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Case Report
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Use of Kenalog Injection in the Reduction of Postoperative Seromas

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Abstract

Background: Postoperative seromas, a common complication following plastic surgery, particularly abdominoplasty, are challenging to manage owing to their high recurrence rates. Traditional treatments: aspiration, drain placement, and doxycycline injection, have demonstrated inconsistent efficacy. This study evaluated the use of intralesional Kenalog (triamcinolone acetonide) as an alternative treatment for recurrent seromas.

Methods: Five female patients, ages 48–65, with postoperative seromas unresponsive to conventional treatments underwent Kenalog injections. The steroid mixture, ranging from 100 mg -200 mg Kenalog diluted in bacteriostatic saline (final volume 10–30 mL), was injected directly into the seroma cavity using an 18-gauge needle after aspiration. Patients were followed-up with weekly to assess resolution.

Results: All five patients experienced seroma resolution following Kenalog injection. Patient 1 had two unsuccessful excision surgeries, multiple unsuccessful aspirations, and doxycycline injections, but achieved long-term relief after Kenalog treatment. Patients 2–5, with smaller seromas, achieved resolution with one Kenalog injection. Patients were followed-up with post-seroma resolution to confirm sustained recovery and the absence of complications. No significant side effects such as fat atrophy, skin atrophy, skin discoloration, or systemic effects were observed.

Discussion: Kenalog may reduce seroma recurrence by downregulating inflammatory signaling, although its precise mechanism of action remains unexplored in this case study. This study supports its efficacy as an alternative treatment in recurrent seromas. Further research with a larger cohort is warranted to confirm its role in postoperative seroma management.

Conclusion: Kenalog is a promising and minimally invasive treatment for refractory postoperative seromas, offering consistent resolution with minimal discomfort and risk.

Keywords: Seromas; Recurrent; Plastic Surgery; Kenalog

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Introduction

Postoperative seromas are common complications of elective plastic surgery. A seroma can be described as a localized collection of serous fluid that may accumulate after tissue trauma, whether from an injury or surgical intervention. This accumulation occurs when peripheral blood vessels are disrupted, allowing the plasma to seep into the affected area. An associated inflammatory response contributes additional fluid exudate to the collection [1]. Abdominoplasty is among the most frequently performed cosmetic procedures in plastic surgery, and seroma formation remains the leading complication. Despite its high incidence, precise knowledge on the origin of this accumulation of serous fluid, its composition, and the prevention and treatment options available remains scarce [2]. The etiology of these persistent fluid collections is described by Berkoff, et al [1] who state that seromas "occur due to the shearing of lymphatic and blood vessels, creating dead space and also [due to] increased use of electrocautery." Current interventions, such as aspiration, drain placement, doxycycline injection, and surgical excision, have demonstrated inconsistent efficacy in resolving recurrent seromas. Shermak, et al [2] documented a case in which a patient underwent "three aspirations, drain replacement, and doxycycline sclerosis" without resolution.

Aspiration is often used as the initial treatment for seromas. Seroma accumulation necessitates "frequent follow-up visits and repetitive percutaneous aspiration, which are associated with patient discomfort and the constant risk of infection at the puncture site [3]. Although aspiration alone is effective in many cases, it does not consistently resolve recurrent seroma. In this study, Patients

1 through 5 underwent aspiration with limited success because the fluid reaccumulated rapidly. This aligns with previous findings that "a majority of cases [of seromas] recur following an initial aspiration [4].

Clinicians often use drains when aspiration is ineffective. However, Anker, et al [3] revealed that patients with drain placement exhibited the highest cumulative seroma volume. Over a four-week period, the mean cumulative seroma volume in the drain-only group was 845 ± 578 cc, compared with 564 ± 626 cc in the no-drain/no-Kenalog group and 236 ± 381 cc in the Kenalog-only group. The authors hypothesized that the "negative-pressure gradient generated by closed-suction drains could maintain drainage of minor lymph and blood vessels," which may inadvertently contribute to seroma persistence.

