**Evidence-based medicine and the influence of marketing**

Evidence-based medicine (EBM), or the judicious use of the best available clinical evidence combined with the clinical expertise of the physician and the expectations and values of the patient , should be the fundamental principle for decision-making in the diagnosis and treatment of individual patients.

The concept of evidence-based medicine, however, may itself be susceptible to bias, as all three pillars [(1) available evidence, (2) clinical expertise

and (3) expectation and values of the patient] may be influenced by marketing campaigns by medical industry and non-scientific publications in the media. Particularly when the available evidence for a new ‘‘promising’’ product is low, the clinical expertise of the physician and the expectations of the patients may solely be founded on marketing and media reports.

How new orthopaedic treatments can be popularized in public health is succinctly described by John A. Bergfeld with a so-called **Orthopaedic Triad.** According to this triad, a treatment may easily be popularized when the following three ‘‘factors’’ are combined: ‘‘a famous surgeon (1) who treats a famous athlete (2) with an untested treatment (3)’’ . A recent example of a popularized treatment (modality) according to this triad is surrounding the use of the autologous

orthobiologics in the field of orthopaedic surgery and sports medicine . Orthobiological treatment is the inclusion of biology and biochemistry in the development of skeletal and soft tissue healing. Popular orthobiological treatment modalities include platelet-rich plasma (PRP), autologous conditioned serum (ACS) and stem cells. Several of these modalities have been tagged as the ‘‘standard of care’’ and often assumed as a ‘‘fix’’ or ‘‘cure all’’ solution by both physicians and patients.

Nevertheless, it should be expected that treatments of any kind undergo thorough investigations on a basic science and clinical level before widespread application in humans. In reality, these treatments are often implemented in daily practice based on the drive of popular culture and the positive mainstream media while there is insufficient scientific evidence to heretofore justify their clinical use as a standard of care.

PRP is produced from autologous whole blood using a standard, commercially available centrifugation system to yield a platelet concentrate which is elevated above baseline values. In the preparation process, the relative concentration of approximately 1,100 different growth factors is not controlled, and the ultimate composition of PRP remains unknown . Lastly, it has been shown that not all growth factors are beneficial to all types of injures and/or effective at all time points . Recently, Mazzocca et al. showed that many variables, such as the system used for preparation, platelet activation, patient age and the time of day that the blood is drawn, affect the composition of PRP. Additionally, Foster et al. evaluated the use of PRP and reported a lack of controlled clinical trials that provide a high level of evidence, since most of the studies were basic science studies and case reports reporting the use of PRP-related products without long-term follow-up. Overall, despite the lack of scientific evidence supporting the use of PRP, and the unpredictable and irreproducible studies supporting it, keen marketing campaigns and positive reports in the media have led widespread clinical use and a subsequent to a quickly increasing market value, which is estimated to be $126 million by 2016 .

Another important issue is that how do you read an article and how do you use the information given in that specific article. In one of the latest articles it was reported a high rate of healing in a commercial study in which tibial nonunions were managed with cultured autologous bone marrow stem cells.

The important detail though was the limited number of stem cells present in bone marrow aspirate. Then investigators had proposed expanding the harvested cells in culture and reimplanting them following expansion. Implications for the future remain unclear. But if this translates into success of the stem cells aspirate then many people will get an expensive treatment with limited success.

As far as the orthopaedic triad mentioned above there is the classic example the publication in New York times, when a very famous baseball player was suffering of Tennis elbow, he had PRP therapy from a well known sports doctor with good results. This newspaper report of a non evidence based medical therapy made this kind of treatment very popular to the extend that profitable medical organizations invested interest.

Is there future in these therapies? Yes there is but there are not yet ready for general use and they have been used for easy profit. We are looking forward for the development of these therapies to the benefit of the patient.

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