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# Successful surgical management of chronic bilateral encapsulated seroma after node-negative breast cancer: A Case Report

Kjersti Fosheim<sup>1\*</sup>, Sophie Bojesen<sup>2</sup>, Hannah Troestrup<sup>2</sup> and Anne-Vibeke Laenkholm<sup>1</sup>

<sup>1</sup>Department of Surgical Pathology, Zealand University Hospital, Roskilde, Denmark.

<sup>2</sup>Department of Plastic Surgery, Zealand University Hospital, Roskilde, Denmark.

### ABSTRACT

**Background:** Chronic encapsulated seroma following breast cancer surgery is a rare entity, and management is challenging. We present clinical and pathologic findings in a patient with extensive history of bilateral refractory breast seroma successfully treated with capsulectomy.

**Case presentation:** A 71-year-old woman with previous early BRCA2 associated, node-negative breast cancer, developed late onset seroma following endocrine therapy, unilateral breast-conserving surgery, and completion of adjuvant radiotherapy. Non-simultaneous bilateral mastectomy was later performed to treat infection and reduce risk of contralateral breast cancer. Each surgery was followed by chronic seroma. After six years of ineffective treatment attempts with repeated aspirations, the patient successfully underwent bilateral capsulectomy. She remains seroma-free nine months from time of capsulectomy.

**Conclusion:** This is the first report of late onset bilateral encapsulated breast seroma following mastectomy without axillary dissection. When managing breast seroma refractory to conventional treatment encapsulated seroma and prompt capsulectomy should be considered.

**Keywords:** Breast cancer, encapsulated seroma, capsulectomy, case report

### \*Correspondence to Author:

Kjersti Fosheim

Department of Surgical Pathology,  
Zealand University Hospital,  
Roskilde, Sygehusvej 9, 4000  
Roskilde, Denmark, Tel: +45 47 32  
59 00

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## Abbreviations

SLNB: Sentinel lymph node biopsy; ET: Endocrine therapy; BCS: Breast-conserving surgery; RT: Radiotherapy; IDC: Invasive ductal carcinoma; ER: Estrogen receptor; HER2: Human epidermal growth factor receptor; BRCA: Breast cancer gene; PBSO: Prophylactic bilateral salpingo-oophorectomy; CKD: Chronic kidney disease; BMI: Body mass index; MRI: Magnetic resonance imaging; CPM: Contralateral prophylactic mastectomy; AD: Axillary lymph node dissection; SSI: Surgical site infection

## Introduction

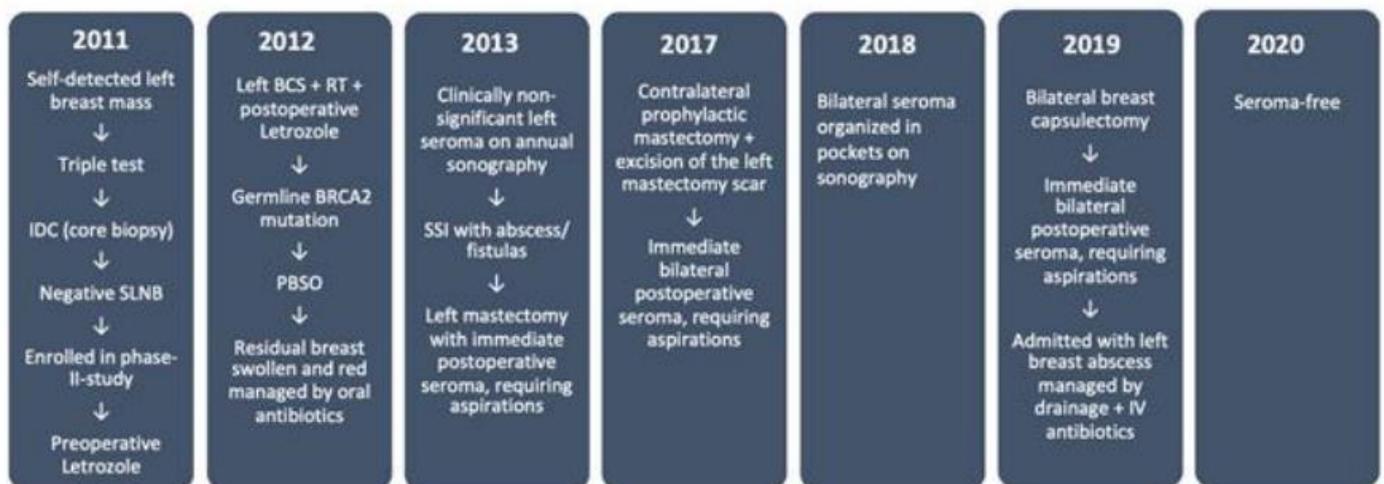
Seroma is the generic term in common use for the abnormal collection of serous fluid [1], which may develop in operative sites after surgery. However, there is considerable inconsistency in the way seroma is defined, and its pathophysiology and risk factors have yet to be determined [1-8]. Seroma is common after breast cancer surgery [1-11], with a reported incidence of 8 to 85% [9,12], depending on diagnostic criteria, methods of detection [2-3], and type of surgery performed (i.e. mastectomy or local excision) [3-4, 7-8].