Doxycycline is often used as a sclerosing agent for seromas that are refractory to aspiration and drain placement. While doxycycline can induce fibrosis of the seroma cavity and has demonstrated potential effectiveness, it has also been associated with adverse outcomes, including "skin necrosis and rarely allergic reactions in the form of systemic inflammatory response syndrome [3]. Additionally, the resultant scar tissue may produce an unsatisfactory aesthetic outcome, particularly in patients undergoing elective plastic surgery. In the present study, Patient 1 received three doxycycline injections without resolution.

Given the limitations of these traditional approaches, the use of Kenalog, a corticosteroid with anti-inflammatory properties, was explored. Taghizadeh, et al [4] reported that "steroid treatment reduced seroma formation" in patients undergoing latissimus dorsi flap procedures. In this study, the administration of Kenalog into the seroma cavity yielded similarly favorable results. Patients who received injections of 40 mg/mL or 10 mg/mL Kenalog in volumes of 3 cc - 5 cc, mixed with 3 cc - 8 cc of normal saline experienced significant and sustained symptom relief. This treatment demonstrated both efficacy and simplicity, with minimal associated complications.

Recurrent postoperative seromas present a persistent challenge during plastic surgery. The findings of this study support the use of intralesional Kenalog as a promising therapeutic option for patients with seromas unresponsive to conventional interventions. Further investigation with larger sample sizes is warranted to validate these results and potentially establish Kenalog as a standard treatment for recurrent postoperative seromas.

Case Presentation

Patient 1 was a 65-year-old Caucasian female with a preoperative Body Mass Index (BMI) of 29.5, who underwent an uneventful circumferential body lift, given Zosyn on call to the operating room and every two hours during the case for up to four consecutive doses. Surgically, the posterior tissue that was removed weighed 1385 g, and 400 mL of tumescent was infused, followed by 200 mL of liposuction aspirate being obtained from the flanks and sacrum. While anteriorly the tissue excised weighed 2185 g, infusion of 2.5 L of tumescent followed by 2.1 L of liposuction aspirate was obtained from the flanks and abdomen. A posterior sacral and an anterior abdominal 15fr round hub less drain was placed. She was prescribed postoperative antibiotics consisting of Augmentin 500 mg twice daily (BID) for five days. Abdominal and sacral drains were removed on Postoperative day (POD) 17. The output of the abdominal drain was scant, and the output of the sacral drain was less than 30 cc/day at the time of removal. Output amounts were consistent for three days prior to removal. A large seroma was noted by the surgeon over the sacrum on POD 21, and 125 cc of serosanguinous fluid was removed using an 18 g percutaneous stick through Betadine- and alcohol-treated skin. Only two days later, the seroma reaccumulated. An in-office attempt was made to place the sterile seroma catheter. A total of 45 cc of serosanguinous fluid was removed; however, the catheter could not be advanced into the deep seroma pocket without pain and discomfort to the patient, despite local anesthetic placement. This attempt was abandoned and an iodoform gauze wick was placed. The patient requested removal and discontinuation of the wick the next day due to significant pain. She was continued on 20 mg Lasix, 20 mEq K-Dur, and 300 mg Gabapentin to decrease fluid collection and pain. Due to a decrease in the serosanguineous fluid output of 70 cc over a period of one week, seroma aspiration was discontinued on POD 34 to determine if the patient would absorb the remaining fluid. No resolution of symptoms or the size of the seroma was observed. On POD 99, the patient underwent a surgical excision of the sacral seroma cavity. There was 467 g of scar tissue and seroma capsule removed. In addition to the placement of a 15fr hub less round Jackson-Pratt (JP) drain, quilting sutures of 2-0 and 0-0 vicryl were placed through small islands of seroma rind, allowing for maximal strength of the quilting closure. Postprocedural compression was performed. On POD 35, the patient complained of cloudy serous fluid in the drain, and antibiotics were started, specifically Minocycline and Bactrim DS. The serous fluid was cleared up within 48 hours. On POD 41, the drain was removed because there was no seroma, and the output was less than 10 cc. On POD 43, a total of 40 cc of serosanguineous fluid was aspirated from the seroma, and the cavity was injected with 30 cc Minocycline/saline mixture along with 8 cc Lido/Bupivacaine. These maneuvers were unsuccessful in treating the seroma, and on POD 54 from her last seroma cavity excision, she was taken back to the operating room to undergo another excision, closure over drain, quilting suture placement using 2-0 PDS, and post-procedure compression garment. The patient developed a yeast infection based on the use of post-operative antibiotics on POD 8. The seroma was injected with 200 mg doxycycline and clamped for one hour due to a high amount of drainage (> 80 cc/24 h). On POD 14, the patient's seroma continued to have high output into the JP drain. A new technique was attempted, and 12 cc Kenalog (10 mg/mL) was injected into the site via an 18 g needle, followed by 10 cc normal saline to flush the cavity. The drain was clamped for three hours and reopened by the patient. The next day, 5 cc was collected from the drain after the injection. No palpable seroma was observed. One day of observation was required to confirm that there was no output, and the drain was removed. The patient showed complete resolution for 84 days. On POD 99, she returned with concerns of seroma formation, aspirating 25 cc of clear fluid. Due to the patient's history, the surgeon decided to inject with 3 cc Kenalog (40 mg/mL), 8 cc normal saline, and 20 cc seroma fluid. The patient returned for another Kenalog injection on POD 101 and reported improvement of the seroma. The fluid pocket aspirated 45cc of clear sanguineous fluid. It was then injected with 5cc Kenalog (40 mg/mL) and 5cc normal saline. Complete resolution was observed and continued for 17 months at the time of writing this manuscript. The patient returned to the office for other cosmetic surgeries without incident.

