

Axillary Dissection in 44 Breast Cancer Patients without Seroma Formation

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Abstract

Background: Seroma formation is a common problem following axillary dissection. It is probably caused by a local inflammatory response. Local steroids may prevent this problem by inhibiting inflammatory response at the wound site.

Methods: This randomized prospective study was undertaken to evaluate the effect of local triamcinolone injection on seroma formation following axillary dissection. In addition, other wound complications were recorded. A total of 44 women who underwent axillary dissection were randomized to receive either 40 mg intracavitary triamcinolone (Group T, n=22) or saline (Group C, n=22) on their first postoperative visit. Drains were removed if 24-hour drainage was <50 mL. The incidence of wound complications (including seroma) during the first postoperative month was recorded. Additionally, some patient and tumor characteristics possibly pertinent to wound complications were assessed.

Results: No wound complications (including seroma formation) were observed in either group in four follow-up visits during the first month after surgery.

Conclusion: In our study, in contrast to previous studies, seroma formation was not a common complication following axillary dissection. We could not evaluate the effect of local triamcinolone on seroma formation, although it apparently had no unfavorable effect on this potential complication. According to this study, axillary dissection can be a safe procedure if optimal surgical techniques and meticulous dissections are used, and if drain removal is timed appropriately.

Keywords: Seroma, Breast cancer, Axillary dissection, Triamcinolone

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Introduction

Seroma formation is claimed to be a common problem after axillary dissection in patients with breast cancer.¹ Previous studies have reported its incidence to be from 18% to 59%.²⁻⁵ It is considered an

annoying problem for patients and surgeons rather than a complication. Seroma in the axilla increases the likelihood of wound infection, flap necrosis and upper extremity lymphedema. Additionally, it can necessitate postponement of adjuvant

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therapy due to poor wound healing. Different procedures have been used to avoid seroma formation, and techniques such as sentinel lymph node biopsy, axillary padding, and closed suction drains have shown benefits. However, results obtained with most other techniques have been too inconclusive to be advocated in clinical practice. The techniques tried to date include fibrin sealants,⁶ hemolympostatic sponges, different types of axillary dissection, external axillary compression, mobilization versus immobilization of the upper limb,⁷ axillary dissection by liposuction, endoscopic axillary dissection,⁸ bovine thrombin,⁹ fibrin glue,¹⁰ and ultrasonic scissors.¹¹

Seroma formation is probably the result of an inflammatory response to wound healing. The presence of several inflammatory factors such as IgG, leukocytes, granulocytes, proteinase inhibitors, and different kinds of cytokines support this hypothesis. Inhibition of the inflammatory response can thus result in a decrease in seroma formation and potentially improve the quality of life after axillary dissection.^{12,13} Studies have shown that even low-dose steroids can suppress the inflammatory response. In several studies of patients after head and neck surgery, edema at the surgical site was reduced after a single dose of 125 mg methylprednisolone.^{14,15} The results of two recent controlled trials also indicate that corticosteroids may reduce the incidence of seroma formation after breast surgery.^{16,17} However, local steroids may be associated with a potential risk of wound infection and complicated wound healing.

On the basis of these findings, we designed and conducted a randomized prospective study to evaluate the ability of 40 mg intracavitary triamcinolone to prevent seroma formation after axillary dissection in patients with breast cancer. This trial was also designed to identify other wound complications and patient characteristics that increase the risk of these complications.

Materials and Methods

During a six-month period, from September 2009 to March 2010, patients with primary breast cancer who underwent axillary dissection were

included in the study. The inclusion criteria were: female, diagnosis of primary breast cancer scheduled for axillary node dissection with or without sentinel lymph node biopsy, and completion of a signed informed consent form. The exclusion criteria were: male, pregnancy or lactation, preoperative chemoradiation, modified radical mastectomy, current corticosteroid use, congestive heart failure, diabetes mellitus, uremia, and coagulopathy.

Our project was approved by the Ethics Committee of the Vice-Chancellor for Research, Shiraz University of Medical Sciences, Shiraz, Iran. After obtaining informed consent, patients were randomized into either the triamcinolone group (Group T) or the control group (Group C). Randomization was sequential and based on the time of incision recorded in the anesthesia chart.

Surgery in both groups included lumpectomy and dissection of the axillary lymph nodes to levels I, II, and III. All operations were performed by or under the direct supervision of two attending surgeons working as a team and using identical methods. Our technique consisted of dissection of the axilla with two DeBakey forceps while avoiding any sharp dissection or electrocoagulation in the field. The surgical team was blind to the patient group at the time of surgery. Axillary dissection was preceded by sentinel node biopsy in some patients. In all patients, a closed suction drain (Hemovac drain) was placed in the site of axillary dissection. Compression dressing in the axilla was used for all patients in the same manner, and was removed after 48 hours. All patients were discharged on the second postoperative day with the drain in place, and were instructed to record daily drain output.

