

# MEAT-INDUCED SUBCUTANEOUS TISSUE INFLAMMATION: TWO CASE REPORTS OF PRIMARY LYMPHEDEMA

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**ABSTRACT:** We reported two patients suffering from chronic primary lymphedema (LE) with history of multiple recurrent cellulitis related to dietary intakes. They were advised to abstain from animal product consumption. At the end of six months of follow-up, a distinct improvement was observed in the patient who followed the dietary advice. The first patient was a 53-year-old Thai female with a body mass index (BMI) of 31.0 kg/m<sup>2</sup> who had suffered from LE for eight years with three recurrent episodes of cellulitis in nine months from January to September 2010. One acute episode of cellulitis occurred in October 2010 suspected to be induced by chicken consumption. Tissue fluid cultures found no organism. The second patient was a 45-year-old Thai female with a BMI of 30.8 kg/m<sup>2</sup>. She had suffered from LE for 15 years with innumerable history of attacks of cellulitis. The last attack was detected three months ago. During 6 months investigation, she was advised to strictly abstain from animal products, no recurrence was seen. This case underwent a significant weight-loss and a remarkable diminution in the percentage difference in circumference of the leg. In addition, high sensitivity C-reactive protein (hsCRP) was significantly reduced from 3.5 mg/l to 0.8 mg/l. These two case reports supported the notion that dietary intake could be an important precipitating factor of subcutaneous tissue inflammation. Restricted meat consumption might benefit in treating patients with chronic LE.

**Keywords:** subcutaneous tissue inflammation, cellulitis, primary lymphedema, dietary

## INTRODUCTION

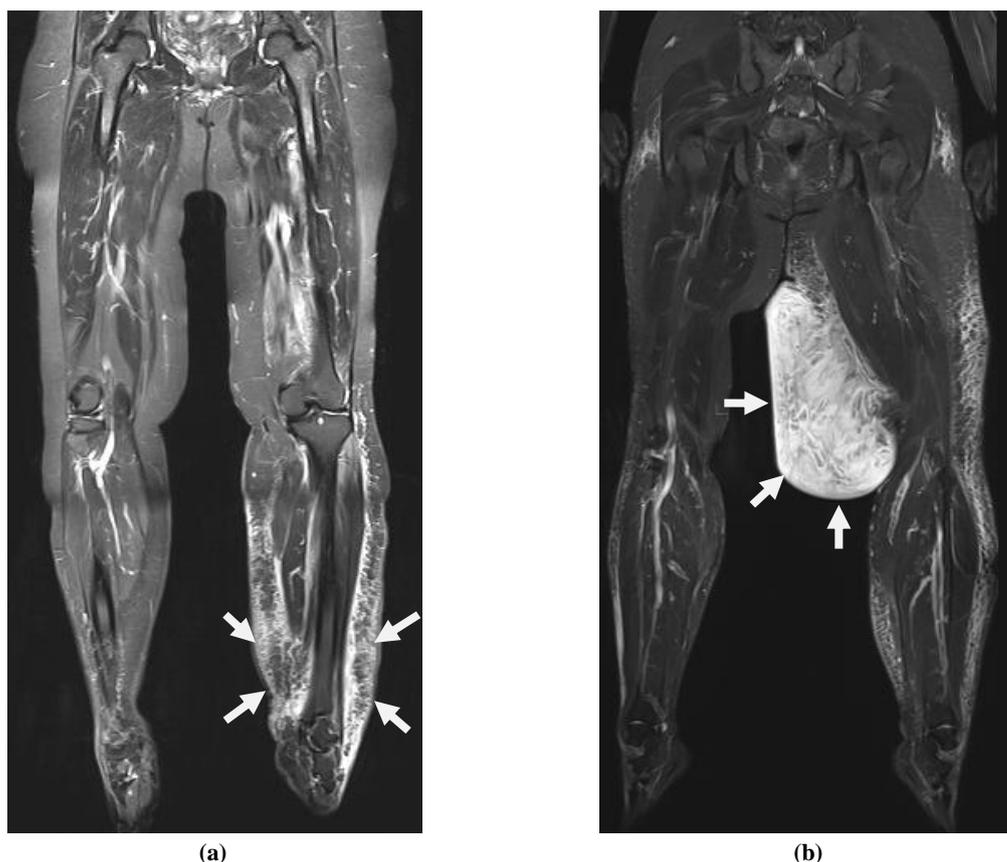
Subcutaneous tissue inflammation is the most common complication found in lymphedema (LE) because of the stagnation of proteins associated with water in the interstitium increasing its risk [1]. The term cellulitis is commonly used to indicate a non-necrotizing inflammation of the skin and subcutaneous tissues characterized by localized swelling, tenderness, erythema, and warmth [2, 3]. Usually, the cause of cellulitis is associated with  $\beta$ -haemolytic Streptococci and *Staphylococcus aureus* [2, 4]. The management of this complication therefore mainly emphasizes on antibiotic therapy. Nevertheless, recent studies encouraged multi-disciplinary aspect in treating cellulitis patients [5, 6]. In addition, there are studies showing that dietary habits of high fat and meat consumption in patients with LE is associated with various patterns of cutaneous manifestation including cellulitis [7, 8]. We reported two cases with chronic LE, in