Patient 2 was a 56-year-old Caucasian female with a preoperative BMI of 24.1, who underwent liposuction of the flanks and bra roll, as well as excision of the dog ears bilaterally, on 5 December 2023. On POD 5, a small amount of fluid over the sacrum was noted, and 55 cc of serosanguineous fluid was aspirated. On POD 12, 30 cc

serosanguineous fluid was aspirated from the sacral seroma, and the cavity was injected with 3 cc Kenalog (40 mg/10 mL) and 5 cc normal saline. No seromas were noted on POD 19. The patient returned on 1 January 2024 and was healing well; the seroma did not return.

Patient 3 was a 60-year-old Caucasian female with a preoperative BMI of 24.7, who underwent an abdominoplasty with extended liposuction on 17 January 2024. On POD 6, the dressings and sutures were removed, and no seromas were noted. The drain was putting out 50 cc/day - 100 cc/day. The patient continued to report a high output (>100 mL per day) with no evidence of infection. On POD 12, the patient was instructed to take the drain off suction the next morning. On arrival to the office for her scheduled appointment on POD 13, an abdominal seroma was found, drained, and injected with 4 cc Kenalog (40 mg/mL) and 6 cc normal saline via a 28 g needle through the prepped skin. The drain was left in the off-suction position, and the tubing was folded and held with a rubber band to clamp it off further. The patient was instructed to unclamp in three hours and replace it with bulb suction. On POD 19, the JP drain sutures were clipped, and the drain was removed without difficulty. The JP drain to the right hip drained 35, 30, and 45 cc of serosanguineous fluid over the past three days, respectively. On POD 28, no seroma was noted, and the incisions healed with minor hypertrophic areas. No seromas were noted on POD 48. Minor fat necrosis and a small umbilical hernia were observed.

Patient 4 was a 48-year-old Caucasian female with a preoperative BMI of 24.7, who underwent bilateral subpectoral silicone Breast Augmentation (BA), mastopexy, and standard abdominoplasty with circumferential liposuction of the torso and arms and fat transfer to the buttocks on 18 January 2024. On POD 6, the dressings and liposuction sutures were removed, and no seromas were noted. The front JP drain had an 80cc output over the past two days, and the back JP drain had 135 cc serosanguineous fluid. On POD 18, the back drain was removed, the front drain was redressed, and no seromas were noted. On POD 27, swelling was noted in the lower abdomen and left dog ear; however, no sacral seroma was noted. The front drain was pulled because there was less than 20 cc of fluid output per day for the previous three days. On POD 33, a small abdominal seroma was observed. As a result, 20 cc serosanguineous fluid was aspirated and injected with 3 cc Kenalog (40 mg/mL) and 7 cc normal saline. No seroma was noted on POD 40.

