Blood transfusion in 2016—Towards a "Nouvelle Vague'' therapy?

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The concept of blood transfusion has not significantly changed over the last century that is since its entrance in medical practice. It still aims at bringing blood elements that are missing in a patient in need; this lack of "elements" or "factors" is still due either to active loss such as severe bleeding or to other reasons that are often genetically driven.

Besides, almost everything has changed in the blood transfusion "processes" that relate to blood donors, blood components (BCs) and recipients of those components. Blood donors are more diverse nowadays than they used to be in old times. Blood donation has sometimes entered activist forums or the like, with vivid debates around e.g.: the profit versus the non for profit cases especially when related to the plasma industry;

• certain infectious safety issues such as the ban of males having or having had sexual relationships with other males (which is the object of revised policy in several countries including France);

• the donor candidates' signature on the donation questionnaire.

Donors and their representatives often express concerns about blood establishment (BE) positions such as being too strict in applying decisions. Indeed, BEs' decision with regard to donors simply is either acceptance of refusal of their donation; as a consequence, what is perceived by certain blood donor candidates is a refusal of their gift/donation (representing the willingness to be benevolent and to share strength with the weakest), this can even be perceived as the refusal of a person or of a behavior. This calls for a need of more explanations or of more adapted wording when a deferral is pronounced [1]. This also questions some precautionary attitudes (of BEs) and occasionally the so-called precautionary principle (applied for example to donor candidates living in regions affected by human cases of the variant of the Creutzfeldt-Jakob prion disease).

This next questions in depth the philosophy of blood donation: is this a matter of donation or acceptance of a gift, or the issue of using it? Deferral is very understandable when the donor's health is threatened; it is less understandable when this is not the case; actually, priority given to recipients' safety is no debatable, and BEs argue that acceptance of at [infectious] risk blood poses a threat on the inventory in case of...
a breach in the global chain process, not to speak about concerns about the BE professionals' safety [2]. Nevertheless, does it not transfer some part of a responsibility from the BE to the donor candidate? In fact, this issue of responsibility—not only as a legal issue but also from a philosophical viewpoint [3]—has become prominent during the last two decades [4], perhaps as a consequence of the tainted blood scandals.

BCs processed from the donated blood have also considerably changed. One can outline two major alterations: the one deals with the materiality of blood while the other one relates the spirit of it. To briefly explain the latter, one can consider the semantics currently used by professionals: "components, products, material or source material, "substances of human origin" or SoHo—now becoming "medical products of human origin" or MPHO [5]; the World Health Organization has recognized blood and certain BCs as "essential medicines" (a wording which has not been well accepted by the donor associations' community) [6]; and "plasma for direct therapeutic use"—its novel nickname—is no longer a labile BC but a blood derived drug as far as it has undergone large pooling and pathogen reduction [7].

Regarding now the materiality of BCs, fractions of blood as opposed to whole blood are mostly used, with separation of desired active factors and undesired pollutants (leukocytes, excess plasma, cell contaminants of other nature that the targeted one); these processing operations proved in a large way to significantly benefit to recipients [8]. Plastics and containers have also changed considerably and this is not over as—after having preferred highly flexible devices—the society representatives now want a ban on certain plasticizers (i.e. DEHP) without having specifically stated that such a change is beneficial for the quality of preserved cells (cannot it be feared that some loss of flexibility inflicts more storage lesions to stored cells)? One of the most remarkable changes however is perhaps the so-called "transfusion process chain", that puts in light safety, quality, surveillance, traceability, reporting, quality control procedures etc. [9]. In all, there seems to have been considerable pressure on BEs to industrialize processes allowing the claim for highly standardized BCs being produced: however, as this is now achieved to provide suitable answers to the post-tainted blood scandal period, is this “one fits all” policy desired to treat patients? Has not the patient cause been kept off sight? Patients are no longer the same since transfusion entered resuscitation tools. Historically, the patient population consisted essentially in delivering mothers presenting with massive and life threatening hemorrhage. Later on, during WWI and all other conflicts that happened in the XXth century, the patient population comprised wounded soldiers and warriors, perhaps as much as injured civilians. While trauma and surgery still represent a large number of transfusion indications nowadays, they are second to medical situations in countries like France. Medical indications of transfusion are, among others: hemoglobinopathies (thalassemia major and sickle cell disease); myelodysplastic syndromes; support to cancer therapy (chemotherapy, radiotherapy); rescue of bone marrow disorders and support of stem cell transplantation; chronic anemia and ageing; acute anemia and infectious diseases; resuscitation and plasma exchange following autoimmune disorders of thrombotic microangiopathy; acute and chronic organ transplant rejection, etc. [10]; one may also cite apheresis procedures to remove toxic components (antibodies, cholesterol) and procedures of extracorporeal photochemotherapy (ECP) [11]. It can be noticed that the mean age to receive BCs is displaced from rather young toward more aged people [12]. In the patient field also, it is worth noting that wording matters: As a matter of fact, "patients" benefiting transfusion are called "recipients" by professionals in BEs and in the transfusion medicine field; some patient associations prefer referring them to as "grantees"; this calls to the consideration of a certain gap between the sole technical aspects and the psychological aspects that—in our opinion—must not be forgotten when someone receives living cells (organ, tissues) from unknowns, that perhaps differ from that of receiving similar cells or tissues from relatives [13]. Besides, a new era has begun in medicine; transfusion medicine, in particular, intends to be forefront: Firstly, it has been understood that medical vampirism is detrimental to patients and paradoxical when those patients need transfusion: how much blood is needed to replace the blood drawn for laboratory analyses (using microliters when sampling goes by dozens of milliliters, thanks to accreditation programs)? Secondly, there have been two complementary moves in the field of clinical transfusion: the “optimal use of blood” and the “patient blood management” programs; both share interests but they may be overviewed by distinct stakeholders especially when there are strong links between opponents to transfusion and the industry of Erythropoietin (imposing some precaution in interpreting documents and publications or even recommendations) [14]. Thirdly, along with oncologist colleagues, some transfusiologists aim at addressing concerns about precision medicine and best fitted transfusion programs to their specific patients. The latter point questions the issue of specific BC availability for designated patients, and of novel forms of BC inventories or management. To date, the dogma of “quality first place” has forced BEs to produce the most standardized BCs ever; this concept has led to considerable, doubtless, achievement in patient safety [15]. It now seems difficult to challenge this industrialized view of the BC production with more patient shaped transfusion protocols, very much desired however by a number of clinicians: will costs be comparable to that which apply to “prêt-à-porter” vs. “haute-couture”? In this special issue of the journal, we thus sought to invite renowned experts to present fresh views on diverse aspects of transfusion medicine and transfusion medicine hazards (and alternatives). The last couple of years brought a number of recommendations and revisits of the use of BCs [16,17], with
a strong focus on plasma and large debates on platelet components [18,19]. Therapeutic plasma has also been recently highlighted in its capacity—when obtained from convalescent individuals having experienced severe infectious diseases—to neutralize virus in recently infected persons, with successes and failures [20,21]. There has been the suggestion that whole blood could be back on the scene, other than in the battlefield, but substantially modified from the vein-to-vein component that was used historically. Transfusion medicine was recently ascribed as to entering a new era despite it is an old therapy [22]: can we forecast a "Nouvelle Vague" therapy?

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References