Although often considered a minor postoperative sequela [4], seroma may delay patient recovery [3, 7, 9], by causing skin necrosis, wound infection [1, 13], and postponed adjuvant therapy [3, 7, 14-16]; with potential deleterious repercussions on patient's outcome and quality of life [6, 7, 9, 15-17].

If a seroma persists, a chronic encapsulated seroma may develop [6]. Few data exist as to the incidence, cause and treatment of this rare phenomenon [15-16]. While most postoperative breast seroma resolve spontaneously with time [2, 5, 7, 14] or respond readily to aspiration [2-4, 16], management of late onset and/or encapsulated seroma is more complex [1, 6, 15]. Surgical intervention with capsulectomy may be required, as described in this case report.

## Case presentation

A 71-year-old woman with previous primary breast cancer presented with a six-year history of refractory bilateral seroma following sentinel lymph node biopsy (SLNB), endocrine therapy (ET), breast-conserving surgery (BCS), adjuvant radiotherapy (RT) and non-simultaneous double mastectomy (Figure 1).



**Figure 1:** Timeline of clinical manifestation and management of bilateral chronic breast seroma.

The patient was diagnosed with early invasive cancer in the left breast in 2011. As part of a phase II-study on preoperative neoadjuvant ET

in postmenopausal women [18], SLNB was performed within five months of primary surgery, with excision of two negative nodes. The patient

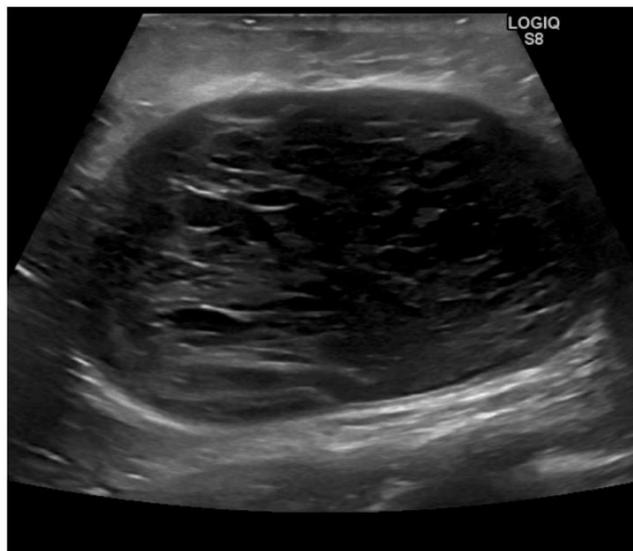
was assigned to receive initial ET for four months, followed by BCS, RT and postoperative adjuvant letrozole for a total of five years. Pathologic evaluation of the lumpectomy specimen revealed a 20 mm, malignancy grade II invasive ductal carcinoma (IDC) with clear margins and moderate residual disease, measured by modified Miller-Payne grading system. The tumor was 100 % ER positive with negative HER2 expression (score 1+) and a Ki-67 index of 1%. Postoperative period and recovery were without complications.

The patient had a family history of breast- and gynecological cancers, and in 2012 genetic testing identified germline BRCA2 mutation. In 2012 she underwent risk-reducing bilateral salpingo-oophorectomy (BSO), and in 2017 a risk-reducing contralateral mastectomy was performed. No prior history of breast augmentation. Past medical history included arterial hypertension, uncompensated insulin-dependent type 2 diabetes mellitus, stage 3 CKD, asthma, and previous tobacco use of 46 pack years. Body mass index (BMI) at time of BCS was > 34.

### **Clinical Findings and Diagnostic Assessment**

Five months after BCS, the patient presented with sudden onset of swelling and redness of the skin of the residual breast with no history of trauma. Physical examination revealed diffuse erythema, warmth, edema with “peau d’orange” appearance of the skin. No fluid collection was apparent. Body temperature and laboratory findings were normal. Seroma formation, infection, late postsurgical-/radiation complications, as well as local recurrence were considered. The condition improved with oral antibiotics, and the patient was without significant symptoms over the ensuing nine months.

Thirteen months after primary surgery, the annual clinical mammography and breast MRI revealed a small nonsignificant seroma and/or hematoma, but no local recurrence. However, two months later the patient developed seroma infection with low-grade fever, malaise, fatigue, spontaneously draining abscess and periareolar fistulas. Culture for bacteria showed minimal growth of normal skin flora. Breast ultrasonography revealed pockets of inflamed seroma with formation of a hyperechoic capsule (Figure 2). Oral antibiotics and compression-therapy proved ineffective.



