

Research Article

Platelet-Rich Plasma as a Treatment for Refractory Thin Endometrium

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• Platelet-rich plasma; Thin endometrium; Refractory endometrium; Embryo transfer

Abstract

Introduction: Endometrial thickness is a key prognostic factor for embryo implantation in assisted reproductive technology (ART) cycles.

Materials and Methods: This prospective observational study evaluated the effectiveness of intrauterine platelet-rich plasma (PRP) infusion in patients with refractory thin endometrium (RTE) unresponsive to conventional hormonal therapy. Thirteen consecutive patients were included. Autologous PRP was obtained after centrifugation, and two intrauterine infusions of 1 mL were administered 48 hours apart.

Results: Mean endometrial thickness increased from 4.8 mm to 7.2 mm following PRP treatment. The clinical pregnancy rate was 84.6%.

Conclusion: Intrauterine PRP infusion appears to be an effective and safe therapeutic option for improving endometrial thickness and clinical pregnancy rates in patients with refractory thin endometrium.

INTRODUCTION

Endometrial receptivity is a critical determinant of implantation and pregnancy success in assisted reproductive technology (ART). Several studies have established a minimum endometrial thickness (ET) of 7 mm as optimal for embryo transfer, with pregnancy rates increasing proportionally with ET [1-3]. The incidence of refractory thin endometrium (RTE) is estimated at approximately 2.5%, increasing to up to 25% in women over 41 years of age [4]. A significant proportion of ART cycles are cancelled due to inadequate ET [5-8].

Despite its clinical relevance, there is limited consensus regarding optimal treatment for RTE unresponsive to estrogen therapy [9]. This study aimed to evaluate the effectiveness of intrauterine platelet-rich plasma (PRP) infusion in improving ET and clinical pregnancy outcomes in patients with RTE.

Objective

To assess the effectiveness of intrauterine PRP infusion in patients with refractory thin endometrium unresponsive

to conventional hormonal therapy and to determine the resulting clinical pregnancy rate.

MATERIALS AND METHODS

This prospective observational study included 13 patients with a history of ART cycle cancellation due to RTE (ET <7 mm), treated at the Reproductive Medicine Unit of Vithas Clínica Baren (Las Palmas de Gran Canaria, Spain) between May 2021 and September 2023.

Refractory thin endometrium was diagnosed by transvaginal ultrasound using a Voluson® E10 system (General Electric®) with a RIC 5-9-D endocavitary probe. Endometrial thickness was measured in the longitudinal uterine plane at the thickest point, from one echogenic endometrial border to the opposite, during days 11-13 of the cycle following estrogen preparation (Table 1).

All patients received oral estradiol hemihydrate 6 mg/day (Meriestra®, Sandoz) starting on day 2 of the menstrual cycle. Once ET exceeded 7 mm, vaginal progesterone suppositories (Cyclogest®, Actavis) 400 mg twice daily were initiated.

Table 1: 13 cases of refractory thin endometrium treated with platelet-rich plasma.

Patient	Age	Diagnosis	Risk Factor	Hk	mm	mm2	Embryotransfer	Pregnancy	Clinical Pregnancy
1	47	Female factor	Uterine fibroid	Yes	4.6	7.2	Egg donation	Yes	C-section (preeclampsia)
2	38	PCOS, Male factor	Curettage	No	5	7.5	IVF	Yes	C-section (breech)
3	42	Female factor	Hydrometra	Yes	6	7.1	IVF	Yes	C-section (maternal request)
4	47	Female factor	No	Yes	4.1	7.5	Egg donation	Yes	Missed abortion at 12 weeks
5	33	Tubal factor	No	Yes	5	7.2	IVF	Yes	C-section (placenta previa)
6	40	Female factor	Twin pregnancy, PROM at 20 wks, C-section at 34 wks	No	4.2	7	IVF	Yes	Missed abortion at 9 weeks
7	27	EOD	Curettage	No	4.9	7.4	FIV	Yes	Elective C-section
8	45	Female factor	Curettage	No	4.5	7	Egg donation	Yes	Missed abortion at 8 weeks
9	43	Female factor	No	No	6	7.3	Egg donation	No	-
10	39	Female factor	No	Yes	4.5	7	IVF	Yes	Missed abortion at 8 weeks
11	43	Female factor	No	No	4.8	7.5	Egg donation	Yes	C-section (maternal request)
12	49	Female factor	Abortion without curettage, fibroids	Yes	4	7	Egg donation	No	-
13	43	Female factor	No	No	5.3	7.4	IVF	Yes	Ongoing pregnancy (9 weeks)

Hk: Hysteroscopy. mm: Millimeters. PCOS: Polycystic ovary syndrome. UFI: Unexplained female infertility. PROM: Premature rupture of membranes. IVF: In vitro fertilization. PET: Preeclampsia.

