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CASE REPORT

Breast Fibromatosis after Hydrophilic Polyacrylamide Gel Injection for Breast Augmentation: a Case Report and Review of the Literature

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BREAST fibromatosis is a rare kind of lesion. The average incidence is about 2-4 per million every year.¹ So far there have been about 100 cases reported altogether.² In this report, we describe a case of breast fibromatosis developed after hydrophilic polyacrylamide gel (HPG) injection for breast augmentation. By reviewing the literature, the possible pathogenesis of this case and the proper treatment strategy are investigated.

CASE DESCRIPTION

A 39-year-old female patient presented with a 2-year history of an enlarging mass in the right breast. Seven years ago the patient underwent breast augmentation with HPG injection. The injection was performed once again 6 years ago. The incisions on both sides of the breast were both 1 cm from the axillary folds, and the dose of gel is unclear. There was no pain, itching, or other abnormal sensations at the breast. Two years ago the patient noticed a mass in the inner lower quadrant of the right breast, accompanied with dull pain. There was no polyrrhea, or

bone and joint pain. Tumor biopsy was performed in another hospital but only polyacrylamide hydrogel was found. The patient still felt painful after the first operation and the tumor grew much more rapidly than before.

At physical examination, bilateral nipples and areolae appeared symmetrical. The size of the left breast was found slightly larger than the right one. A 3 cm-long scar could be seen in the inferior mammary fold of the right breast. The skin was normal, with no superficial varicose vein or inflammatory signs. A 5 cm×7 cm palpable mass was located in the inner lower quadrant of the right breast, which was tenacious, tender, and unmovable with unclear margin. Multiple nodules at the size of 1-3 cm could be palpated in bilateral breast. Bilateral subclavian and axillary lymph nodes were not palpable.

Laboratory tests showed white blood cells at $5.57 \times 10^9/L$, lymphocytes 57.1%, neutrophils 34.3%, red blood cells $3.86 \times 10^{12}/L$, hemoglobin 126 g/L, and platelets $195 \times 10^9/L$. Test results demonstrated that liver and kidney functions were normal. Urine routine test result was normal. Electrocardiography and X-ray did not detect any abnormality.

Breast ultrasound revealed no cyst or mass in the layer of mammary gland, which was 0.5 cm thick at both sides. Behind the gland there was an echoless area about 2.6-3.7 cm deep (Fig. 1A). Anechoic and hypoechoic disorder could



Figure 1. Preoperative ultrasound of the mass in the inner lower quadrant of the right breast.

- A. An echolless area behind the mammary gland;
- B. A well-defined, hypoechoic mass;
- C. Color Doppler flow imaging shows blood flow in the mass.

be seen in this area. A solid mass with clear margin and irregular echo was detected within the inner lower quadrant of the right breast, the size of which was measured at about 5.5 cm×8.0 cm×2.8 cm (Fig. 1B). Color Doppler flow imaging revealed arterial blood flow in the mass (Fig. 1C). The signal of ribs could be observed behind it. Based on the above described findings, the diagnosis of breast tumor or inflammatory mass was made.

Tumor resection and removal of polyacrylamide hydrogel were performed under general anesthesia. The incision was designed along the lower edge of the right areola. Some gel-like substance could be seen after lifting the gland. All the gel and adhesion tissues were removed, including part of the gland and pectoralis major. A mass at about 9 cm×7 cm surrounded by muscles was observed on the surface of the ribs. The tumor was completely removed from the chest wall and its size measured at 9.5 cm×5.5 cm×3.5 cm. White and tenacious tissues could be seen after cutting open the tumor. Fast pathological examinations of the tumor showed fibrous hyperplasia combined with light blue stained gel-like substance (Fig. 2). Immunohistochemical staining showed the presence of vimentin and smooth muscle actin, the absence of CD34 and S-100 protein, and a Ki-67 labeling index under 1% (Fig. 2).