Patient 5 was a 55-year-old Caucasian female with a preoperative BMI of 21.6, who underwent a bilateral subpectoral silicone BA, mastopexy, and standard abdominoplasty with circumferential liposuction of the torso and arms, and fat transfer to the buttocks on 22 April 2024. On POD 8, a sacral seroma was noted, and 35 cc of serosanguineous fluid was aspirated. The sutures were left in the sacral liposuction sites; however, the other liposuction sutures were removed. On POD 15, a sacral seroma was noted, and 50 cc of serosanguineous fluid was aspirated. The cavity was then injected with 3 cc Kenalog (40 mg/mL) and 4 cc of normal saline. On POD 19, 5 cc serosanguineous fluid was aspirated from the anterior abdomen, and no seroma was palpable posteriorly.

Methods

To prepare the steroid mixture, a minimum of 100 mg and a maximum of 200 mg Kenalog was drawn into the syringe. Bacteriostatic saline was then drawn up to equal a minimum of 10 mL of fluid for injection (up to a maximum of 30 mL). The purpose of this maneuver was to allow sufficient dilution of the fluid to be massaged and to touch all sides of the seroma. Larger seromas require a higher amount of steroid mixture to be injected into the space Table 1.

Table 1: Variable steroid dosing based off seroma size.

Seroma Size	Steroid Dose	Final Volume with Saline
30–75 mL	120 mg (3 mL of 40 mg/mL or 12 mL of 10 mg/mL)	12–15 mL
76-150 mL	160 mg	20-25 ML
>150 mL	180-200 mg	25-35 mL

The materials used include a 10–20 mL syringe, bacteriostatic saline, and 10-40 mg/mL of Kenalog, Triamcinolone. The seroma area was prepped for drainage with Chloraprep or Betadine swabs. A small bleb of 0.03 mL - 0.05 mL of 1% Lidocaine with Epinephrine was placed for enhanced patient comfort during the procedure. Using an 18 g needle attached to a 20–60 mL syringe, the seroma was tapped and drained. Once the seroma had been emptied of its contents and the amount of seroma fluid has been quantified, the 18 g needle was detached from the syringe but remained in the seroma cavity. A new syringe with the planned dose of steroid mixed with bacteriostatic saline was attached and injected directly into the seroma cavity.

It is important to note that no drain is needed for this procedure, and the Triamcinolone mixture will not adequately go retrograde through a Blake or pigtail drain. Furthermore, drain usage would require dosing to account for drain loss and create an opportunity for retrograde bacterial seeding into the pocket. The best treatment was direct injection with an 18 g needle placed through a prepped skin site. This method is not painful when injected and tolerated well by patients. If a drain is present, it should be clamped for a minimum of three hours before opening and placing it back to the suction or gravity drain. As noted, removal is not necessary, and the mixture may remain in the cavity for absorption. If this is unsettling for the surgeon, it is acceptable to have the patient return within three to twenty-four hours and attempt drainage of the injected material.

Follow-up within one week is recommended to evaluate the presence of a seroma. If so, the treatment may be repeated in a short time frame, without superficial sequelae. In addition to repeated treatment, the patient was placed into a compression garment after the injection to help facilitate the movement of the fluid to all walls of the seroma.

Discussion

Extensive efforts have been made to determine the root cause of seromas using preoperative risk assessment and surgical techniques to prevent this complication. Although surgical advancements and intraoperative measures have helped mitigate seroma formation, they have not eliminated the problem [3]. The root cause of seromas remains somewhat elusive, as multiple factors contribute to their development. These include inflammatory responses, subclinical infections, tissue reaction to surgical trauma, frictional forces between tissue planes, and lymphatic disruption [2]. This multifactorial nature of seroma formation makes treatment challenging, especially in cases of chronic or late-term seromas that do not resolve with conventional management strategies.

Doxycycline remains the current standard of care for recurrent abdominal and sacral seromas because of its ability to induce fibrosis in the seroma cavity. However, its application is not without complications, as it has been associated with significant adverse effects, including localized tissue necrosis, severe inflammatory reactions,

and aesthetic concerns resulting from excessive scar formation. The limitations of Doxycycline therapy have necessitated the exploration of alternative treatments that provide comparable efficacy with fewer complications.