PRP was prepared from autologous blood. Twenty milliliters of blood were collected with sodium citrate anticoagulant and centrifuged at 1200 rpm for 12 minutes (HyTissue® PRP 20, Fidia). After separation, a second centrifugation at 3300 rpm for 7 minutes was performed. The PRP fraction was activated with 0.1 mL of 10% calcium chloride, and 1 mL was infused intrauterinely using a Gynetics® IUI catheter under ultrasound guidance. The procedure was repeated after 48 hours.

Embryo transfer was performed at the blastocyst stage using a Kitazato® catheter under ultrasound guidance. Clinical pregnancy was defined as the presence of an intrauterine gestational sac with fetal cardiac activity at six weeks of amenorrhea.

RESULTS

During the study period, 435 ART cycles were performed, of which 13 patients (2.9%) were diagnosed with RTE. Mean patient age was 41.2 years, with 69.2% over 40 years old. Diminished ovarian reserve was the most common infertility factor (84.6%). Following two PRP infusions, mean ET increased from 4.8 mm to 7.2 mm.

All embryo transfers were performed at the blastocyst stage by the same physician. The clinical pregnancy rate was 84.6%. No adverse events or complications related to PRP treatment were observed (Table 2 and Table 3).

Table 2: Inclusion criteria.

• Age under 50 years
• Endometrial thickness measured by transvaginal ultrasound less than 7 mm
• Two prior properly performed cycles with embryo transfer
• Anatomical uterine cavity abnormalities ruled out via TVUS, 3D US, and HyFoSy
• Uterine cavity pathology ruled out via TVUS, 3D US, and HyFoSy

TVUS: Transvaginal ultrasound. 3D US: Three-dimensional ultrasound. HyFoSy: Hysterosalpingo-Foam Sonography.

Table 3: Exclusion criteria.

• Uterine cavity pathology
• No previous embryo transfers
• Abnormal lab findings

DISCUSSION

Adequate endometrial thickness is essential for embryo implantation. RTE, defined as ET <7 mm, remains a challenging condition in ART, often leading to cycle cancellation [10-13]. Current therapeutic strategies show variable efficacy, and no standardized treatment exists [14-18].

PRP is an autologous blood-derived product with a high concentration of platelets and growth factors that promote tissue regeneration and angiogenesis [11,19-21]. Its intrauterine application has shown promising results in improving endometrial thickness and pregnancy outcomes in RTE patients [22-26].

Our findings support previous reports demonstrating that PRP infusion can significantly improve ET and clinical pregnancy rates in patients with RTE. The observed miscarriage rate (33%) is likely influenced by advanced maternal age and associated aneuploidy risk.

CONCLUSION

Intrauterine platelet-rich plasma infusion is a safe and effective therapeutic option for patients with refractory thin endometrium, resulting in increased endometrial thickness and improved clinical pregnancy rates in ART cycles.

Ethics Approval and Consent to Participate

All procedures were conducted in accordance with

institutional guidelines. Written informed consent was obtained from all participants.

Consent for Publication

Written informed consent was obtained from all patients for publication.

Authors' Contributions

All authors contributed to study design, data collection, analysis, and manuscript preparation. All authors approved the final version.

