



# Subcutaneous Oleomas Following Sunflower Oil Injection: A Novel Case and Review of Literature

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## ABSTRACT

Liquid foreign material injection has been used as an early medical intervention since the end of nineteenth century for the augmentation of body shape. Nowadays, these types of procedures have been abandoned by health professionals due to late onset of serious complications. However, it is still misused by some subcultures such as bodybuilders, passive homosexuals, transsexuals, and patients with mental illness. This article discusses a male patient who injected himself with a large amount of sunflower oil, which became complicated by an inflammatory response-abscess formation and sclerosing lipogranuloma of breasts. The radiologic and pathologic signs of this entity are discussed with a review of the relevant literature. Lack of suspicion of this entity may cause a great delay in establishment of definitive diagnosis, giving rise to prominent morbidity and mortality. It is necessary to know the diagnosis and treatment of this phenomenon because illegal substances that cause factitial panniculitis are widely available on websites and threaten thousands of people, which is anecdotally referred in medical literature. Chronic or recurrent lesions of a bizarre or atypical morphology should alert the physician to this artificial phenomenon. Radiologic findings are most important criteria for diagnosis because self-injection is denied by the patient.

**Keywords:** Breast, panniculitis, subcutaneous injection, magnetic resonance imaging, ultrasound

## Introduction

Subcutaneous injection of liquid foreign material such as mineral oil (paraffin) or vegetable oil (cotton seed and sesame oils) has been used for remodeling of body shape for more than a century. Liquid silicone injection became popular after it was shown to be well tolerated by tissues and has been used as a minor procedure to feminize the face, breasts, buttocks, hips, or calves in transsexuals (1). Liquid foreign materials induce foreign a body reaction that is known as oleoma or sclerosing lipogranuloma in subcutaneous fat. Paraffinomas have been described in the genitalia, lower extremities, male or female breasts, ureter, eyelids, lips, abdomen, and neck (2). Although subcutaneous injection of these materials is not recommended due to the late onset of serious complications, it is still misused by body builders, passive homosexuals, and transsexuals. Foreign material self-injection is a worldwide entity with thousands of users because the market is illegal and there is no legislation for the distribution of anabolic steroids and supplements (3). Diagnosis and treatment is a challenging owing to the lack of considerable medical literature and unawareness of physicians about foreign material injection.

In the current case report, we present the clinical and radiologic manifestations of breast oleoma in a male patient following sunflower oil injection, followed by a review of literature.

## Case Presentation

A male smoker aged 40 years with a history of chronic alcohol and substance abuse was admitted to hospital with the symptoms of bilateral breast enlargement and remarkable weight loss. He had fistulized painful drainage in the outer quadrant of the right breast. He denied any history of trauma or self injection to the involved area. He had received anti-tuberculosis treatment for 9 months 3 years ago.

His physical examination revealed skin erythema in the right lower inner quadrant, a 3-4 cm palpable mass in the lower outer quadrant and enlarged right axillary lymph nodes. Cultures of the sero-purulent exudate and tissue biopsy material were negative for aerobic and anaerobic bacteria and acid fast micro-organisms. Gram staining revealed Gram-negative and positive bacteria and leukocytosis. Inflammation findings regressed following broad spectrum antibiotic treatment for 12 weeks. Informed consent was obtained.

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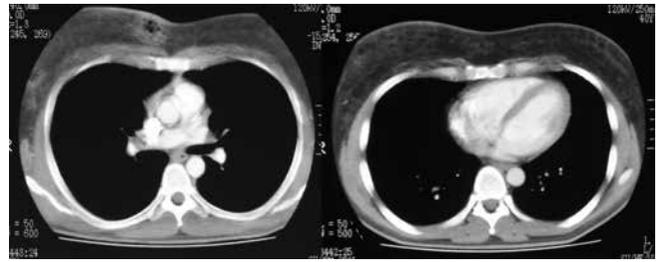
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Computerized tomography (CT) of the chest was performed because of the previous history of tuberculosis. Chest CT revealed no pathologic changes in lung parenchyma, but curvilinear-reticular densities in bilateral subcutaneous tissue, which indicated that diffuse inflammation was present (Figure 1). On mammography, there was a prominent reticular pattern and asymmetric densities with central radiolucency consistent with abscess formation (Figure 2). Ultrasonography (US) showed a remarkable skin thickening and multiple anechoic cystic lesions in the skin and subcutaneous fat (Figure 3). There were also cystic lesions in the abdomen and bilateral cruris. Magnetic resonance imaging (MRI) revealed inflammatory changes and abscess formation (Figure 4). All cystic lesions detected under US showed fat signal in all MRI sequences (Figure 5). On US-guided fine needle aspiration, liquid oil material was obtained. Excisional biopsy revealed areas of adiponecrosis and lipogranuloma formations (Figure 6). During the 8<sup>th</sup> month follow-up, the patient confessed to a large amount of sunflower oil injection into bilateral breast tissue to increase muscle mass and definition (Figure 7).

