



Latissimus Dorsi Flap Invasion by Ductal Breast Carcinoma after Lipofilling

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Summary: Autologous fat grafting is commonly performed in reconstructive breast surgery but also increasingly in breast augmentation surgery. On the international level, we are witnessing an important increased confidence for this procedure. Nevertheless, it continues to raise questions on the risks of cancer. A 66-year-old patient benefited from a lipofilling to improve a latissimus dorsi flap breast reconstruction, 7 years after initial cancer management. Two years later, constant pain in the flap leads to reoperation. The flap showed a major retraction with histologically massive infiltration of the muscle by an undifferentiated carcinoma of breast origin. The tumor cells were displayed directly in contact with lipofilling inside the muscle. Without establishing any causal link between these 2 events, this case raises the question once more of the risks of breast cancer and encourages us to continue being careful. (*Plast Reconstr Surg Glob Open* 2013;1:e68; doi: 10.1097/GOX.000000000000012; Published online 7 November 2013.)

The autologous fat grafting (AFG) revolutionized the management of tissue losses. This procedure is nowadays widely used in reconstructive breast surgery after cancer but more recently also in breast augmentation surgery.¹ After mastectomy, the AFG is generally performed, but in the management of the conservative treatment sequelae and in breast augmentation surgery, it remains controversial.²⁻⁵ The main issue is the risks of cancer, still badly identified, of the AFG in the breast

parenchyma. For 20 years, the recommendation of prudence of the American Society of Plastic and Reconstructive Surgeons edited in 1987 was a real barrier. However, since a few years, we have noticed a significant increase in confidence for AFG.

A 66-year-old woman initially admitted for an invasive ductal carcinoma (IDC) of the right breast in 2003 benefited from a latissimus dorsi flap (LDF) in 2009 for the sequelae of radiotherapy. In 2010, an AFG allowed us to improve the cosmetic result. In 2012, she presented constant pain in the flap leading to reoperation. The LDF showed a massive infiltration of the muscle by an undifferentiated carcinoma of breast origin. Histologically, the tumor cells were displayed directly in contact with AFG inside the muscle.

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CASE PRESENTATION

A patient aged 66 was admitted for an IDC of the right breast in 2003. Initially, a conservative treatment with a lumpectomy and an axillary node dissection had been performed. It was a grade II IDC with sufficient exeresis margins and 1 positive lymph node. Thus, chemotherapy and radiotherapy had

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been initiated. In 2008, the patient benefited from 10cm³ of AFG taken from supratrochanteric regions, and purified according to Coleman method, to improve cutaneous trophicity. In 2009, the sequelae of radiotherapy have led us to perform an LDF, and then in 2010, a new session of AFG (30cm³) allowed us to improve the cosmetic result. In 2012, major pain in the LDF lead to reoperation. The flap showed a major retraction (Figs. 1 and 2) and pathologic analysis found a massive infiltration of the muscle by an undifferentiated carcinoma of breast origin, rich in atypia and mitosis. We have noticed that, histologically, the tumor cells were displayed directly in contact with AFG inside the muscle (Fig. 3). Currently, the patient presents a metastatic invasion of the lungs and mediastinum.

DISCUSSION

The AFG enables an undeniable cosmetic improvement but still remains highly controversial nowadays.

In terms of radiological follow-up, the literature in favor of a slight modification of the breast parenchyma is numerous and seems to participate in the development of the AFG.⁶⁻⁸ We remark that a radiologist specially trained finds little difficulties in interpreting the images.⁵

Contrariwise, the problem of oncologic risk remains much debated.

For in vitro studies, the promotion or the recurrence of breast cancer, along with the possibilities of promoting the metastases, has been demonstrated in coculture through the action of the adipose-derived stem cells, the expression of the aromatase, and the neoangiogenesis.^{9,10} Nevertheless, in vivo, nothing has ever been shown at the present time. There is indeed a real difference between laboratory studies and studies in humans. In vivo, Perrot et al¹¹ have, however, shown a link between osteosarcoma and lipofilling without definitive clinical conclusion. We recently report in *Plastic and Reconstructive Surgery* a case of early breast cancer recurrence after AFG, but many questions remain on hold.¹²

For this second patient, a causal link between AFG and recurrence of cancer is not conceivable; however, it seems essential to discuss several points.

First, it is possible that the recurrence has no relationship with fat grafting, but at this moment, it seems necessary to wonder about the possibilities of having spread, with cannula a preexisting cancer. The injection movements could have disseminate the tumor in the latissimus dorsi and participate in the development of metastasis.



Fig. 1. Cosmetic alteration 3 y after the latissimus dorsi flap reconstruction. We can notice a flap ptosis, with a retraction. The patient had severe pain on the site of reconstruction.

Second, currently, the risks of promoting a latent cancer or contributing to metastases are not excluded.¹⁰ So in this case, fat injection could have promoted cancer recurrence and dedifferentiation, which is a bad prognostic factor. Histologically, it is interesting to note that the tumor cells were disposed directly in contact with AFG.