REFERENCES

- Khalifa E, Brzyski RG, Oehninger S, Acosta AA, Muasher SJ. Sonographic appearance of the endometrium: the predictive value for the outcome of in-vitro fertilization in stimulated cycles. *Hum Reprod.* 1992; 7: 677-680.
- El-Toukhy T, Coomarasamy A, Khairy M, Sunkara K, Seed P, Khalaf Y, et al. The relationship between endometrial thickness and outcome of medicated frozen embryo replacement cycles. *Fertil Steril.* 2008; 89: 832-839.
- Richter KS, Bugge KR, Bromer JG, Levy MJ. Relationship between endometrial thickness and embryo implantation, based on 1,294 cycles of in vitro fertilization with transfer of two blastocyst-stage embryos. *Fertil Steril.* 2007; 87: 53-59.
- Check JH, Dietterich C, Graziano V, Lurie D, Choe JK. Effect of maximal endometrial thickness on outcome after frozen embryo transfer. *Fertil Steril.* 2004; 81: 1399-1400.
- Check JH, Dietterich C, Lurie D, Adelson HG, O'Shaughnessy A. Relationship of endometrial thickness and sonographic echo pattern to endometriosis in non-in vitro fertilization cycles. *Gynecol Obstet Invest.* 1995; 40: 113-116.
- Check JH, Dietterich C, Nazari A, Lurie D, Choe JK, Check ML. Non-homogeneous hyperechogenic echo pattern three days after frozen embryo transfer is associated with lower pregnancy rates. *Clin Exp Obstet Gynecol.* 2005; 32: 15-18.
- Check JH, Nowroozi K, Choe J, Lurie D, Dietterich C. The effect of endometrial thickness and echo pattern on in vitro fertilization outcome in donor oocyte-embryo transfer cycle. *Fertil Steril.* 1993; 59: 72-75.
- Check JH, Lurie D, Dietterich C, Callan C, Baker A. Adverse effect of a homogeneous hyperechogenic endometrial sonographic pattern, despite adequate endometrial thickness on pregnancy rates following in-vitro fertilization. *Hum Reprod.* 1993; 8: 1293-1296.
- Lebovitz O, Orvieto R. Treating patients with "thin" endometrium - an ongoing challenge. *Gynecol Endocrinol.* 2014; 30: 409-414.
- Yamaguchi R, Terashima H, Yoneyama S, Tadano S, Ohkohchi N. Effects of platelet-rich plasma on intestinal anastomotic healing in rats: PRP concentration is a key factor. *J Surg Res.* 2012; 173: 258-266.
- Marx RE. Platelet-rich plasma (PRP): what is PRP and what is not PRP? *Implant Dent.* 2001; 10: 225-228.
- Dix E, Check JH. Successful pregnancies following embryo transfer despite very thin late proliferative endometrium. *Clin Exp Obstet Gynecol.* 2010; 37: 15-16.
- Kasius A, Smit JG, Torrance HL, Eijkemans MJ, Mol BW, Opmeer BC, Broekmans FJ. Endometrial thickness and pregnancy rates after IVF: a systematic review and meta-analysis. *Hum Reprod Update.* 2014; 20: 530-541.
- Galliano D, Bellver J, Díaz-García C, Simón C, Pellicer A. ART and uterine pathology: how relevant is the maternal side for implantation? *Hum Reprod Update.* 2015; 21: 13-38.
- Hooker AB, Lemmers M, Thirkow AL, Heymans MW, Opmeer BC, Brölmann HA, et al. Systematic review and meta-analysis of intrauterine adhesions after miscarriage: prevalence, risk factors and long-term reproductive outcome. *Hum Reprod Update.* 2014; 20: 262-278.
- Gleicher N, Vidali A, Barad DH. Successful treatment of unresponsive thin endometrium. *Fertil Steril.* 2011; 95: 2123.e13-17.
- Puente E, Alonso L, Laganà AS, Ghezzi F, Casarin J, Carugno J. Chronic Endometritis: Old Problem, Novel Insights and Future Challenges. *Int J Fertil Steril.* 2020; 13: 250-256.
- García-Velasco JA, Acevedo B, Alvarez C, Alvarez M, Bellver J, Fontes J, et al. Strategies to manage refractory endometrium: state of the art in 2016. *Reprod Biomed Online.* 2016; 32: 474-489.
- Amable PR, Carias RB, Teixeira MV, da Cruz Pacheco I, Corrêa do Amaral RJ, Granjeiro JM, et al. Platelet-rich plasma preparation for regenerative medicine: optimization and quantification of cytokines and growth factors. *Stem Cell Res Ther.* 2013; 4: 67.
- Lee JW, Kwon OH, Kim TK, Cho YK, Choi KY, Chung HY, et al. Platelet-rich plasma: quantitative assessment of growth factor levels and comparative analysis of activated and inactivated groups. *Arch Plast Surg.* 2013; 40: 530-535.
- Dhillon RS, Schwarz EM, Maloney MD. Platelet-rich plasma therapy - future or trend? *Arthritis Res Ther.* 2012; 14: 219.
- Chang Y, Li J, Chen Y, Wei L, Yang X, Shi Y, et al. Autologous platelet-rich plasma promotes endometrial growth and improves pregnancy outcome during in vitro fertilization. *Int J Clin Exp Med.* 2015; 8: 1286-1290.
- Santana Suárez MA, Álvarez Sánchez M, Machado Rider Y, Pérez Matos C, Torres Afonso A, Roldán Gutiérrez L. Tratamiento con plasma autólogo rico en plaquetas en una paciente estéril con un endometrio refractario. *Rev. Iberoam. Fert Rep Hum.* 2017; 34: 22-26.
- Chen MJ, Yang JH, Peng FH, Chen SU, Ho HN, Yang YS. Extended estrogen administration for women with thin endometrium in frozen-thawed in-vitro fertilization programs. *J Assist Reprod Genet.* 2006; 23: 337-342.
- Nazari L, Salehpour S, Hosseini S, Sheibani S, Hosseinirad H. The Effects of Autologous Platelet-Rich Plasma on Pregnancy Outcomes in Repeated Implantation Failure Patients Undergoing Frozen Embryo Transfer: A Randomized Controlled Trial. *Reprod Sci.* 2022; 29: 993-1000.
- Zadehmodarres S, Salehpour S, Saharkhiz N, Nazari L. Treatment of thin endometrium with autologous platelet-rich plasma: a pilot study. *JBRA Assist Reprod.* 2017; 21: 54-56.