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Case Report

Successful Pregnancy Following Endometrial Platelet-Rich Plasma (PRP) INFUSION in Advanced age Woman Repeated IVF Failure: A Case Report

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Abstract

Background*: Endometrial platelet-rich plasma infusion is a promising treatment for women facing challenges with infertility. The use of PRP in the endometrium has gained attention due to its potential to improve endometrial receptivity and thickness to support embryo implantation.*

Case*:*

A 41-year-old woman visited ALBARAKA FERTILITY HOSPITAL between 2008 and 2018 with a history of primary infertility for 2 years. Underwent an endometrial PRP infusion as a part of fertility (INFERTILITY) treatment after four unsuccessful embryo transfer attempts, which included two times on day 5 fresh embryo transfer, one time on day 3 frozen/thawed embryo transfer, and one time on day 3 thawed for day 5 frozen/thawed embryo transfer. After undergoing the procedure, the patient successfully achieved a clinical pregnancy.

This case highlights the potential role of endometrial PRP infusion in improving endometrial receptivity and facilitating successful pregnancy outcomes.

Conclusion*:*

The successful pregnancy in this case suggests a potential benefit of endometrial PRP infusion in (advanced age) patient with repeated embryo transfer failure. Further research and clinical studies are warranted to elucidate the mechanisms and efficacy of PRP therapy in improving endometrial receptivity and enhancing fertility outcomes.

Keywords: *Recurrent implantation failure; endometrial thickness; platelet-rich plasma (PRP); frozen embryo transfer; implantation; receptivity.*

Introduction

Repeated IVF failure (RIF) refers to the lack of successful pregnancy following multiple in vitro fertilization (IVF) treatment cycles. Typically, it is defined as the absence of a viable pregnancy after three or more IVF cycles, despite the transfer of good-quality embryos (1). This can be a challenging experience for individuals or couples undergoing fertility treatments.

Various therapeutic approaches have been used to investigate and manage RIF, such as local endometrial injury, changes in stimulation protocols, intrauterine granulocyte colony-stimulating factor before embryo transfer, blastocyst-assisted hatching transfer, and preimplantation genetic diagnosis for aneuploidy [2]. To enhance endometrial and embryonic development, human endometrial tissue contains receptors such as adhesion molecules, cytokines, growth factors, lipids, and other factors [3]. Platelet-rich plasma (PRP) contains growth factors and cytokines that can positively affect local tissue repair and endometrial receptivity. It is currently being researched as a potential treatment to enhance endometrial thickness in women with a thin endometrium. PRP is considered safe as it is derived from the patient's blood [4,5].

This report discussed the successful pregnancy of a 41-year-old woman with repeated IVF failure (RIF).

Case Presentation

A 41-year-old female patient diagnosed with primary infertility for 2 years in ALBARAKA FERTILITY HOSPITAL finally has a blissful outcome.

The primary routine investigations for infertility were found as follows: anti-Mullerian hormone (AMH) 3.5ng\dl, (follicle-stimulating hormone: (FSH)10.9 mIU/mL, luteinizing hormone: (LH) 17.7 mIU/mL, and estradiol: (E2)40 mIU/mL). However, there was no history of gynecological disorders, and the menstrual cycle was regular every 26 days.

After a couple assessments and investigations, Intracytoplasmic sperm injections (ICSI) with ovarian stimulation were recommended. The patient underwent multiple (ICSI) trials, and each cycle resulted in less than 5 oocytes. So, the conclusion is the patient has a poor ovarian response.

The patient had two-day 5 fresh embryo transfer and one day 3 frozen embryo transfer all of them were unsuccessful.

Between November 2020 and February 2021, two more ICSI trials resulted in two embryos being frozen on day 5 as they reached the blastocyst stage. The embryos were then transferred, but once again, there was no pregnancy occurring.

After several unsuccessful attempts, the treating physician suggested changes in the stimulation protocol and tried a new attempt changing the stimulation protocol for a new trial. These trials were conducted between October 2021 and September 2022, resulting in the development of 9 frozen embryos on day 3.

The change was endometrial intrauterine autologous administration platelet-rich plasma (PRP) administration after giving informed consent.

The endometrial preparation for a frozen embryo transfer began on the second day of the menstrual cycle, along with an endometrial scratch. The patient was given hormonal replacement - 12mg of 17β-estradiol daily After two weeks, the patient was evaluated, and the transvaginal ultrasound (TVUS) showed a good trilaminar endometrial line of 9mm. LPS was started on the 17th day of the patient's menstrual cycle, including Dydrogesterone 40mg daily, progesterone suppositories (180mg) daily, and Hydroxy progesterone caproate injections 250mg twice weekly. LPS was continued until a pregnancy test was conducted.

Endometrial intrauterine autologous platelet-rich plasma (PRP) administration was done 72 hours before transfer.

According to Iranian Blood Transfusion Organization protocols, blood samples were collected from the patient, and PRP was separated and prepared [6]. Under ultra guidance by using (Classic Embryo Replacement Catheter; Smiths Medical, Hythe, Kent, U.K) Wallace catheter,0.5-1 ml of PRP was infused into the uterine cavity.

After being thawed, six (day 3) embryos were kept until they reached the blastocyst stage, and then transferred on the sixth day of progesterone administration.

Discussion

In the female reproductive tract, there are various factors that are believed to enhance endometrial and embryonic development, including growth factors, cytokines, and adhesion molecules. [7] Many growth factors and cytokines are present in PRP, including transforming growth factor beta, fibroblast growth factor, platelet-derived growth factor, insulin-like growth factors I and II, vascular endothelial growth factor (VEGF), epidermal growth factor (EGF), interleukin 8, keratinocyte growth factor, and connective tissue growth factor [8,10].

Endometrial receptivity refers to the ability of the endometrium (the most inner lining of the uterus) to support embryo implantation and development. In contrast, endometrial thickness is a physical measurement of the endometrium. Endometrial receptivity is a complex and dynamic process that involves various molecular and cellular factors. In contrast, endometrial thickness is a simpler metric that can provide some information about endometrial health but does not fully capture endometrial receptivity [10].

Platelet-rich plasma (PRP) has received increasing interest in applied medicine and is widely used in clinical practice to stimulate tissue healing [7,5].

The first successful live birth from frozen-thawed embryo transfer in a woman with RIF and using intrauterine administration of autologous PRP was reported in January 2017 [2].

Chang et al (2015) were the first ones who performed an intrauterine PRP infusion in infertile women with thin endometrium. They reported 4 pregnancies from 5 patients with thin endometrium and a poor response to conventional preparation method during frozen embryo transfer.

In general, it is accepted that three factors contribute to embryo implantation: embryo quality; endometrial receptivity; and embryo transfer technique [9,10,11].

Conclusion

The head point of this research was to highlight PRP intrauterine infusion during the preparation protocol for frozen embryo transfer.

After receiving an intrauterine infusion of autologous platelet-rich plasma, a successful pregnancy in an elderly woman that previously experienced multiple unsuccessful implantations. Moreover, there is currently evidence supporting the efficacy of local PRP administration. For a successful clinical pregnancy

It is necessary to conduct more studies to find out the effect of using PRP before reviewing the embryo process to determine the extent of its effect on the success of the transfer process and whether there are side effects that can be avoided in the future.

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