All plastic surgery societies around the world do not have the same opinion on AFG. The American Society of Plastic Surgeons Fat Graft Task Force had concluded that no reliable study confirmed the absence of risk of cancer since 2009. In 2011, the French Society of Plastic and Reconstructive Surgery (*Société Française de Chirurgie Plastique et Reconstructrice*) modified its point of view. It is now mandatory for French practitioners to perform AFG as part of a clinical protocol including a strict follow-up of the patients, controls by experienced radiologists, and above all to stay careful.

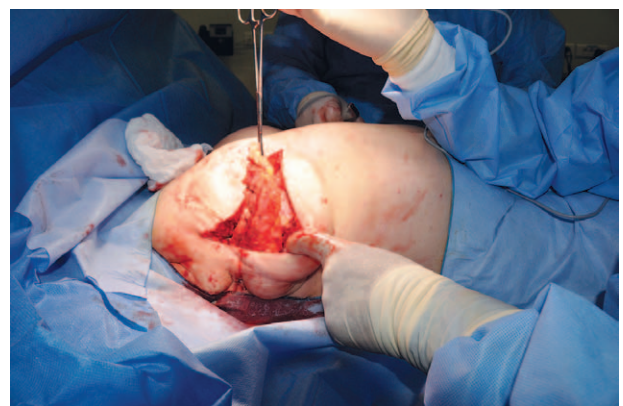


Fig. 2. Intraoperative appearance of the latissimus dorsi flap. The muscle is fully retracted and highly indurated. Its appearance is already suspicious of tumor infiltration.

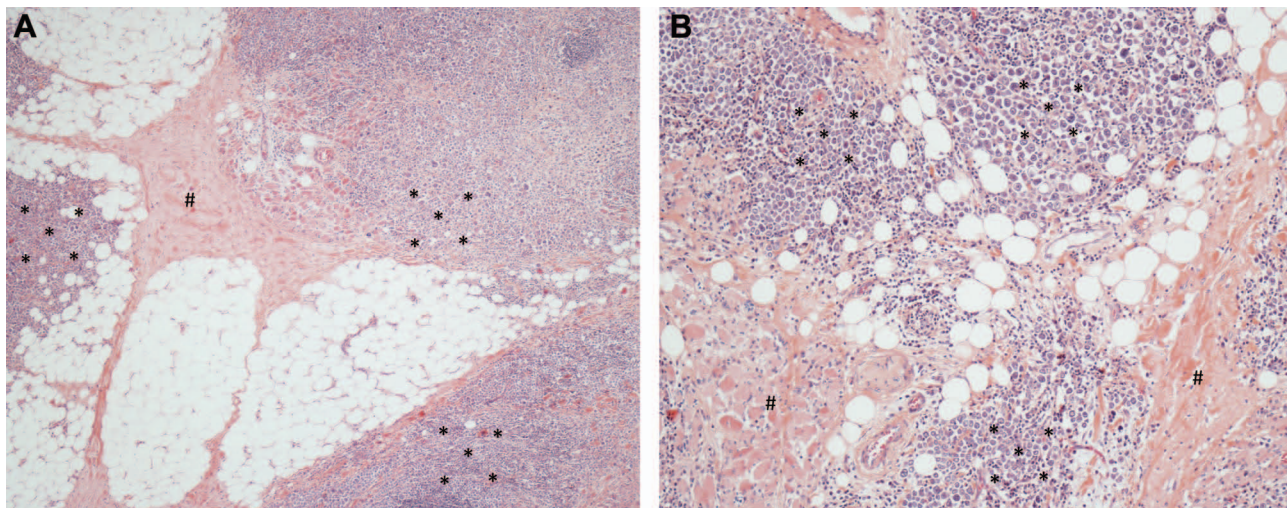


Fig. 3. Histological analysis of the latissimus dorsi flap. Hemalaun-eosin staining magnification: $\times 20$ (A) and $\times 40$ (B). We can see the trenches created by the lipofilling inside the muscle (#) and the arrangement of tumor cells (*) directly in contact with the muscle and adipose tissue. On these 2 sections, we note the massive invasion of muscle by tumor cells.

Currently, our unit is performing a controlled and randomized multicenter prospective study in France [Adipose Tissue Transfer for Moderate Breast Cancer Conservative Treatment Sequella (GRATSEC); <http://clinicaltrials.gov/show/NCT01035268>]. Its aim is to try to answer to the uncertainties that persist between AFG and breast neoplasia, with a high level of evidence.

CONCLUSIONS

For now, no study has definitely concluded the absence of risk of cancer in breast AFG. Although the in vitro studies are mainly orientated toward an increased risk of promoting cancer, even metastases, nothing has ever been found in vivo.

This clinical case reports a very unusual breast cancer recurrence in an LDF after lipofilling.

The very atypical histology of this recurrence requires to question once again about the relations of this procedure with breast cancer. As there is no strong scientific evidence in the literature, we must remain vigilant and continue to follow systematically patients who received lipofilling.

In conclusion to these 2 cases of breast cancer recurrence after lipofilling, it would be interesting to create an international compulsory registry of cancer recurrence in patients who received lipofilling. The international learned societies shall remain on guard.

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