**Figure 2:** Ultrasonography image of a 5 x 10 x 15 cm breast seroma organized in pockets with hyperechoic capsule.

### Therapeutic interventions

In 2013 a simple left mastectomy was performed to treat persistent infection, and in 2017 a contralateral prophylactic mastectomy (CPM) with excision of the left mastectomy scar was performed. Reconstructive surgery was discussed but abstained, due to body weight and comorbidity. The procedures were followed by escalation of bilateral seroma formation. Seroma aspiration was initiated in 2013 and continued with various frequencies over a period of six years. 43 aspirations were required with a mean aspirated volume of 236 ml (range, 7-1250 ml).

In 2019 a bilateral breast capsulectomy was

performed. Fibrous capsules were identified and excised, and excess skin with overlying scarring was removed. Macroscopic evaluation of both capsulectomy specimens revealed identical bilateral changes with multiple communicating subcutaneous pockets surrounded by a distinct dense fibrous capsule. The pockets measured 25.7 cm in diameter, with up to 1.2 cm thick surrounding capsules (Figure 3a). Microscopically, a cavity with fibrinous-thread-containing material was observed surrounded by a peripheral well-defined dense fibrous capsule. The findings were consistent with bilateral organized encapsulated breast seroma (Figure 3b).



Figure 3: Encapsulated breast seroma (a) Gross appearance of the capsulectomy specimen shows a distinct thick fibrous capsule surrounding seroma with hemorrhage (b) H&E staining shows the thickened capsule and hematoma sequelae.

## Follow-up and Outcome

Four months after capsulectomy the patient was admitted with leukocytosis, fever, and an abscess in the left breast. The condition was successfully managed by drainage and intravenous antibiotics. No significant seromas were detected at nine months' follow up from time of capsulectomy.

## Discussion

This case is believed to be the first presenting a breast cancer patient with excessive encapsulated seroma involving both breasts, requiring bilateral capsulectomy without prior history of axillary dissection (AD). Many patients develop transient low-volume seroma after surgery, but only few develop persistent refractory seroma. In this case onset of clinically significant seroma occurred fifteen months from time of primary surgery. Bilateral onset was seen years later following additional procedures.

Even though postoperative seroma is common, there is no uniform consensus to explain the pathogenesis of seroma or its risk factors [2-5]. Several surgical- and patient related predictors have been proposed, but only the extent and type of surgery have proven significant in some subsequent studies [3-4, 7-8, 10].

The impact of surgeons' skills and duration of surgery on seroma formation have been thoroughly investigated [7, 9-10, 12-14, 17]. Some studies suggest that the surgeons' experience and qualifications are preventive factors for the development of postoperative seroma [7, 10], while others have found no significant association [5, 9, 13]. These findings imply that seroma cannot be avoided even with impeccable surgical technique.

Seroma has been shown to be significantly associated with surgical site infection (SSI) [3]. In the present case, a SSI was diagnosed eight months prior to seroma with subsequent

recurrent infections. A critical review of the patient's medical journal revealed a clinically undetected seroma noted at the first annual breast-MRI. An earlier and more intensive follow-up with prompt aspiration, might have reduced the long-term risk of SSI, seroma recurrence and encapsulation, but in contrast elevated the patient's risk of iatrogenic infection.

The linkage between seroma and predictive patient related factors is unclear. Available evidence is inconsistent for whether factors such as increasing age [4-5, 7-9, 11, 13, 17], body weight [4-5, 7, 9, 11, 17], hypertension [5, 9, 11, 17], diabetes mellitus [5, 7, 9-10, 17] and smoking [5, 7, 10] influence seroma occurrence rate. To our knowledge, the significance of BRCA mutation carrier status on seroma formation is unknown. Thus, it remains unclear if the patient was preoperatively predisposed to seroma.

A few previous cases have described the successful effect of capsulectomy on post-axillary dissection encapsulated seroma [6, 14-16, 19]. However, it can be difficult to attribute seroma in the lateral chest site to the axillary- versus breast surgical procedure, because of the combined surgical field [3]. Because seroma can occur late, an extended follow-up is needed to detect all seroma recurrence, and hereby establish the true incidence of this not uncommon postoperative sequelae. The lack of seroma recurrence in previous reports is noteworthy and supports our observation of capsulectomy as an effective strategy in managing seroma refractory to other measures.

## Conclusion

This report highlights the benefit of capsulectomy as a treatment of encapsulated seromas proven resistant to aspiration.

Further research is required to determine the predictors of seroma and to identify effective strategies of prevention and management.

### Conflict of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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### Authors' contribution

KF and AVL: Were involved in the preparation of the case study, and the examination and microscopy of the case.

KF: Drafted the manuscript.

SB: Obtained informed consent from the patient, provided radiological images and edited the manuscript.

All authors read, reviewed and approved the final manuscript.

### Consent

The patient provided informed consent for the publication and the use of accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

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