Routine follow-up visits took place in the outpatient clinic on postoperative days 4, 8, 15, and 30. On the first visit (fourth postoperative day), if drain output during previous days was <50 mL per 24 hours, patients in Group T received 40 mg (1 mL) triamcinolone acetonide mixed with 9 mL of 0.9% saline. Patients in Group C received 10 mL of 0.9% saline. The drug or vehicle was injected in both groups via the Hemovac drain, which was

Table 1. Patient and tumor characteristics.

	Group T	Group C	P value
Patients (n)	22	22	NA
Age (years)	46.9 ± 9.3*	47.0 ± 9.6	NS
BMI (kg/m ²)	26.4 ± 2.7	27.6 ± 3.6	NS
Removed nodes (n)	13.4 ± 2.9	14.0 ± 3.7	NS
Involved nodes (n)	2.8 ± 2.7	3.3 ± 2.9	NS
Palpable LAP (n)	7	7	NA
SLNB (n)	11	13	NA

* All values represent the mean ± standard deviation

NA, Not applicable; NS, Not significant; BMI, Body mass index; LAP, Lymphadenopathy; SLNB, Sentinel lymph node biopsy

clamped for 2 hours after injection, and then removed. If drainage was >50 mL per 24 hours no drug or saline was injected. Drain output was checked in each follow-up visit, and the drug or saline was injected when the output was <50 mL per 24 hours.

Axillary seroma was defined as palpable fluid collection in the axilla and documented by needle aspiration if clinically suspected. In addition, the wound was checked for other complications, including cellulitis, abscess formation, flap necrosis, dehiscence, and upper extremity edema at every follow-up visit. We recorded age, body mass index, tumor size, tumor location, presence of palpable axillary lymphadenopathy, use of sentinel lymph node biopsy, total number of nodes removed, and total number of tumor-involved nodes.

Statistical Analysis

Data were analyzed with SPSS v.15 software using the Mann-Whitney and Wilcoxon tests for subgroup analyses, and student's t-test for whole-group analyses. *P*<0.05 were considered statistically significant.

Results

A total of 44 patients fulfilled the inclusion criteria. Half (n=22) were assigned to the triamcinolone group (Group T) and half to the control group (n=22; Group C). Because drainage

output was <50 mL per 24 hours, all drains were removed on the first postoperative visit (fourth postoperative day). There were no significant differences between the two groups with respect to age, body mass index, tumor size, tumor location, presence of palpable lymphadenopathy, use of sentinel node biopsy, the number of lymph nodes removed, and the number of tumor-involved lymph nodes.

Table 1 compares the characteristics of the patients and tumors between the two groups. Table 2 shows the distribution of tumor sizes in the two groups, and Table 3 shows the distribution of tumor locations in the two groups. No wound complications including seroma, cellulitis, abscess formation, flap necrosis, wound dehiscence or upper extremity edema were seen in either group in the four follow-up visits during the first month after surgery.

Discussion

Axillary node dissection is associated with numerous complications, including seroma formation, infection, hematoma, flap necrosis, and lymphedema of the ipsilateral upper extremity. Multiple studies have investigated ways to prevent these complications, focusing on seroma formation, which is often considered a nuisance rather than a true complication. The exact etiology of seroma formation has not been identified, although mechanisms such as lymphatic disruption

Table 2. Tumor size in 44 women with breast cancer.

Group	<1 cm	1-2 cm	2-5 cm	>5 cm
Group T, n (%)	1 (4.5)	8 (36.4)	11 (50)	2 (9.1)
Group C, n (%)	0 (0)	8 (36.4)	13 (59.1)	1 (4.5)

Table 3. Tumor location in 44 women with breast cancer.

Group	UOQ	LOQ	UIQ	LIQ	Central
Group T, n (%)	11 (50)	2 (9.1)	3 (13.6)	2 (9.1)	4 (18.2)
Group C, n (%)	10 (45.5)	2 (9.1)	5 (22.7)	2 (9.1)	3 (13.6)
Total, n (%)	21 (47.7)	4 (9.1)	8 (18.2)	4 (9.1)	7 (15.9)

UOQ, Upper outer quadrant; LOQ, Lower outer quadrant; UIQ, Upper inner quadrant; LIQ Lower inner quadrant

or inflammatory response have been proposed. Although conventional measures such as closed suction drainage and axillary padding have benefits in seroma prevention, studies of other techniques such as the use of fibrin glue, bovine thrombin, and ultrasonic scissors have shown them to be ineffective.⁹⁻¹¹

Taghizadeh et al.¹⁶ reported that the intracavitary injection of 80 mg triamcinolone in patients with seroma formation after autologous latissimus dorsi breast reconstruction significantly reduced the need for any further aspiration. Okholm et al.¹⁷ failed to show any benefit of an i.v. bolus of methylprednisolone sodium succinate before surgery in reducing seroma formation after mastectomy. The present study was designed to evaluate the role of intracavitary triamcinolone injection in preventing seroma formation following axillary dissection. We excluded patients undergoing modified radical mastectomy to minimize the influence of fluid from the mastectomy site. We encountered no complications in any of our 44 patients for whom axillary dissection was done for level I, II, and III lymph nodes, so we could not evaluate the role of triamcinolone in this regard. This result has not been reported in previous studies, so an analysis of our results from a technical and surgical aspect may shed light on the reasons for the favorable postoperative outcomes in our patients.

