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Opinion

Autologous Platelet-Rich Plasma: Is it the Best Choice to Treat Degenerative Pathologies in the Elderly?

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Body text

Thousands of scientific articles related to the clinical use of platelet-rich plasma (PRP) are published worldwide every year; perhaps as many as PRP infiltrations are carried out daily in the health centers of our cities. A significant number of these studies and these infiltrations refer to the use of PRP to treat degenerative pathologies in elderly people, frequently, patients having a poor systemic condition, even with problems for blood drawing.

In our case, we daily process blood from 6-7 patients to produce PRP. We deliver this product for clinical indications in different specialties (Traumatology and Orthopaedic Surgery, Rehabilitation, Dermatology, Gynecology, Ophthalmology, and Maxillo-Facial Surgery). Thirty seven percent of patients are over 60 years of age (33% of them being over 70 years). Frequently, treatment with PRP is indicated after other therapeutic options have failed. The degenerative pathology of the knee represents 40% of the overall activity. The clinical outcome of these patients is unknown for us.

Several aging-related mechanisms (genomic instability, telomere attrition, epigenetic alterations, loss of proteostasis, deregulated nutrient-sensing, mitochondrial dysfunction, cellular senescence, stem cell exhaustion, and altered intercellular communication) have been highlighted as responsible for the time-dependent functional decline of living organisms [1]. Although some of them, such as senescence, can be considered beneficial against aging (controlling the risk of oncogenic transformation) the accumulation of senescent cells may become deleterious [1], showing the senescence-associated secretory phenotype [2]. Thus, therapies based on tissue rejuvenation by improving autocrine and paracrine cell-signaling pathways have been proposed [3].

Considering that secretome reflects the physiological status of an individual, the use of blood from older patients with degenerative pathologies as source of PRP does not seem an advisable strategy. Although the platelet content may not be affected, the plasma proteome could condition its clinical efficacy.

Obviously, the use of blood from young and healthy blood donors (with proteomic profiles unaffected by pathological processes or aging) involves an allogeneic use. Thus, the risks associated to immune response and disease transmission are of major concerns regarding the clinical use of allogeneic PRP. Nevertheless, the extensive experience in blood banks on donor screening process (with the implementation of nucleic acid testing techniques for viral detection), whose criteria are permanently reviewed and updated, offers a high level of biosafety [4]. Regarding the antigenic load, the available clinical experience with allogeneic PRP has been shown safe and efficient [5]. In any case, it is possible to minimize its antigenicity without compromising its clinical efficacy.

The processing of PRP to obtain a releasate (through platelet activation) or a lysate (using freeze-thaw cycles) from its granular content gives rise to a plasma rich in bioactive substances. This product has been frequently used to supplement culture media for the *ex vivo* expansion of human cells [6]. The implementation of centrifugation and filtration steps could significantly reduce the presence of potentially immunogenic elements, limiting the content of the final product to soluble compounds and extracellular vesicles.

Conclusion

As a conclusion, we propose concentrating the production of this allogeneic therapeutic resource in blood banks, for those indications in which autologous use would be restricted (for example, due to peripheral arterial and neuropathic disease, severe high blood pressure, cachexia, anemia, thrombocytopenia, immune deficiency, etc.) or when a secretome with higher regenerative poten-

tial were recommended (aged patients). As a practical example of the interest of this strategy, efforts aimed at standardizing clinical grade procedures for the preparation of allogeneic platelet concentrates from umbilical cord blood have been developed [7,8]. In the same way, production could be standardized from other sources, such as plateletpheresis, which would hypothetically make it possible to optimize processing, providing greater efficiency.

Conflict of Interest

The authors declare no conflict of interest.

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