whom meat consumption, was identified as a probable cause that induce a recurrence of subcutaneous tissue inflammation, and whose clinical course was significantly improved during the period they strictly followed the nutritional regimes.

## CASE REPORTS

**Case No.1:** A 53-year-old Thai woman visited the Thailand Lymphedema Day Care Center (TLDCC) due to the swelling of her left leg in September 2010. Primary lymphedema tarda stage 2, grade 3a was diagnosed. Physical examination revealed a body mass index (BMI) of 31.0 Kg/m<sup>2</sup>, blood pressure of 122/58 mm Hg and moderate severity of LE demonstrated by the percentage difference in the circumference of the legs (PDCL) of 25.7. The lymphatic vascularity was visualized through magnetic resonance imaging (MRI) as shown in Figure 1(a). She experienced recurrent cellulitis for more than seven times in eight years with the last three episodes occurred during Jan-Sep 2010. No other contributory sickness or food allergy was elicited in her medical history.

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**Figure 1** T2-weighted images of MRI demonstrate dilatation and proliferation of peripheral lymphatic vessels. Hyperintense signals represent lymph retention in lymphatics: (a) case no.1, (b) case no. 2.

She was given a ten-day treatment course composed of three components: compression therapy (Twisting Tounique® Technique), vegan diet and cold application. This day care program resulted in a diminution of the PDCL and BMI at 17.1 and 30 kg/m<sup>2</sup> respectively. She was assigned with a home treatment program that required her to continue with the compression regularly and practice the vegan diet.

One and a half months later, the patient revisited TLDCC due to an acute attack of recurrent subcutaneous tissue inflammation. Physical examination revealed a little decline of BMI to 28.7 Kg/m<sup>2</sup>, while the PDCL was increased from 17.1 to 18. The body temperature was 36.5°C, slightly lower than that of left shin (36.8°C). The left leg was erythematous, tensely swollen and non-pitting. There was no muscle injury. She was referred to a dermatologist and was diagnosed cellulitis. Laboratory findings showed an increased white blood cell count (14.1 x 10<sup>3</sup>/μl) and elevated high sensitivity C-reactive protein (hsCRP) (243 mg/l). Needle aspiration was performed. The tissue fluid cultures of aerobic and anaerobic organisms were negative.

The patient was assessed with a structured

interview chart, tested seven days Food Frequency Interviewed Chart (FFIC) and Dietary Recall (DR) 24 hours which demonstrated that she kept practicing vegetarian regime regularly except only on the day of the attack. She ingested four pieces of sliced chicken (1.5 x 3.5 cm) at lunch. Within six hours, she could felt tenseness and heat in her left leg that grew deep red followed by fever and chill. In fact, she described that this was similar to the previous two episodes of food induced subcutaneous tissue inflammation experienced in the past. Nevertheless, she was prescribed with Clindamycin 600 mg three times a day for 5 days followed by Ceftriazone 1 g injection for another 5 days. The subcutaneous tissue inflammation subsided a month later.

Physical examinations at the last follow-up four months later revealed an increase of PDCL from 18 to 18.9 and BMI from 28.7 to 30.9 Kg/m<sup>2</sup>. Discoloration of skin and heat were not elicited. The hsCRP level was 4.3 mg/l.

**Case No.2:** A 45-year-old Thai woman was referred to TLDCC in January 2011. Her chief complaint was left leg swelling for 15 years. The diagnosis was primary lymphedema tarda stage 2, grade 3a. Physical examination revealed a BMI of

31.0 Kg/m<sup>2</sup>, blood pressure of 114/83 mm Hg and moderate severity of LE demonstrated by the PDCL of 35. The MRI shows dilatation and proliferation of peripheral lymphatic vessels as shown in Figure 1(b). The hsCRP level was 3.5 mg/l. She experienced innumerable episodes of recurrent cellulitis with seven-day hospitalization at each attack. The latest episode was occurred in November 2011. No other contributory sickness or food allergy was elicited in her medical history.