A potential factor in the excellent postoperative course in our patients may have been our operative technique. Our technique for axillary dissection includes meticulous dissection using only two DeBakey forceps, while avoiding any sharp dissection as may occur with Metzenbaum scissors or electrocautery in the axillary field. After irrigation with saline, we placed a Hemovac drain with its tip about 2 cm below the axillary vein, and closed the wound in a single subcuticular layer

with absorbable sutures. The sutures were covered with Steri-Strips. All patients received three doses of 1 g cephazoline every six hours while they were in the hospital. Patients were discharged with oral analgesics only, to be used as needed. We aimed for drain removal as soon as drainage output fell below 50 mL per 24 hours.

In conclusion, our findings show that axillary dissection is a safe procedure when an optimal surgical technique is used, and suggest that meticulous surgical techniques will reduce the incidence of seroma formation and shorten the postoperative time to drain removal.

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References

1. Baiba JG, Christopher MR, Armando EG. Local management of invasive breast cancer: Axilla. In: Jay RH, Marc EL, eds. *Diseases of the Breast*. 3rd ed. Philadelphia: *Lippincott William and Wilkins* 2004:745-83.
2. Tejler G, Aspegren K. Complications and hospital stay after surgery for breast cancer: A prospective study of 385 patients. *Br J Surg* 1985;72:542-4.
3. Vinton AL, Traverso LW, Jolly PC. Wound complications after modified radical mastectomy compared with tylectomy with axillary lymph node dissection. *Am J Surg* 1991;161:584-8.
4. Tadych K, Donegan WL. Postmastectomy seromas and wound drainage. *Surg Gynecol Obstet* 1987;165:483-7.
5. Bryant M, Baum M. Postoperative seroma following mastectomy and axillary dissection. *Br J Surg* 1987;74:1187.
6. Carless PA, Henry DA. Systematic review and meta-analysis of the use of fibrin sealant to prevent seroma formation after breast cancer surgery. *Br J Surg*

- 2006;93(7):810-9.
7. Douay N, Akerman G, Clement D, Malartic C, Morel O, Barranger E. Seroma after axillary lymph node dissection in breast cancer. *Gynecol Obstet Fertil* 2008;36(2):130-5.
 8. Gomatos IP, Filippakis G, Albanopoulos K, Zografos G, Leandros E, Bramis J, et al. Complete endoscopic axillary lymph node dissection without liposuction for breast cancer: Initial experience and mid-term outcome. *Surg Laparosc Endosc Percutan Tech* 2006;16(4):232-6.
 9. William EB, Patricia SG, Donn CY, William BF. Seroma formation following axillary dissection for breast cancer: Risk factors and lack of influence of bovine thrombin. *J Surg Oncol* 1998;64(1):27-31.
 10. Ko E, Han W, Cho J, Lee JW, Kang SY, Jung SY, et al. Fibrin glue reduces the duration of lymphatic drainage after lumpectomy and level II or III axillary lymph node dissection for breast cancer: A prospective randomized trial. *J Korean Med Sci* 2009;24(1):92-6
 11. Lumachi F, Brandes AA, Burelli P, Basso SM, Iacobone M, Ermani M. Seroma prevention following axillary dissection in patients with breast cancer by using ultrasound scissors: A prospective clinical study. *Eur J Surg Oncol* 2004;30(5):526-30.
 12. Watt-Boolsen S, Nielsen VB, Jensen J, Bak S. Postmastectomy seroma: A study of the nature and origin of seroma after mastectomy. *Dan Med Bull* 1989;36(5):487-9.
 13. Baker EA, Leaper DJ. Proteinases, their inhibitors, and cytokine profiles in acute wound fluid. *Wound Repair Regen* 2000;8(5):392-8.
 14. Holte K, Kehlet H. Perioperative single-dose glucocorticoid administration: Pathophysiologic effects and clinical implications. *J Am Coll Surg* 2002;195(5):694-712.
 15. Schulze S, Andersen J, Overgaard H, Norgard P, Nielsen HJ, Aasen A, et al. Effect of prednisolone on the systemic response and wound healing after colonic surgery. *Arch Surg* 1997;132(2):129-35.
 16. Taghizadeh R, Shoaib T, Hart AM, Weiler-Mithoff EM. Triamcinolone reduces seroma re-accumulation in the extended latissimus dorsi donor site. *J Plast Reconstr Aesthet Surg* 2008;61:636-42.
 17. Okholm M, Axelsson CK. No effect of steroids on seroma formation after mastectomy. *Dan Med Bull* 2011;58(2):A4241.