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Successful Pregnancy Following Sub-Endometrial PRP Injection in a Patient with Thin Endometrium: A Case Report

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Abstract

Thin endometrium poses a significant barrier to successful embryo implantation in assisted reproductive technology. This report describes a 36-year-old woman with primary infertility, diminished ovarian reserve, and persistent thin endometrium (≤6.8 mm despite hormonal priming), who achieved a successful term pregnancy after hysteroscopy-guided sub-endometrial platelet-rich plasma (PRP) injection combined with adhesiolysis. Following ovarian stimulation, preimplantation genetic testing, and frozen euploid blastocyst transfer in a hormone replacement cycle, serum β-hCG confirmed pregnancy at 1615 mIU/mL on day 14 post-transfer, culminating in a healthy term delivery. This case highlights PRP's potential to enhance endometrial receptivity in cases of refractory infertility.

Keywords: Thin endometrium, Platelet-rich plasma, IVF, Embryo transfer, Infertility

Introduction

Thin endometrium, typically defined as <7 mm on the day of embryo transfer, significantly impairs implantation and pregnancy rates in IVF cycles, affecting up to 25% of patients with prior implantation failures. [1,2] This condition arises from disrupted endometrial proliferation, vascularity, and receptivity, often linked to factors like prior curettage, endometritis, or subclinical adhesions [3,4]. Even with high-quality euploid embryos, thin endometrium halves live birth rates compared to optimal thicknesses (8-12 mm), underscoring its independent prognostic impact [1,5]. Conventional priming with high-dose estrogen, vaginal sildenafil, low-dose aspirin, or granulocyte colony-stimulating factor yields inconsistent results, particularly in refractory cases [6,7].

Platelet-rich plasma (PRP), derived from autologous centrifugation, concentrates growth factors like VEGF, PDGF, and TGF-β that promote angiogenesis, stromal remodeling, and endometrial regeneration [8-10]. Recent meta-analyses demonstrate PRP increases endometrial thickness by 1.5-3 mm and clinical pregnancy rates exceeding 40% in hormone replacement therapy cycles for thin endometrium [11,12]. Intra-uterine instillation remains common, but emerging hysteroscopy-guided sub-endometrial injections target deeper stromal layers for potentially superior receptivity [13,14]. This CARE-compliant report details a novel application of hysteroscopy-guided sub-endometrial PRP injection following adhesiolysis, resulting in a successful euploid pregnancy despite compounded risks [3,13,15].

Patient Information

A 36-year-old G0P0 female and her 45-year-old normospermic partner (BMI 25.6 kg/m^2) presented in October 2024 with 1 year of primary infertility [4]. Both denied tobacco, alcohol, or substance use [9]. She had a history of extrapulmonary tuberculosis (2017, fully treated) and a normal family/social history [4]. He had controlled hypertension [1]. Informed consent was obtained for all interventions.

Clinical Findings

Baseline transvaginal ultrasound showed endometrial thickness of 2.5 mm (cycle day 10), antral follicle count of 4, and diminished ovarian reserve (AMH 0.5 ng/mL) [1,16]. Male semen analysis revealed teratozoospermia (1% normal forms, 36% progressive motility, 56 million/mL total count).

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Table 1: Timeline

Event	Date (2024)	Key Details	Endometrial Thickness
Presentation	October	Primary infertility workup	2.5 mm (day 10)(1)
Ovarian Stimulation & OPU	Late October	4 oocytes retrieved; 2 euploid blastocysts cryopreserved	N/A(5)
Estrogen Challenge	Day 14-23	Oral/topical estradiol	6.8 mm (day 23)(9)
PRP Injection + Adhesiolysise	Day 23	Hysteroscopy-guided; Foley catheter 3 days	N/A(3)
Post-PRP Follow-up	~Day 26	Continued estrogen	4.2 mm(6)
HRT Cycle Prep	November	Estradiol + aspirin + tamoxifen	5.7 mm (day 12, trilaminar)(10)
FET	Day 12 progesterone +5	Single euploid blastocyst	5.7 mm(5)
β-hCG	Day 14 post-FET	1615 mIU/mL; Confirmed pregnancy	(16)
Delivery	Term (2025)	Healthy baby	N/A

Diagnostic Assessment

TVS confirmed a thin endometrium and low AFC [1]. No diagnostic challenges; differentials included Asherman's syndrome (ruled out pre-PRP but adhesions noted intraoperatively) [3,4]. Prognosis was guarded due to age and reserve [16].

Therapeutic Intervention

Mild ovarian stimulation yielded 3 MII oocytes; ICSI produced 2 euploid blastocysts (PGT-A) [17]. For endometrium: estrogen challenge (6.8 mm response), then hysteroscopy-guided PRP (13.5 mL autologous blood, double-centrifuged, LN2-activated, 1 mL injected at 4 sites post-adhesiolysis) [11,13]. No changes needed; tolerated well with a Foley balloon [19].

Follow-up and Outcomes

Post-FET HRT achieved 5.7 mm trilaminar endometrium [8]. β-hCG rose appropriately; 6-week USG confirmed intrauterine pregnancy [18]. Term delivery of a healthy infant occurred without adverse events [12]. Patient adherence was excellent.

Discussion

This case demonstrates sub-endometrial PRP's efficacy in optimising thin endometrium refractory to hormones, with partial thickness gain (2.5→5.7 mm) enabling euploid FET success [9,13]. Unlike prior reports, hysteroscopic adhesiolysis addressed adhesions, potentially synergising with PRP's angiogenic effects (VEGF, PDGF) [3,10,20]. The combination allowed transfer of a genetically normal blastocyst in a hormone replacement cycle, overcoming compounded risks from age, low reserve, and teratozoospermia [16,17]. Recent studies confirm thin endometrium halves live birth rates even with euploid transfers [1,5].

While intrauterine PRP instillation shows promise, this hysteroscopy-guided sub-endometrial approach targets deeper stromal layers for enhanced receptivity [13-15]. Meta-analyses report PRP boosts clinical pregnancy rates to over 40% in refractory cases, aligning with our outcome despite suboptimal thickness [11,12]. Adhesiolysis likely restored the implantation window by removing barriers, amplifying PRP-induced vascular endothelial growth factor expression [3,19]. This multimodal strategy merits randomised trials, especially for patients failing conventional priming [21,22].

Limitations include the single-case design, absence of controls, and short-term follow-up [21]. Long-term neonatal data and standardised PRP protocols remain needed [8,11]. Compared to alternatives like stem cells or granulocyte colony-stimulating factor, PRP offers autologous safety and accessibility [16,23]. Nonetheless, this report supports guided PRP in multimodal protocols for refractory thin endometrium, particularly with adhesions.

Key takeaway

Guided PRP merits consideration in multimodal protocols [16,21].

Patient perspective

The patient reported relief post-PRP and optimism, stating, "This gave us hope after repeated failures."

Informed Consent

Written consent obtained for treatment, reporting, and imaging use, per institutional and CARE guidelines.

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