A ten-day treatment program of TLDC resulted in a diminution of the PDCL and BMI of 20.6 and 29.9 Kg/m<sup>2</sup> respectively. She was assigned with a home program that required her to continue the compression regularly and practice a vegan diet. She revisited the TLDC in April and July 2011 for follow-up appointments. Physical examination revealed that her weight and the diameter of left leg continued to decrease. The laboratory investigation in July 2011 showed a significant reduction of the hsCRP level at 0.8 mg/l.

The patient was assessed through a structured interview chart, seven days FFIC and DR-24 hours at each TLDC visiting. The results demonstrated that the patient abstained from dietary habit of all animal origin during these six months. She strictly maintained on this new dietary habit because she could recall many acute recurrent subcutaneous tissue inflammation in association with animal products meal, such as shell-fish, pricked fish, beef and pork.

The comparative characteristics of these two cases were shown in Table 1.

## DISCUSSIONS

Cellulitis is responsible for LE progression and disability. Contributory factors for its recurrent are therefore an important issue. We reported two chronic primary LE cases with history of multiple recurrent cellulitis related to dietary. These two cases had similar characteristics including BMI, blood pressure, chief complaints, diagnosis, repeated episode of cellulitis and FIE. Case no.2 had more severe problem of higher PDCL, longer period of suffering and more episodes of cellulitis. Nevertheless, at sixth month follow-up, the clinical results of case no.2 were improved distinctively evidenced by a significant diminution of BMI, the PDCL, blood pressure and the level of the hsCRP. In addition, no recurrent episode of cellulitis was observed in this case. A dietary regime was the only factor found difference among these two cases. These findings were consistent with recent studies indicating an inverse association of the hsCRP and quantity of the intake of legume, fruit and vegetable [9-11] which supported the previous findings on the benefit of diet in LE treatment. The improvement of diameter of the affected limb in patients with LE was achieved by using restricted long-chain triglycerides diet, low-fat diet and weight-reduction diet [12, 13].

Lymphatic vessels are essential for fluid homeostasis, immune surveillance and fat absorption [14]. The fatty acids absorption depends upon the length of their chain. Those fatty acids having 10 or fewer carbons are quickly passed into the portal blood stream without further modification, while

**Table 1** Cases' characteristics

| Characteristics                                    | Case no.1                                  | Case no.2                                  |
|--|--|--|
| <b>First Enrollment</b>                            |  |  |
| Age (yrs)  | 53   | 45   |
| Sex  | female                                     | female                                     |
| Body Mass Index (kg/m <sup>2</sup> )               | 31   | 31   |
| Duration of lymphedema (yrs)                       | 8  | 15   |
| Percentage difference in circumference of the leg  | 25.7                                       | 35   |
| Systolic/diastolic blood pressure (mm Hg)          | 122/58                                     | 114/83                                     |
| High sensitivity C-reactive protein (mg/l)         | NA   | 3.5  |
| Chief complaint                                    | Swelling of left leg                       | Swelling of left leg                       |
| Diagnosis  | Primary lymphedema tarda stage 2, grade 3a | Primary lymphedema tarda stage 2, grade 3a |
| History of cellulitis (times)                      | 7-8  | innumerable                                |
| Food induced complication experiences (FIE, times) | 2  | innumerable                                |
| <b>Sixth month follow-up</b>                       |  |  |
| Body Mass Index (kg/m <sup>2</sup> )               | 30.9                                       | 25.6                                       |
| Percentage difference in circumference of the leg  | 18.9                                       | 13.5                                       |
| Systolic/diastolic blood pressure (mm Hg)          | 168/107                                    | 109/73                                     |
| High sensitivity C-reactive protein (mg/l)         | 4.3  | 0.8  |
| Recurrence episode of cellulitis                   | Yes  | No   |
| Bacterial investigation                            | Negative                                   | NA   |
| Leg compression regularly                          | Yes  | Yes  |
| Practicing vegetarian regimens                     | No   | Yes  |

NA Not Applicable

the bigger chain fatty acid, after modification, and finally enter to the blood stream through the lymphatic system [15]. A few studies suggested that diets rich in trans-or saturated fatty acids (TFAs, SFAs) are more closely associated with inflammation than vegetarian diets, which usually contain fewer of those compounds [15-19]. Such information supported our believe that recurrent episode of subcutaneous tissue inflammation could be controlled by restriction of fat and meat consumption among patients with LE. We reported these two cases to emphasize that the lack of awareness of dietary in patients with LE might result in high recurrent rate of subcutaneous tissue inflammation. Limited meat and fat consumption in patients with LE should be raised to prevent unnecessary and costly treatments of the subcutaneous tissue inflammation. Further experimental study of dietary control in prevention of subcutaneous tissue inflammation in patients with LE is recommended.

#### CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

#### CONSENT

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

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