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LETTER TO THE EDITOR

The effect of hyperbaric oxygen therapy combined with hair transplantation surgery for the treatment of alopecia

Dear Editor,

We have read the recent article by Dr. Fan et al[1] on evaluating the clinical efficacy of hyperbaric oxygen therapy (HBOT) as adjuvant therapy for hair transplantation surgery with great interest, including exploring the clinical effects of the integrated therapy of hair transplantation and HBOT. In this study, the authors concluded that HBOT could minimize postoperative hair follicle shedding, reducing folliculitis, and itching, which provided evidence for HBOT in hair transplantation operation acting as adjuvant therapy. The conclusions above were encouraging and of great significance. Here, we provide some opinions on this study.

In Dr. Fan's study, it has been mentioned that HBOT reduced the postoperative shedding rate of transplanted hair follicles and effectively suppressed itching and folliculitis. However, we have noticed that whether the gender difference in outcome between the control group and the HBOT group was significant was not clearly described in the original article. As different patients (males and females) with AGA, the androgen secretion levels were quite different, whether the gender difference in outcome between the control group and the HBOT group was significant was indispensable for the evaluation of the studies. At the same time, the usage of related drugs with alopecia in this research was not clearly explained in the exclusion criteria. We would be very grateful if the author could provide more detailed information in this regard, which would give us a further understanding of the effectiveness of this treatment.

We agreed with the mechanism analysis of hyperbaric oxygen therapy on reducing the rate of transplanted hair follicles, but there were some supplements. Based on hyperbaric oxygen studies in our center, we suggested that the protective effects of hyperbaric oxygen might also be closely related to the following mechanisms. Hyperbaric oxygen could significantly reduce the level of inflammation by reducing the expression of local inflammatory factors, including IL-6, IL-12p40, MIP-1β, and PDGF-BB.[2,3] Inflammatory status was associated with follicle abnormalities and pathogenesis of alopecia.[4,5] Zhang's studies have shown that inflammatory infiltration was observed in the upper dermis of early alopecia lesions and might participate in the pathogenesis of alopecia.[4] Furthermore, hyperbaric oxygen could also promote cell proliferation[6] and might reduce the inhibition of follicle shedding and increase the survival rate of transplanted hair follicles. This could be verified in one of our experiments. We extracted hair follicle dermal papilla cells (HFDPCs) isolated from the hair papilla of normal humans for cell culture and divided them into hyperbaric oxygen treatment (HBOT) group and control group. The CCK8 and RT-qPCR experiments were used to identify the differences in cell proliferation (Figure 1). PCNA (Proliferating Cell Nuclear Antigen) is an important indicator for evaluating cell proliferation.[7] The forward primer of PCNA for RT-qPCR was ACACTAAGGGCCGAAGATAACG, and the reverse primer was ACAGCATCTCCAATATGGCTGA. The experimental results showed that the proliferation level and PCNA expression of HFDPCs with hyperbaric oxygen treatment were

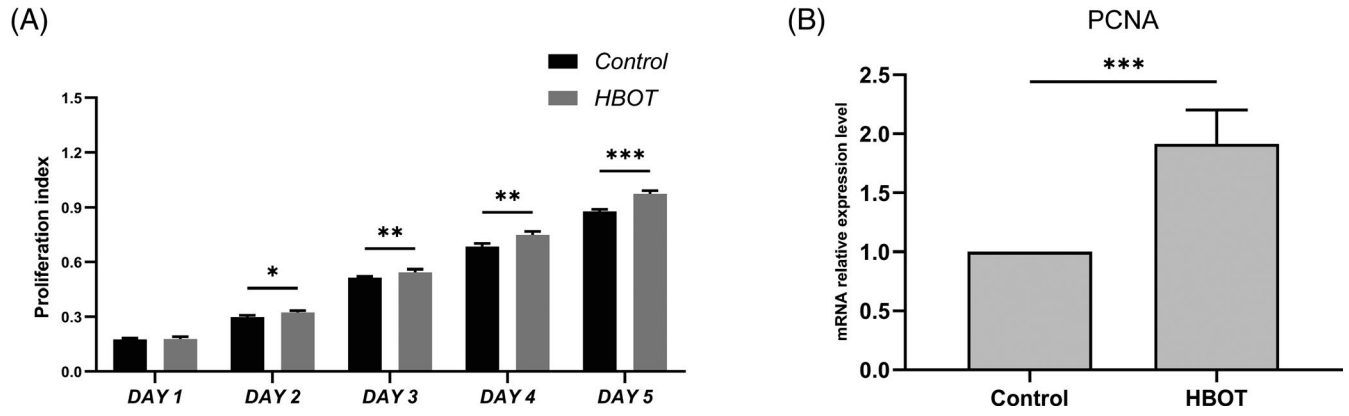

FIGURE 1 Effects of hyperbaric oxygen treatment on the proliferation capacities of HFDPCs in different groups. (A) The CCK8 results indicated that the proliferation index of HFDPCs in the HBOT group was significantly higher than the control group and have shown a time-dependent increasing tendency. (B) The expression level of PCNA detected by RT-qPCR in the HBOT group was up-regulated than the control group. Results were measured by means±SD, $*p < 0.05$, $**p < 0.01$, $***p < 0.001$

significantly higher than that of the control group ($p < 0.05$). Further studies on detailed mechanisms will be carried out.

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The authors declare that they have no conflict of interest.

KEYWORDS

alopecia, androgenetic alopecia, anti-inflammatory

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest to disclose.

INFORMED CONSENT

For this type of study, informed consent is not required.

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