Surgical Innovation
2014, Vol. 21(4) 441

DOI: 10.1177/1553350613520516
sri.sagepub.com

Platelet-Rich Plasma in Surgical Oncology

Eleftherios D. Spartalis, MD, MSc, PhD[1], Periklis Tomos, MD, PhD[1], Dimitrios Dimitroulis, MD, PhD[1], and Gregory Kouraklis, MD, PhD[1]

We read with great interest the article titled "Breast Reconstruction With Autologous Fat Graft Mixed With Platelet-Rich Plasma" by Gentile et al.[1] This well-designed clinical protocol evaluated the effects related to the use of fat grafting with platelet-rich plasma (PRP) in the improvement of fat volume in breast reconstruction. Study included patients with unilateral breast hypoplasia, patients affected by breast soft tissue defects after prosthesis removal, and others affected by outcomes of breast cancer reconstruction.

After a thorough search of the literature, we found no reported evidence of PRP application on tumor excision sites. Is there any established contraindication?

Much research is now devoted to determining the impact of growth factors on tumor development and progression, and the reciprocal influences of tumor products on the stromal microenvironment. A more detailed understanding of the complex parameters that govern the interactions between the tumor and vascular compartments has already helped improve anti-angiogenic strategies, not only for cancer treatment but also for preventing recurrence.[2]

The secretory proteins contained in the α-granules of platelets include platelet-derived growth factor (PDGF-AA, BB, and AB isomers), transforming growth factor-β (TGF-β), vascular endothelial growth factor (VEGF), epidermal growth factor (EGF), platelet-derived endothelial growth factor (PDEGF), and many others.[3]

It is a fact that the release of these growth factors stimulates angiogenesis.[4] PDGF and VEGF induce tumor lymphangiogenesis, leading to enhanced rate of nodal metastasis.[5] Patients with breast tumors positive for PDGF have a significantly lower response rate to chemotherapy as well as significantly shorter duration of survival. In addition, patients with breast cancer who had elevated plasma PDGF levels have a significantly shorter survival.[6] EGFR (HER) and other members of the ErbB receptor family regulate several cell biology processes, including proliferation, survival, differentiation, and tumorigenesis.[7] TGF-β ligand is a multifunctional growth factor that regulates various cell behavior, such as cell differentiation, migration, and apoptosis.[8]

For all these reasons mentioned above, we consider the use of PRP not yet indicated in patients undergoing resection for cancer, because of the presence of growth factors that could promote tumor proliferation. Even after a tumor is excised and in order to achieve optimal survival, we must implement every single evidence-based guideline while, at the same time, exclude any maneuver, the indication of which has not been established yet.

Therefore, we strongly believe that the authors should have considered this important point and analyzed it in their article; otherwise, inclusion of patients affected by outcomes of breast cancer reconstruction should have been avoided. The role of PRP in surgical oncology deserves further experimental investigation and large-scale prospective randomized clinical trials.

References

1. Gentile P, Di Pasquali C, Bocchini I, et al. Breast reconstruction with autologous fat graft mixed with platelet-rich plasma. *Surg Innov*. 2013;20:370-376.
2. Bergers G, Benjamin LE Tumorigenesis and the angiogenic switch. *Nat Rev Cancer*. 2003;3:401-410.
3. Eppley BL, Woodell JE, Higgins J. Platelet quantification and growth factor analysis from platelet-rich plasma: implications for wound healing. *Plast Reconstr Surg*. 2004;114:1502-1508.
4. Carmeliet P, Jain RK. Angiogenesis in cancer and other diseases. *Nature*. 2000;407:249-257.
5. Cao R, Björndahl MA, Religa P, et al. PDGF-BB induces intratumoral lymphangiogenesis and promotes lymphatic metastasis. *Cancer Cell*. 2004;6:333-345.
6. Seymour L, Dajee D, Bezwoda WR. Tissue platelet derived-growth factor (PDGF) predicts for shortened survival and treatment failure in advanced breast cancer. *Breast Cancer Res Treat*. 1993;26:247-252.
7. Howe LR, Brown PH. Targeting the HER/EGFR/ErbB family to prevent breast cancer. *Cancer Prev Res (Phila)*. 2011;4:1149-1157.
8. Imamura T, Hikita A, Inoue Y. The roles of TGF-β signaling in carcinogenesis and breast cancer metastasis. *Breast Cancer*. 2012;19:118-124.

[1]Second Department of Propedeutic Surgery, University of Athens, Medical School, Athens, Greece

Corresponding Author:
Eleftherios D. Spartalis, Vasilissis Sofias 49, Kolonaki 106 76, Athens, Greece.
Email: eleftherios.spartalis@gmail.com