

Emphysematous mastitis with necrotizing fasciitis, a rare devastating complication of hydrogel injection into the breasts- a wake up call for women considering breast augmentation

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ABSTRACT

Background: Breast augmentation using polyacrylamide hydrogel (PAAG) are frequently associated with chronic persistent infection. However, emphysematous mastitis with necrotizing fasciitis of the breast following using PAAG injection is very rare.

Case Report: A 31 years old female presented with bilateral breast pain, swelling, redness, foul smelling discharge and fever for 24 hours. The patient had injection of hydrogel in her both breasts for breast augmentation approximately 3 months ago. The patient was mildly tachycardic with an elevated WBC(15×10^3). Examination of breast revealed grossly swollen both breast(left > right), redness of the skin and two obvious ulceration on the upper quadrant of left breast with pus like discharge. On palpation both breasts were warm to touch, tender and sub-cutaneous crepitation was felt over the both breast. The patient was started with empiric broad spectrum antibiotic and consented for bilateral incision and drainage of breast abscess. Intra-op findings revealed necrotising fasciitis of the subcutaneous fat of the entire both breast except its attachment with the nipple areolar complex. Multiple debridement along with VAC dressing were done. The right breast healed well with preservation of breast shape however, the left breast becomes disfigured with significant skin loss, hence a toilet mastectomy and delayed autologous flap reconstruction was done on her left breast.

Discussion: Complications of breast augmentation with PAAG injection can varies from simple breast lumps, bleeding, pain, inflammation, migration of gel to very a rare life threatening infection. These complications can be immediate and very late even after many years later. High index of suspicion should be kept for early recognition, diagnosis and treatment of PAAG-related complications. MRI of the breast is the most reliable screening method for the detection of masses following PAAG augmentation. Different treatment attempts have been made to treat these complications from conservative to surgery and those with acute infections undergo a two stage procedure; at first, wide debridement and control of sepsis and later on delayed breast reconstruction.

Conclusion: Great care should be taken during insertion of PAAG for breast augmentation. Strict follow up protocol should be implemented to identify any potential complication at its earliest time. High index of suspicion should be kept for early recognition, diagnosis and treatment. Appropriate steps should be taken to prevent further morbidity and disfigurement. We present a young female patient with emphysematous mastitis and necrotising fasciitis following hydrogel injection for breast augmentation.

Key words: Breast augmentation–Polyacrylamide hydrogel–Breast infection

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1 INTRODUCTION

Polyacrylamide hydrogel (PAAG) is a gel-like non-biodegradable material often being used for breast, cheeks and buttocks augmentation [1, 2]. PAAG use was initially popularized in Russia, China, and Iran. However, its popularity for breast augmentation has fallen out of popularity since 1990s. Increasing complications of polyacrylamide hydrogel (PAAG) augmentation mammoplasty, such as chronic persistent infection, have recently caught the attention of both the medical field and the general public. Uncontrolled infections result in various degrees of problems that often can result in breast atrophy and various degrees of breast deformation.

However, severe infections like emphysematous mastitis with necrotizing fasciitis of the breast are rare and may result in mastectomy and psychological depression. This article presents the case of emphysematous mastitis which required multiple debrided with toilet mastectomy and a delayed autologous flap reconstruction and a review of the literature.

2 CASE REPORT:

A 31 year's old East Indian female was presented to the accident and emergency department of San Fernando Teaching Hospital of Trinidad and Tobago with bilateral breast pain and discomfort (left more than right) for 1-2 weeks, which progressively worsened over the last 3 days. The patient also complaints of nausea, vomiting and fever and had noticed gradual redness of her both breasts (left > right). Over last 24 hours, the patients noticed that her left breast became more red and suddenly it ruptured with obvious foul smelling discharge.

The patient gave a history of taking Hydrogel injection in her both breasts approximately 2-3 months ago for breast augmentation. She claimed that 350 mls of hydrogel was used in each breast. After injection the patient had minimal discomfort and denied of any further injection or trauma to the breasts. She is unmarried and has no children.

On physical examination, she was mildly tachycardic with an elevated WBC (15×10^3).

