



# Use of Low-Thrombin Fibrin Sealant Glue After Axillary Lymphadenectomy for Breast Cancer to Reduce Hospital Length and Seroma

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## Abstract

**A prospective evaluation of 149 axillary lymph node dissection (ALND) procedures in 2 groups using either drainage or a drainless procedure with fibrin glue and a padding technique was performed. No difference was observed in seroma punctures, but an interesting significantly reduced postoperative hospital stay length. Quilting sutures and fibrin glue after ALND is a promising technique for reducing hospital stays and costs.**

**Background:** Axillary lymphadenectomy for primary breast cancer produces a non-negligible rate of postoperative lymphorrhea, prolonged hospital stays, and multiple seroma punctures. We evaluated the impact of low-thrombin fibrin sealant glue on surgical wounds in patients undergoing axillary lymph node dissection for breast cancer.

**Methods:** We conducted an observational study of 149 patients who underwent axillary lymphadenectomy for primary breast cancer between January 2014 and December 2015. Data were obtained from 2 successive prospective studies. The hospital stay length and morbidity (seromas, punctures) were compared between 2 groups: patients who had padding sutures and low-thrombin fibrin sealant glue without drainage ( $n = 49$ ) and patients with drainage alone ( $n = 100$ ). Hospital costs were assessed from the hospital perspective. **Results:** The mean hospital stay length was shorter in the fibrin sealant group (2.6 vs. 4.7 days;  $P < .001$ ). Seroma magnitude and punctures were similar in patients treated with fibrin sealant compared with patients with drainage alone. The rate of needle aspiration for seroma was similar irrespective of whether or not a drain or fibrin sealant was used (30.6% vs. 33.0%,  $P = .77$ ). **Conclusion:** Low-thrombin fibrin sealant glue does not significantly reduce the amount of fluid produced in the axilla after breast surgery; however, its systematic use may help reduce hospital stays and costs.

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## Introduction

Despite progress in prevention and care, axillary lymphadenectomy is still the treatment of choice for some advanced invasive breast cancers. However, seroma formation is the most common complication following this procedure, with an incidence ranging from 15% to 80%.<sup>1</sup> Even if seroma is often considered a constant

nuisance of breast surgery, it can be associated with both local and general infection, wound dehiscence, and skin necrosis that may delay adjuvant therapy and prolong hospital stays. In addition, a significant proportion of seromas require needle aspiration to treat symptomatic discomfort and pain, increasing the risk of microorganism contamination, anxiety, the need for more clinic visits, and further postoperative costs for transport and care.

Several techniques have been used in the past to prevent and manage seroma formation, both mechanically and chemically.<sup>2</sup> First, suction drainage is usually removed when it is less than 20 to 50 mL per 24 hours and generally after 5 to 7 days. Other methods include external compression dressing, ultrasound cutting devices, laser scalpel, a bipolar vessel sealing system, shoulder immobilization, quilting sutures, tetracycline sclerotherapy, fibrin sealants, octreotide injection,<sup>3</sup> and surgical procedures like LyM-PHA<sup>4</sup> (lymphatic microsurgical preventing healing approach) for primary prevention of breast cancer-related lymphedema.

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# Fibrin Glue in Axillary Lymphadenectomy

Fibrin glues are used to improve hemostasis and tissue adherence in many surgical fields, such as cardiac, liver, orthopedic, and vascular surgery.<sup>5</sup> For women undergoing axillary dissection, their application can reduce fluid accumulation by closing the multiple small blood and lymphatic vessels damaged during axillary lymphadenectomy.

The aim of this study was to evaluate the impact of a new low-thrombin fibrin sealant glue, ARTISS (Baxter, UK), after axillary lymphadenectomy for breast cancer in reducing the hospital stay length and morbidity (infection, reintervention, and hematoma). This new sealant polymerizes after approximately 60 seconds due to its reduced concentration of thrombin, allowing more time for tissue manipulation and suture application.

## Methods

### Patients

The series comprises 149 consecutive patients who underwent axillary lymph node dissection (ALND) with or without breast-conserving surgery for stage I-II breast cancer, in the Breast Surgical Oncology Department, Gustave Roussy, Villejuif, France, between January 2014 and December 2015. This work is a comparison of 2 groups of patients treated successively using 2 distinct axillary management techniques during the 2-year study period. The first group of 100 women treated using conventional vacuum drainage was the control group for this study. The following 49 cases were selected for the second period when we switched from vacuum drainage to the glue padding technique. ALND was performed in cases of clinically palpable nodes with positive fine-needle aspiration, large tumors (larger than 5 cm), or a positive sentinel lymph node dissection (SLND) (macrometastasis) at immunohistochemical analysis. According to the intraoperative analysis of the sentinel lymph node, ALND can be performed at the same time or subsequently if the definitive pathology report confirms nodal involvement.

### Surgical Procedure

All surgeries were performed by a specialist in breast surgery. The axillary lymphadenectomy was performed through a separate incision from that of the tumorectomy. The ALND encompassed lymph nodes from levels I and II. The long thoracic and thoracodorsal nerves were preserved. Clips and electrocautery were used to achieve hemostasis and lymphostasis. A closed suction drain was placed in the axillary fossa in the control group. The control group underwent standard closure of the back skin wound with 2 layers of monocril 3/0 sutures. No formal quilting was undertaken.

In patients who underwent the fibrin sealant procedure, axilla padding was performed, as previously described,<sup>6</sup> with three 2.0 polyglactin stitches suturing the 2 fascia margins to the underlying pectoralis major, serratus anterior, and latissimus dorsi muscles (Figure 1). A total of 4 mL of ARTISS glue was applied as a spray with the manufacturer's spray set (2 mL, from a distance of 10 cm with 2 bars of pressure) to the site of the ALND, and after 5 minutes of manual compression, the stitches were closed. A compressive dressing using elastic bandages was applied to the operation site for 48 hours.

### Postoperative Care

In the control group, total drain output was recorded daily. The drains were removed when output was less than 50 mL over a

**Figure 1** Surgical View of the Quilting Technique. Stitches Are Placed Separately to Approximate the Skin Flap on the Underlying Muscles



24-hour period. For patients who underwent the fibrin sealant procedure, a compressive dressing was applied over the axilla for the first 48 hours. Arm exercises were commenced within 24 hours. The patients were discharged on the same day of drain or compressive dressing removal.

A clinical review was undertaken 3 weeks after surgery in an outpatient setting. All complications were recorded and graded. In addition to the clinical review, patients reported symptomatic seromas and went to the nurse-led seroma clinic. The decision to aspirate a seroma was based on an assessment of its volume and the discomfort reported by the patient.

### Costs

Costs were assessed from the hospital perspective. The cost study focused on inpatient costs that were the only differing costs between the 2 groups. The unit cost of fibrin sealant glue was €230 (value-added tax included). The cost of each hospital stay was computed using the length of stay and the cost per day and per diagnosis-related group from the French hospital cost survey (year 2014).

### Statistical Analysis

Data regarding the length of surgery, complications (hemorrhage, wound healing) and postoperative pain also were collected. Pain was assessed using the classic 11-point visual analog scale ranging from 0 (no pain) to 10 (the worst pain). The distribution of baseline characteristics among groups for categorical factors was computed using the  $\chi^2$  test. The Student *t* test was used for continuous

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