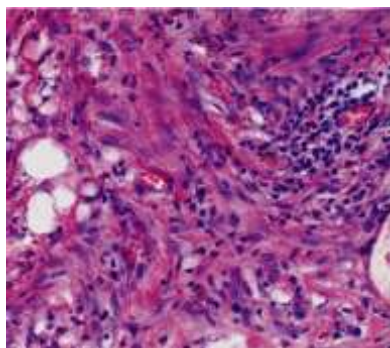


Figure 2. Immunohistochemical staining in fast pathological test demonstrates the presence of vimentin and smooth muscle actin, the absence of CD34 and S-100 protein, and a Ki-67 labeling index <1%. HE ×40

The patient recovered quick and well after the surgery. Follow-up was conducted for a period of 2 years, finding no complication in this case.

DISCUSSION

Fibromatosis is the proliferation of myofibroblast, and is closely related with skeletal muscles and tendons in most cases. Incidence of this disease is only 0.103% of all the breast tumors, while in patients who suffered from familial intestinal polyps the incidence is as high as 13%.³ The body parts most commonly involved include shoulder, chest, back, thigh, abdominal wall, head and neck. Fibromatosis in the breast is rarely encountered.

Breast fibromatosis was first reported in 1923 by Nicholls. Its etiology is unclear yet. It usually occurs in women between 13 and 80 years old (average, 46 years; median, 40 years), while a few male cases have also been reported.⁴ The latest WHO classification of breast tumors defined breast fibromatosis as the tumor originated from the fibroblasts and myofibroblasts in mammary gland, characterized by local invasion without metastasis. The margin of the tumor is usually unclear, and the size varies from 0.15 cm to 10 cm (2.15 cm on average). The cross section of the tumor is usually gray and tenacious. Histology and immunophenotype are similar to the fibromatosis originated from the other parts of the body such as muscle fascia or tendon. Proliferated spindle-shaped fibroblasts and myofibroblasts can be seen in the tumor and intertwined with a typical finger-like tip invading into breast lobule and duct.⁵ The tumor usually appears as an isolated, hard, and tough palpable mass with or without pain. Bilateral tumors are rare. Skin or nipple retraction is observed in some cases, while nipple discharge is rare. It is difficult to differentiate fibromatosis from breast cancer by X-ray examination. For distinction from liposarcoma, fibrosarcoma, and malignant fibrous histiocytoma, it is necessary to perform ultrasound or magnetic resonance im-

aging and biopsy. As soon as diagnosis is made, complete tumor resection needs to be conducted, which is now the only effective approach to treat this disease. The recurrence rate of breast fibromatosis is 21-27%, lower than that of the fibromatosis in other parts of the body. Most cases relapse within 3 years after tumor resection.⁵ If pathology shows aggressiveness of the fibromatosis, removal of the adjacent normal tissues is required to avoid recurrence. Radiotherapy can be considered for the treatment of relapse, while for those cases with contraindications, chemotherapy (doxorubicin, dacarbazine, and carboplatin) can be used.⁶ However, the application of radiotherapy or chemotherapy in fibromatosis is still controversial.²

HPG was once used as soft tissue filler. Since 1997, a large number of women in China have received HPG injection for augmentation mammoplasty. Wang et al⁶ reported 101 cases who received bilateral HPG injection for augmentation mammoplasty, among them three cases developed unilateral fibroadenoma and 2 had unilateral breast cancer. There has been no report yet about fibromatosis after HPG injection.

A few cases of augmentation mammoplasty combined with fibromatosis have been observed, all of them received silicone gel breast implantation.⁶⁻⁸ Fibromatosis in some cases derive from the chest wall while others are related with the capsule around the prosthesis.⁹ The relationship between fibrocapsule and the tumor remains unclear.

The patient in this case suffered from tumor in the right breast 5 years after HPG injection. The lesion was not detected in the first biopsy partially because the hydrogel affected the surrounding tissues and the normal anatomic structure was destroyed. Ultrasound revealed arterial blood flow around the tumor, which is a sign of breast cancer, hence the resection area was decided based on the result of fast pathological test during the surgery. The tumor was found surrounded by fibrous tissue and closely adhered with the chest wall. There was also diffused hydrogel in the fibrous tissue, suggesting that the etiology in

this case might be the adhesion between polyacrylamide hydrogel and the surrounding tissues, and the long-term chronic inflammatory stimulation of the fibroblast cells. Further investigations and more observations of similar cases are required to determine the possible association between HPG injection and breast fibromatosis.

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