Examination of breast revealed grossly swollen both breasts (left > right), redness of the skin and two obvious ulceration on the upper quadrant of left breast with pus like discharge. On palpation both breasts were warm to touch, tender. Sub-cutaneous crepitation was felt over the both breasts.

There was no palpable axillary lymphadenopathy. Rest of the systemic examination were normal. The patient was started with empiric broad spectrum antibiotic (augmentin) and consented for bilateral incision and drainage of breast abscess. Bilateral inframammary incision along with a semilunar incision was made on the left breast (including



Figure 1. Picture of patient's right breast



Figure 2. Picture of patient's left breast showing obvious sign of acute infection along with areas of ulceration and necrotic skin on the left breast



Figure 3. Picture of patient's both breasts

the ulcerated area). Pus like discharge was expressed from both breasts. Swab was taken for culture and sensitivity. Intra-op findings revealed necrotising fasciitis of the subcutaneous fat of the entire both breast except its attachment with the nipple areolar complex.

Approximately 30% breast tissue on the right and 40-50% on the left was necrotic. The retro-mammary fasciae were also necrotic and it partly involves the left pectoral muscles and extended in to the left axilla. Extensive debridement of all the dead and devitalized tissues was performed. The breast tissues were also sent for histology. The cavities were washed with normal saline mixed with antibiotic solutions. The overlying skin on the left breast looked mildly ischaemic at the end of the procedure however left for observation. Daily saline lavage and dressing was done. The culture grew staphylococcus aureus and it was sensitive to amoxicillin and clavulanic acid. During the post-operative period, small areas of skin on the right breast became necrotic which was excised and a VAC dressing was applied. However, on the left breast the entire nipple areolar complex as well as surrounding skin became progressively necrotic, further debridement was done. Because of the disfigurement a toilet mastectomy and delayed autologous flap reconstruction done on her left breast.

3 DISCUSSION:

Polyacrylamide Gel (PAAG) is a gel-like non-biodegradable material that cannot be absorbed into the body and consists of a synthetic polymer (polyacrylamide) and water. It is often being used for breast, cheeks and buttocks augmentation [1, 2]. The residual raw material of PAAG, acrylamide monomer is toxic to the reproductive, genetic, neural tissue and also known to be a carcinogen in animals.

It is usually given by injection and does not require any hospitalisation or surgery which makes it more acceptable to the young female population. As these fillers are easily available for cosmetic use; the indiscriminate and unregulated use of it are also expected to be detrimental.

Complications of breast augmentation with PAAG injection include breast lumps, infection, inflammation, bleeding, abscess, pain, change in skin sensation and contour, migration of gel, etc. These complications can be immediate and very late even after many years later [3]. Several case series have reported these complications [4-6]. Unukovych et al, in their study of 106 patients with PAAG breast augmentation reported that pain, breast deformities, and subcutaneous nodules are the most frequently reported complications [4].

Similarly Luo et al, in their series of 235 patients noted that the patient's age ranged from 20 to 38 years and the mean duration from the time of injection to complication was 39 months (ranged 6 months to 10 years) [5]. The most common complications reported in this series was induration and masses (single or multiple) accounting for 78.9% of patients. Breast asymmetry was the second most common complication accounting 20% of the patients followed by psychological problems or worry, gel migration, mastalgia,

and nipple retraction and infection accounting 12.3%, 8.9%, 8.5%, and 2.5% respectively [5, 7]. Approximately 72.8% of patients had multiple complications simultaneously, accounting for a total of 171 patients [4, 7].

Patlazhan et al divided these complications in Ukraine and Sweden into two broad categories: (1) with signs of acute inflammation at presentation (mastalgia, fever, hyperaemia, swelling, discharge or fistula) accounting 21% and (2) without signs of acute inflammation at presentation accounting 79% of their cases. They found that 54% of their patients who complained of breast deformity and or asymmetry showed significant gel migration [7].

