

Case Report

Complete lasting reversal of polycystic ovary syndrome from intravenous umbilical cord derived mesenchymal stem cell infusion

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Abstract: Polycystic ovary syndrome (PCOS) presents distressing symptoms and stands as a primary cause of infertility. Currently, treatment options are limited to symptom management. This article presents a case study of a patient suffering from hair thinning associated with PCOS, treated with intravenous and subdermal injections of umbilical cord-derived mesenchymal stem cells (UC-MSCs). Remarkably, following treatment, the patient's 14-year history of menstrual irregularities and hormonal imbalances completely resolved, alongside the disappearance of ovarian cysts, with these improvements persisting for well over a year. Given PCOS's recognized inflammatory nature and the potent anti-inflammatory properties of UC-MSCs, we propose inflammation modulation as the likely mechanism of action. Further exploration is underway, actively seeking additional PCOS patients to ascertain whether similar therapeutic effects are reproducible or if this case represents an anomaly. This case underscores the potential of stem cell therapy as a revolutionary approach to PCOS management, addressing symptomatic relief and potentially underlying pathogenic mechanisms. The sustained clinical benefits observed advocate for comprehensive investigation into the efficacy and mechanisms of stem cell therapy in PCOS management.

Keywords: Polycystic ovary syndrome, mesenchymal stem cells, intravenous, PCOS

Introduction

Polycystic ovary syndrome (PCOS) affects an estimated 8-13% of reproductive-aged women. Up to 70% of affected women remain undiagnosed worldwide. PCOS is the most common cause of anovulation, a leading cause of infertility, and can produce many troubling symptoms [1]. No previous studies have used mesenchymal stem cells to treat patients with PCOS. Until now, there has been no cure for PCOS, only symptom management. The Rotterdam Criteria diagnose PCOS by requiring at least two of the following: oligo- or anovulation, clinical and biochemical signs of hyperandrogenism, and polycystic ovaries on ultrasound [2]. Studies show that people with PCOS have long-term, low-grade inflammation in which polycystic ovaries produce androgens (male hormones) and insulin [3-5]. This inflammation can lead to heart and blood vessel problems [6]. The chronic low-grade inflammation-induced polycystic ovaries may cause

missed periods, irregular periods or very light periods, enlarged ovaries, ovarian cysts, excess body hair, including the chest, stomach, and back, weight gain, especially around the belly (abdomen), acne or oily skin, male-pattern baldness or thinning hair, and infertility [7].

Researchers have shown that mesenchymal stem cells harvested from bone marrow reduce inflammation and stabilize hormone levels in mice with induced PCOS. The injection of the stem cells caused a spike in the anti-inflammatory cytokine interleukin-10 (IL-10), which reduced the expression of pro-inflammatory cytokines such as interleukin-1 beta (IL-1 β). The reduction in inflammation improved metabolic function and restored fertility in the mice [8]. In another study, PCOS was induced in mice, and then they were transplanted with mesenchymal stem cells. Compared to the PCOS-only mice, the PCOS+MSC mice saw an increase in the total volume of the ovary, cortex, number of antral follicles, volume of the oocyte, and zona



Figure 1. Patient hair thickness progression before and after stem cell treatment. A. Patient hair thickness prior to treatment. B. Patient hair thickness 4 months after treatment.

pellucida thickness. In addition, there was a significant increase in the serum level of FSH and TAC and a significant decrease in the serum level of testosterone, LH, and MDA in the PCOS+MSC group [9].

This case history describes the successful mesenchymal stem cell treatment of a patient with PCOS. The full relief of the patients symptoms shows promise for future implementation of mesenchymal stem cell treatment for PCOS.

Case history

A lean, athletic 28-year-old woman presented with a chief complaint of thinning hair (**Figure 1**). She was also noted to have ultrasound-diagnosed polycystic ovary syndrome on 9/8/21 and abnormal hormone levels with a progesterone level of 1.6 during the luteal phase, whereas normal is 2-25. Her periods were irregular since menarche at age 14, usually 9 per year. She was told by her gynecologist that none of these problems were severe enough to require treatment, and her only troubling symptom was mild but bothersome scalp hair thinning.

We told her that intravenous injection of umbilical cord-derived stem cells, along with injection of these stem cells underneath the skin of the scalp, generally results in hair thickening. We did not address her PCOS as she had no other symptoms related to it and was not seeking care for it.

Stem cell treatment

After informed consent, she received an infusion of 130 million umbilical cord-derived AlloRx stem cells (Vitro Biopharma in Golden, Colorado). She also received multiple subdermal injections totaling 20 million AlloRx stem cells distributed evenly on her scalp. Lidocaine was not used to avoid toxicity to the stem cells. She received 10 mg of diazepam orally prior to the procedure. The procedure was completed without incident.

Follow-up

At her four-month follow-up, she noted definite, visible new hair growth and thickening (**Figure 1**).

She also, however, noted that her menstrual periods had been completely regular every month beginning the first month after her treatment - for the first time in her life. Four months after the first treatment, she elected to repeat treatment to further accelerate her hair thickening.

At her ten-month follow-up, she noticed continued scalp hair thickening and continued regular periods. She also noted that her occasional skin breakouts were gone after the stem cell treatment. We decided to check her hormone levels and found that her progesterone level was now normal at 0.5 in the follicular phase.

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On 10/9/23, we obtained an ultrasound of her ovaries and, to our surprise, found that the previously present cysts were now completely gone. At her last follow-up - 18 months after her first treatment and 14 months after her second - she noticed substantially thicker hair and continued regular periods.

Discussion

It would appear that the stem cell treatments resulted in a complete reversal of her polycystic ovary syndrome, elimination of her thinning hair, and elimination of her mild skin disruptions - more than a year after her last treatment. We do not know if the first stem cell infusion alone accomplished this goal or if the second was also necessary. We suspect the first alone was sufficient since she had immediate normalization of her menstrual periods after this first treatment.

While this is only one patient, it is clear that the stem cell treatment essentially eliminated her PCOS. This case suggests that stem cell treatment may have broader applications in treating and even curing this disorder. This is particularly important since no other treatment directly addresses reversing PCOS. This report is based on a single patient, which limits the generalizability of the findings. Unfortunately, we were not able to obtain an ultrasound prior to treatment; we have the patient's physician on record stating the following: "Yes, the ultrasound I performed in the office demonstrated ovarian cysts consistent with PCOS". This answer was given in response to the patient asking for documentation of her ultrasound, which had not been saved in her medical record [10].

We are actively seeking to treat other patients with this disorder to see if these results are consistent. It would be particularly interesting to see if it could improve the infertility that some PCOS patients experience.

Conclusion

Simple intravenous umbilical cord-derived mesenchymal stem cell infusion can eliminate polycystic ovary syndrome for at least one year.

Disclosure of conflict of interest

None.

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