

Sun Burn Induced Upper Limb Lymphedema 13 Years Following Breast Cancer Surgery: A Case Report

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Abstract

Upper arm lymphedema is a common complication within one year following breast cancer surgery, which has profound impact on patients' quality of life. We reported a case of lymphedema 13 years after breast cancer surgery induced by prolonged sun exposure.

Keywords: Sun-burn; Upper limb lymphedema; Breast cancer

Introduction

Breast cancer is one of the most common malignancies, accounting for 15% of female tumors [1]. The incidence in China have been increasing since 2000 with an annual increase of 1% [2]. Although the survival has been greatly improved due to progress in treatment, the quality of life was affected, sometimes by lymphedema in the affected side [3]. Lymphedema is the main complication after cancer treatment, affecting 12–28% of the patients after axillary dissection and 3.5–7.5% after sentinel node biopsy [4]. Patients are manifested with the upper limb accumulation of lymph due to lymphatic vessel rupture and deformation. Lymphedema not only causes shoulder joint dysfunction but also affects patients' mental wellbeing [5,6]. Research shows that nearly 1/5 of patients in China developed secondary upper limb lymphedema within one year after breast cancer surgery [7]. Despite various approaches have been attempted, lymphedema remains the most common chronic complication of breast cancer treatment and the therapies are solely palliative [8]. Therefore, prevention to avoid modifiable risk factors has become paramount. Risk factors for lymphedema include overweight/obesity, high blood pressure, having axillary lymph node dissection, chemotherapy, and local radiotherapy [9], in addition to limb overload, trauma and infection [10]. Postoperative infection, delayed healing and improper nursing can hinder the reconstruction of lymphatic vessels and the establishment of collateral circulation [11]. Recently, we cured a patient with severe limb lymphedema following solar dermatitis with massive infection 13 years after left breast cancer surgery. We hereby report the case upon the patient's informed consent.

Case Presentation

A female patient aged 61 complained a progressive swelling and heaviness of the right upper limb after a 4-day outdoor field work under the direct sun with chest wall burning pain starting on the 7th day and came to seek help on the 9th day. When she was admitted on the 9th September 2021, she had erythema and desquamation and a body temperature of 39.4°C. She underwent modified radical mastectomy for the right breast cancer (with chemotherapy and radiotherapy of armpit and chest) 13 years ago in our department. **Figure 1** showed the affected limb on admission. She was diagnosed as sunburn induced severe lymphedema in the right upper limb based on a difference of >5 cm in circumference on both affected and unaffected sides as indicated in the 2017 edition of The Consensus of Rehabilitation Treatment for Breast Cancer Patients [12]. The circumference measurements on both arms were listed in **Supplement Table 1**.



Figure 1: Patients affected right limb on admission (on September 9, 2021).

Supplement Table 1: Comparison of circumferences of left and right upper limbs on admission (cm).

Measurement points	Thumb web	The wrist	10 cm below elbow	10 cm above elbow
Left (unaffected)	20.4	17.9	21.3	26.3
Right (affected)	23.2	20.0	27.1	31.2
Difference	2.8	2.1	5.8	4.9

She was also diagnosed having chest wall infection at the affected side upon blood tests and physical examinations. A 8-day 400 U penicillin (b.i.d) was initiated by bacterial culture results, and standard of daily dressing and close monitoring of the blood circulation of the infected skin were applied. The patient was advised to wear loose dresses to avoid friction. On the 9th day after the infection was cured, a physiotherapist started to perform lymphatic drainage massage daily for 40 min. The centripetal massage was also conducted twice daily for 15 minutes each time with a sleeve pressure < 40 mmHg. After the physiotherapy, patients were instructed to wear elastic sleeve. The circumference measurements were taken each day at 5:00 pm to monitor the recovery (**Supplement Table 2**). On the 15th day of admission, the patient was discharged after a comprehensive check of fully recovered limb and function. **Figure 2** showed the limbs on the discharge day. We followed the patient on telephone at 2 weeks, 1 month and 3 months, and six months after discharge and the patient did not report any function or circumference change on the right limb. Throughout the hospital stay and follow up calls, the patient was encouraged to discuss with the care team about her negative feelings, and to be actively involved in making decisions on treatments, monitor and prevention of lymphedema.



Figure 2: Comparison of the affected limb on discharge.

Supplement Table 2: Circumferences of the affected limb during hospital stay (cm).

Hospital stay	Thumb web	The wrist	10 cm under elbow	10 cm above the elbow
Day 1	23.2	20.0	27.1	31.2
Day 3	22.5	19.2	26.0	29.8
Day 5	22.0	18.9	25.4	29.3
Day 7	21.8	18.5	24.7	29.0
Day 9	21.5	18.4	24.0	28.8
Day 11	21.3	18.4	22.5	28.2
Day 13	21.1	18.2	22.3	28
Day 15	21.1	18.2	22.0	27.1

Discussion

Prolonged ultraviolet radiation to the affected limb stimulates inflammatory mediators to dilate and infiltrate the blood vessel and damages the skin barrier function, leading to local oozing and even infection [13], due to high protein deposited in the interstitial tissues that accelerates the growth and reproduction of bacteria [14]. The case indicated to avoid sun exposure should be informed to patients shortly or long after breast cancer surgery, especially in regions where people culturally like beaches and outdoor activities. Patients' knowledge, attitude and behavior play a key role in preventing lymphedema in breast cancer patients [15]. Medical care team should disseminate evidence-based knowledge of lymphedema, guide and train patients to avoid risks, follow up and closely monitor their practice following hospital discharge. Baseline upper limb circumference is an objective measurement to monitor the prevention, occurrence and outcome of lymphedema in patients with breast cancer. In this case, overall circumference changes before and after the occurrence of lymphedema and after the treatment could not be evaluated, suggesting the need to record complete upper limb measurements for the rehabilitation of breast cancer patients. At present, there is no internationally recognized effective treatments for lymphedema [15]. In China, upper arm lymphedema could be

substantially prevented if breast cancer screening is promoted in the community based on the success from western countries for early detection and less radical surgical treatment [16].

Summary

We reported a case of lymphedema 13 years after breast cancer surgery and/or radiotherapy induced by prolonged sun exposure. Upper arm lymphedema could be prevented by breast screening, patient's education and follow up after hospital discharge.

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