dead spaces can prevent seroma formation. Precaution should be taken while handling the tissues. This can be done with the careful use of fingers or blunt instruments to tear the underlying tissue in order to cause the small vessels to vasoconstrict and stop any bleeding. Clamps, suture, or cautery are reported to be very efficient in sealing the small bleeders. The accumulation of fluids, post-operatively, can be avoided in certain cases through the application of pressure for three to four days or by inserting a drain. These drainage systems have many functions where they keep the surfaces in contact with each other, preventing the formation of dead spaces, and the accumulation of fluids, thus reducing the risk of infections and formation of a pseudocapsule. Through these drains, fluid output can be measured daily; it can be removed once the output has reduced substantially.¹ Another way of reducing the seroma formation is by preserving Scarpa's fascia and minimizing the usage of electrocautery. Literature has shown that the use of tissue adhesives, and the application of progressive tension sutures (PTS), along with limiting mobility in the early post-operative period can also prevent the seroma formation.³

An abscess differs from seroma by the presence of infection; i.e. debris and the breakdown products of bacteria or white blood cells. A seroma is a sterile serum collected in a space or an area between the tissues that were previously attached, as a result of tissue inflammation.¹ Small seromas can persist for years with no apparent symptoms or signs. However, when seromas become evident and symptomatic, they can be treated conservatively as a first step. One of the easy and reasonable ways to conservatively treat seromas is by the application of hot packs. It is believed that warmth will increase the circulation to

the area, and thus will deliver oxygen and nutrients to the newly formed tissue. Moreover, it can aid the reabsorption of serous fluid that has formed in the blood stream. For larger seromas that do not settle with heat application, percutaneous drainage via needle aspiration is used. It was reported that a small percentage of seromas might resolve after a single aspiration. Others may require repeated aspirations over interval periods, until the aspirated fluid is around or less than 10 ml, after which it can be stopped. Seromas may reappear if the dead space is not eliminated.¹

Chronic seromas will eventually form a pseudocapsule around them. Once this pseudocapsular sac has formed, it is unlikely for the seromas to be reabsorbed and it might even get infected. Surgery will then be the best option with complete excision of the pseudocapsular sac.¹ In our case, the patient was an obese lady, thus increasing her risk. In spite of measures for perfect haemostasis observed throughout, with careful tissue handling and insertion of subcutaneous drains, along with the application of tight abdominal pressure garment, the patient still developed this complication. She presented more than two years later, which is a rare event as these complications usually occur at an earlier period. The gold standard of management of chronic seroma is by surgical intervention. In accordance with our case, the entire pseudocapsule was excised and the patient had no recurrence, till date.

Upon reviewing the literature for similar cases, seromas were reported to be the most common encountered and serious complication following abdominal procedures in plastic and aesthetic surgeries.⁵ However, it was only stated that they appear as an early complication for these types of procedures. It was also stated in literature that seromas can develop a fibrous pseudocapsule around them if they were not identified and treated immediately.³ In one case report, Matarasso recommended ultrasonic-guided aspiration of seromas in lengthening intervals, until complete resolution or minimal fluid aspirate.⁶ This was the mode of treatment used for our patient. It was also suggested that the seroma reformation rate could be lowered by the inoculation of fibrin

glue spray and streptokinase after puncturing the pseudocapsule. Occasionally where there was any suspicion of infection, IV antibiotics were injected (Doxycycline). This measure was however not used in our practice. Once these conservative measures fail, then surgical intervention with complete excision of the pseudocapsule is mandated.⁶ Another study mentioned that a fibrous pseudocapsule of chronic seroma can present with varying degrees of abnormalities including abdominal scar deviation and asymmetry.³ Our patient did not show any of these features upon follow-up.

In our practice, we apply two redivac drains intra-operatively just before preservation of the Scarpa's fascia, and discontinued them around 10 days post-operatively, depending on the daily measurement of serous fluid drained. The patient was educated and advised to apply compressive garment for at least six weeks, following the operation. Patients are kept on bed rest on the post-operative day, and their mobilization minimized in the first 4-6 weeks. In one case report, massive reduction in the complication rate was reported after the use of quilted sutures and fibrin glue spray.³ It was believed that these measures decrease the dead space. A meta-analysis involving more than 1800 patients and 15 studies concluded lower seroma rates in abdominoplasties with placement of progressive tension sutures or in those who had their Scarpa's fascia preserved.³ Pollock and Pollock is another study that showed similar results.⁷ The authors converted from using drains to the application of progressive tension sutures, and noted lower rate of seroma formation. Progressive tension sutures were used for 127 patients and conducted the traditional abdominoplasty on 324 patients. Results showed only 2% of seroma rate formation versus 9% respectively.⁷ Progressive tension sutures are believed to reduce the dead space area, distribute the tension along the skin flap surface, and apply mechanical fixation of the flap to prevent shear forces, thus lowering the rate of seroma formation.²

Since 2008, more than 2000 patients under our care have gone through the same procedure described above. Using similar techniques, this complication was reported in only three cases.