### Discussion and Conclusion

There have been many publications related to granuloma formation and other tissue reactions following mineral/oil injections; however, few are about the adverse effects of vegetable oil. The resulting tumors are defined as paraffinoma, siliconoma, or oleoma according to the injected substance. Darsow et al. (2) reported granuloma formations after intramuscular injection of sesame seed oil in body builders. In another series, a pseudotumor following injection of anabolic steroid dissolved in sesame seed oil was presented (4). To our knowledge, there are no case reports in the literature describing oleomas due to sunflower oil injection.

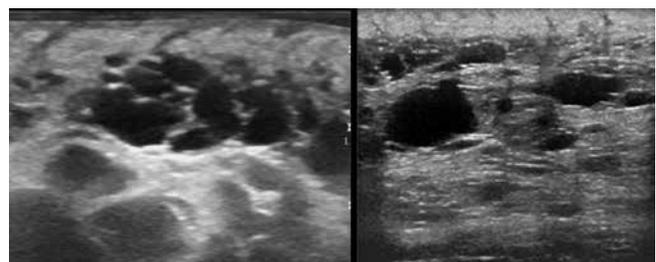
Self-injection with contaminated material produces an acute suppurative panniculitis with concomitant systemic symptoms. Lesions are generally atypical and bizarre in appearance, arising on sites easily accessible to the handedness of the patients. Symmetrical distribution is not frequent. Involvement of the breast is highly suspicious for factitious disease (5). The superficial layers such as skin, dermis, and subcutaneous fat are involved. Initially, the lesions are seen as isolated or coalescent hard, brown nodules, forming typical plaques secondary to fat necrosis and suppuration. Some cases may show abscess formation, lymphangitic spread, skin sloughs, draining sinuses, contractures, and deformities. Additionally, the inflammatory process may cause granulomatous inflammation and fibrosis. Oleomas may present either as a painless mass in the breast or painful hard swellings, skin ulcerations and drainage. This presentation may be misdiagnosed as a malignant lesion. The axillary lymph nodes may be enlarged. Patients may be symptom free for 2 to 25 years. In our patient, symptoms started approximately 3 years following the injection, supporting the findings reported in literature. Darsow et al. (2) also stated that oleomas more likely occur as a consequence of subcutaneous rather than intramuscular injections. In our case, innumerable oleomas due to subcutaneous injections were detected and this finding is consistent with this report. Lesions may become life threatening due to secondary septicemia. Possible long-term complications of oil injections are regional lymphadenopathy, infiltration of adjacent soft tissues and compression of surrounding organs. Acute and chronic respiratory impairment and clinical or subclinical signs of vascular collagen disease have also been described. Recurrent small fat emboli and/or transport of olive oil by lymphatics may cause lipoid pneumonitis (6). Venous embolism in distant organs is another complication of high viscosity liquid injection. In the acute phase, even minor surgical procedures may trigger



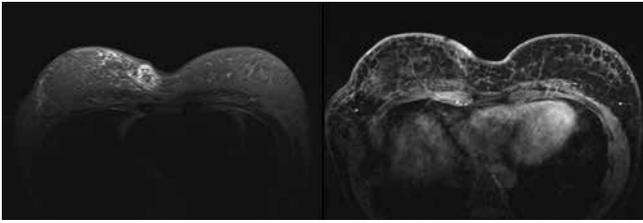
**Figure 1.** Contrast-enhanced axial chest CT images show curvilinear-reticular densities in bilateral subcutaneous tissue indicating diffuse inflammation and subcutaneous abscess with gas formation  
CT: computerized tomography



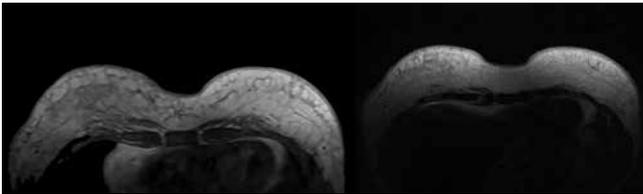
**Figure 2.** Bilateral mammography in mediolateral oblique projection shows diffuse reticular pattern consistent with subcutaneous inflammation and asymmetrical densities with central radiolucency indicating abscess. No marked parenchymal breast density is detected



**Figure 3.** US shows marked skin thickening and multiple anechoic cysts that are located in subcutaneous tissue and underneath skin. Tubular anechoic areas, which indicate gland neck or hair follicle, connect the subcutaneous cysts and dermis  
US: ultrasound

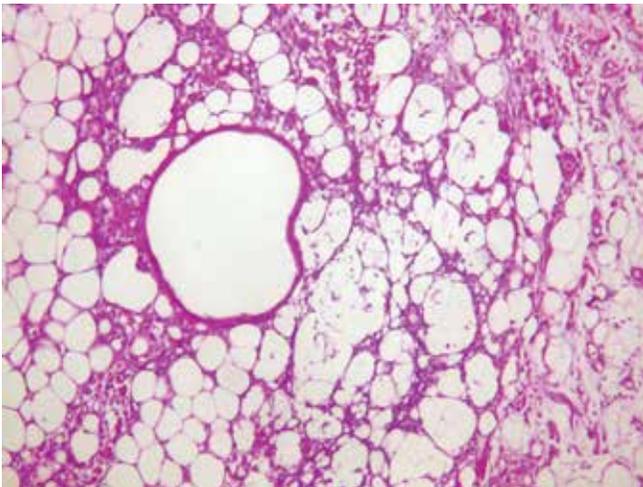


**Figure 4.** Axial short tau inversion recovery (STIR) and axial contrast enhanced T1-W sequence show inflammation and abscess formation with oil cysts with rim enhancement