The mechanism by which steroids aid in the resolution of recurrent seromas is not yet fully understood. However, corticosteroids, such as Kenalog (Triamcinolone acetonide), are known to exert potent anti-inflammatory effects by inhibiting pro-inflammatory cytokine production, reducing vascular permeability, and stabilizing cellular membranes [3-6]. It is plausible that these effects contribute to seroma resolution by decreasing the inflammatory response within the seroma cavity, thereby limiting continued fluid accumulation. Shirsath, et al demonstrated that Triamcinolone injections provide an effective and minimally invasive treatment for auricular seromas [5]. While these theoretical mechanisms align with the observed clinical outcomes in this study. Further research is necessary to elucidate the exact pathways through which corticosteroids influence seroma resolution and whether additional factors, such as individual patient response, timing of administration, or seroma characteristics, affect treatment efficacy.

Our study presents a technique for the direct injection of Kenalog into seroma cavities, which has demonstrated consistent efficacy in resolving cases in which aspiration, drain placement, and Doxycycline therapy have failed. The described method involves direct percutaneous injection of a Kenalog-bacteriostatic saline mixture into the seroma cavity following fluid aspiration. This approach allows for uniform distribution of the steroids throughout the cavity while avoiding the risks associated with retrograde injection through a drain, such as infection and inadequate medication distribution. Importantly, this technique is well tolerated by patients, does not require the placement of additional drains, and can be easily repeated if necessary.

The patients included in this study exhibited varying degrees of seroma severity and persistence. However, in all cases, Kenalog injections resulted in a significant reduction in fluid accumulation, with no reported recurrences following treatment completion. This suggests that steroid injections may provide a more definitive solution for recurrent seromas than traditional interventions. Moreover, the minimally invasive nature of this procedure reduces the burden of repeated aspiration and prolonged drain use, which are associated with increased patient discomfort and risk of infection.

Future research should focus on larger-scale studies with standardized protocols to further validate the effectiveness and safety of Kenalog injections for seroma management. Additionally, investigations into optimal dosing regimens, injection timing, and patient selection criteria would enhance clinical decision-making and improve treatment outcomes. Although our findings are promising, long-term follow-up studies are necessary to determine whether corticosteroid injections provide a permanent resolution or merely delay seroma recurrence.

Conclusion

The use of Kenalog as an adjunct treatment for postoperative seromas represents a valuable addition to the therapeutic arsenal for plastic surgeons. Its ease of administration, low complication profile, and efficacy demonstrated in this study suggest that it may serve as a superior alternative to traditional seroma treatments, particularly in refractory cases. By refining injection protocols and expanding clinical research in this area, Kenalog has the potential to become a new standard of care for recurrent postoperative seromas.

References

1. Berkoff DJ, KanaanM, Kamath G. Fibrin glue as a non-invasive outpatient treatment for post-arthroscopic knee seromas. Knee Surg Sports. Traumatol Arthrosc. 2013;21(8):1922-24.
2. Shermak MA, Rotellini-Coltvet LA, Chang D. Seroma Development following body contouring surgery for massive weight loss: patient risk factors and treatment strategies. Plastic and Reconstructive Surgery. 2008; 122 (1):280-88.
3. Alexandra MA, Oliver F, Lukas P, Sebastian G, Vanessa B, Andreas K, et al. Local Triamcinolone Treatment Affects Inflammatory Response in Seroma Exudate of Abdominoplasty Patients: A Randomized Controlled Trial. Plas Reconstruct Surg. 2021;147(2):345-54.
4. Taghizadeh R, Shoaib T, Hart AM, Weiler-Mithoff EM. Triamcinolone reduces seroma reaccumulation in the extended latissimus dorsi donor site. J Plast Reconstr Aesthet Surg. 2008;61(6):636-42.
5. Shirsath H, Jain S. Seroma of Auricle. Cureus. 2022;14(11):e31200.
6. Hart AM, Duggal C, Pinell-White X, Losken A. A prospective randomized trial of the efficacy of fibrin glue, triamcinolone acetonide, and quilting sutures in seroma prevention after latissimus dorsi breast reconstruction. Plast Reconstr Surg. 2017;139(4):854-63.