Conclusion

Patients should always be made aware of the post-operative complications of abdominoplasties. They should be explained in detail about the early and common complications of this surgical procedure. One should always keep in mind a possible occurrence of seromas following abdominoplasties. Persistent, stubborn, chronic seromas should be treated by surgical intervention, especially if conservative management has failed. It is advisable to remove the entire pseudocapsule during the surgery in order to prevent the recurrence of seromas.

Patient perspective

I am over 50 years old lady and I used to suffer chronic pains in my knees and had difficulty in walking fast. When I visited the doctor, I was told I was obese and needed to reduce weight. I started brisk walking and managed to reduce some weight. But I had loose hanging skin of my abdomen. I approached plastic surgery to find a solution. The doctor explained to me in detail about the procedure of abdominoplasty. I was also explained about the possible complications and the outcome. I underwent the surgery in 2014. I stayed in the hospital for 3 days and was then discharged. I was regularly seeing my doctor in clinic and he assured me that the healing was going on as expected. 2 years later, I noticed a small swelling in the upper part of my abdomen. Initially I ignored it, but it began to grow. I had to see my doctor again as I was tensed and worried of that something sinister has happened to me. I wondered if this was a tumor growing inside my body. I underwent some tests and radiographs, and fortunately it was only a "seroma". The doctor explained to me that this was just a fluid collection, a common complication in these types of surgeries. I underwent removal of this seroma by a syringe. But every time I reviewed, it would come back again. The doctor even inserted a drain which would reduce the seroma and explained to me that I will need surgery. I was not ready for another surgery within a span of 2 years and insisted on other measures to reduce the problem. But I found it cumbersome to carry a drain with me all the time whenever I go out. I was also tired of the fact that the drain was changed almost 5 times as it used to get blocked or pulled out; so I

agreed for the surgery. I had the second surgery in 2017. The doctor told me that the entire seroma was removed. I was discharged with drains which were also removed later. I made a good recovery and had a good result following the surgery. I am now able to carry out my activities without any problems. I whole heartedly thank my doctor for taking good care of me and helping me get back to my regular life.

Conflict of Interest

The authors have no financial or proprietary interests in any material or method mentioned.

References

1. Reddy HK, Ujwala J, Swetha M, Shilpa BR. Seroma: an interesting case report. *Int J Reprod Contracept Obstet Gynecol.* 2014;3(1):254-57.
2. Smith MM, Lin MP, Hovsepian RV, et al. Postoperative seroma formation after abdominoplasty with placement of continuous infusion local anesthetic pain pump. *Can J Plast Surg* 2009;17(4):127-9.
3. Neaman KC, Hansen JE. Analysis of Complications From Abdominoplasty: A Review of 206 Cases at a University Hospital. *Ann Plast Surg.* 2007;58:292-8.
4. Macias LH, Kwon E, Gould DJ, Spring MA, Stevens WG. Decrease in Seroma Rate After Adopting Progressive Tension Sutures Without Drains: A Single Surgery Center Experience of 451 Abdominoplasties Over 7 Years. *Aesthet Surg J.* 2016;36(9):1029-35.
5. Smith MM, Hovsepian RV, Markarian MK. Continuous-infusion local anesthetic pain pump use and seroma formation with abdominal procedures: is there a correlation?. *Plast Reconstr Surg.* 2008;122(5):1425-30.
6. Roje, Z, Roje, Ž, Karanović, N et al. Abdominoplasty Complications: A Comprehensive Approach for the Treatment of Chronic Seroma with Pseudobursa. *Aesth Plast Surg.* 2006;30:611.
7. Jabbour S, Awaida C, Mhawej R, Bassilios Habre S, Nasr M. Does the Addition of Progressive Tension Sutures to Drains Reduce

Seroma Incidence After Abdominoplasty? A Systematic Review and Meta-Analysis. *Aesthet Surg J.* 2017 1;37(4):440-7.

8. Seretis K, Goulis D, Demiri EC, Lykoudis EG. Prevention of Seroma Formation Following Abdominoplasty: A Systematic Review and Meta-Analysis. *Aesthet Surg J.* 2017;37(3):316-23.