**Figure 5.** Axial (a) T1-W and (b) axial non-fat saturated T2-W sequences. In all sequences, the multiple cystic lesions detected on US showed fat signal on MRI

T1-W: T1-weighted; T2-W: T2-weighted; US: ultrasound; MRI: magnetic resonance imaging



**Figure 6.** The histologic specimen depicts fat necrosis in subcutaneous tissue, release of fat droplets into intercellular spaces, and a granulomatous response



**Figure 7.** The physical appearance of the patient after treatment and 8 months of follow-up

the progression of the disease leading to chronic ulcerations, scarring, and secondary infections; therefore, unnecessary incisions, diagnostic biopsies, and open drainage should be avoided. In our patient, findings of inflammation regressed following antibiotherapy.

Diagnosis of factitial lesions is made largely by exclusion of other potential entities. Patients do not readily confess their self-destructive behavior, unless they admit to or are caught in the act of self-injury. Consequently, the factitial basis is usually difficult to prove conclusively. In our case, the patient persistently denied the use of any foreign substance.

On mammography, paraffinoma of the breast presents with streaky reticulated densities leading to architectural distortion. Amorphous or round calcifications may accompany. Yang et al. (7) presented 5 cases of breast paraffinomas that presented with dense fibrosis, particularly in the retroglandular area, architectural distortion, abnormal lobulated densities, and dystrophic calcifications. Darsow et al. (2) reported marked calcifications and they suggested that the presence of calcifications may be a helpful finding in the diagnosis of sesame seed oil granuloma. In our case, a prominent honeycomb pattern consistent with subcutaneous edema was present but no calcifications were detected.

Ultrasound is used to show cystic lesions, which are the main manifestations of oleomas. Georgieva et al. (8) presented a man who self-injected sesame oil and US showed cystic lesions presenting as hypoechogenic lesions with acoustic shadowing accompanied by round hyperechoic encapsulated lesions with calcifications. Yang et al. (7) showed well-defined round hypoechogenic nodules with posterior acoustic shadowing. In our case, US revealed multiple anechoic cysts underneath the skin and in subcutaneous tissue with a diffuse skin thickening. There were similar cystic lesions in the abdomen and bilateral cruris. Histopathologically, involvement of the dermis is one of the main findings of factitial panniculitis. In our case, tubular anechoic areas consistent with gland neck or hair follicle, connected subcutaneous cysts and dermis. This finding indicates that a lesion is in continuity with the dermis ultrasonographically. Therefore, we think that this US finding has important diagnostic value; we have seen no data in the literature showing this association.

Additionally, MR imaging may have an incremental value in the diagnosis of oleomas. It may help in accurate localization and extent of oleoma by enabling multiplanar imaging. The lesions are best seen on fat-suppression sequence. Khong et al. (9) reported MR imaging findings of 7 cases with paraffin oil injection for the purpose of breast augmentation. The authors detected that the main component of paraffinoma showed low to intermediate signal intensity on both T1-weighted (T1-W) and T2-weighted images (T2-W), and the round component with paraffin was hypointense on T1 and T2-W images with a remarkable suppression on fat saturation sequences. Wang et al. (10) also reported that paraffinoma was seen as low to intermediate signal on T1 and T2-W sequences. In another series, 16 women with paraffinoma was evaluated and in two cases the lesions were hypointense on T1-W, and hyperintense on T2-W and fat-suppressed sequences. It was hypothesized that the lesion turned to be semisolid during the latency period (11). As Lee et al. (12) had previously described, we detected high signal intensity in T1-W sequences and verified fatty content of the lesion in fat suppressed images. In our case, all the lesions showed fat signal in all sequences and were signal free in fat suppression sequences. MRI can be superior to mammography in patients who experience pain due to inflammatory process. As a result, we conclude that MRI may have an incremental value to reveal an artificial lesion.

In cases of foreign material self-injection history, patients often deny the action of self-harm; therefore, factitious disease is a challenging in diagnosis and treatment. In our case, the patient refused psychiatric

consultation and he did not believe that the complications were caused by self-injected material. We think that radiologic imaging is crucial in the follow-up of these patients.

In conclusion, the diagnosis of oleomas may be challenging. Involvement of the breast is very suspicious for factitious disease. Chronic or recurrent lesions of a bizarre or atypical morphology should alert the physician to this entity. Awareness of this phenomenon, obtaining an accurate history of the patient (due to denial of self-injection), and knowledge of specific radiologic manifestations may contribute to a fast and definitive diagnosis. We think that US and MRI are particularly efficacious in the determination of the extent of disease, identification of causative agent, and follow-up of the patients.

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