The most feared reported complication after PAAG augmentation is the increased risk of breast cancer. Literature has reported few cases of breast cancer following Breast augmentation with PAAG [8-10]. Few reasons have been postulated for the increased risk of breast cancer in these patients. The first hypothesis is that PAAG inhibits the growth of human fibroblasts, as well as it causes apoptosis of the human fibroblasts, and increases the potential for carcinogenicity [11]. The second hypothesis is that it can alter the granularity as well as the size of the human fibroblasts. It also induces an increase in mRNA expression of c-myc gene that codes for growth control and transcription factor [11].

High index of suspicion should be kept for early recognition, diagnosis and treatment of PAAG-related complications. MRI of the breast is the most reliable screening method for the detection of masses following PAAG augmentation. When suspicious masses are detected, core needle biopsy should be performed to confirm the presence or absence of associated breast cancer. A Sentinel lymph node biopsy is also suggested when a palpable mass is indistinguishable from a hydrogel collection in the breast [7, 11, 12].

Different treatment attempts have been made to treat these complications from conservative to surgery. There is no recent guideline as to how to manage these cases. However, Patlazhan et al developed a two stage treatment plan. Those with no sign of acute inflammation undergo one stage procedure with debridement or removal of the PAGG masses with immediate autologous breast reconstruction and those with acute infections undergo a two stage procedure; at first, wide debridement and control of sepsis and later on delayed breast reconstruction [7]. Similar approach has also been suggested by Wang et al [12].

Steroid may reduce a foreign body type of reaction and eventually make it disappear [13]. The use of antibiotic is shown to have no effect as micro-organism is very rarely isolated in these cases [14], in contrast to our cases where Staphylococcus aureus was isolated.

The ultimate effective therapy of this complication is surgical evacuation. However, simple aspiration ever after several attempts are ineffective to evacuate all the gel material completely as it is diffusely scattered into the breast tissue and underlying muscle [15].

Incision and drainage and or debridement are the most important method of removing these gels. The patient should be informed before the surgery that complete removal is often impossible and the surgical technique will

depends on the location, size, extent of infection and the condition of the surrounding tissues.

Commonly, incisions at inframammary fold and drainage at low sites are applied. Successful treatment of the PAAG augmentation complication requires removal of as much of the material as possible [16]. The key to the surgical technique is to completely remove all the infected or necrotic tissues, granulation tissues, cysts and fistulas. The wound should be repeatedly irrigated normal saline with or without antibiotic until the drainage fluid is clear, and there is no pus or PAAG granules are observed [12].

In rare instances like ours where multiple attempts of debridement failed to clear all the gel materials and or there is significant cosmetic deformity; a subcutaneous mastectomy with immediate or delayed reconstruction may be the last option [4, 17].

Immediate autologous reconstruction has not yet reported in the literature for this condition. However several case series have documented the use of delayed autologous or prosthetic reconstruction. Luo et al in 235 patients, 136 desired volume reconstruction, Dual plane silicone implants placed immediately in 108 patients or after 6 months in 28 patients. Of 136 who underwent reconstruction, 3 developed a Baker 2-3 capsular contracture and 1 inflammatory reaction was documented. Nearly all patients reported a complete resolution of pain, lumps, and infection [5].

Global public awareness of PAAG injections has been increasing as of late. Surgeons without any experience with these injections are now beginning to see patients with PAAG-related complications [12]. Knowledge of this implant is important as Canada has a high Asian population, as well as increasing immigration from the Ukraine and the recent popularity of the medical tourism industry.

4 CONCLUSIONS:

Emphysematous mastitis with necrotising fasciitis of the breasts following PAAG injection for augmentation mammoplasty is very rare and complex. Its treatment is also troublesome and associated with strong psychological effect. Failure of early recognition and proper management may lead to serious infection and disfigurement. Once the infection is confirmed, surgical intervention is preferred. Taking appropriate measures to completely remove infected tissues and PAAG is crucial for infection control and to reduce the destructiveness. Augmentation mammoplasty with PAAG is again confirmed to be an injectable failure, and caution should be taken in the injection of liquid filler. Indiscriminate use of this hydrogel for breast augmentation should be prohibited. With the increasing interest and availability of fillers for cosmetic use, it is to be expected that complications of fillers in general will occur more frequently. Therefore, it is important to gather all possible information about these serious complications and their possible treatment.

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