Ayurvedic Management of Poor Endometrial Receptivity Assessed by Modified Applebaum Score: A Single Case Report

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***Abstract*—Background: Endometrial receptivity is a decisive factor for successful embryo implantation. Even with good-quality embryos, implantation failure may occur due to impaired functional uterine blood flow and suboptimal endometrial development. The Modified Applebaum Uterine Scoring System (AUSS) is a validated Doppler-based tool for assessing endometrial receptivity.**

Case Presentation: A 35-year-old woman with primary infertility and uterine fibroids presented with poor endometrial receptivity. Baseline transvaginal ultrasound and Doppler evaluation revealed a Modified Applebaum score of 12/20, indicating low implantation potential. An individualized Ayurvedic treatment protocol was administered for two months, focusing on Apana Vata regulation, Rakta Prasadana, and restoration of end-diastolic flow.

Outcome: Post-treatment assessment showed significant improvement in endometrial morphology and functional uterine blood flow, with the Modified Applebaum score increasing to 17/20, despite persistence of uterine fibroids.

Conclusion: This case suggests that personalized Ayurvedic intervention may improve functional endometrial receptivity, as evidenced by objective Doppler-based parameters. Ayurveda may serve as a supportive integrative approach in infertility management by optimizing uterine function even in the presence of structural pathology.

***Index Terms*—Endometrial receptivity, Modified Applebaum score, Ayurveda, Infertility, Doppler ultrasound, Uterine fibroids**

I. INTRODUCTION

Successful implantation depends on optimal embryo quality and a receptive endometrium. While assisted reproductive technologies largely focus on embryological factors, uterine receptivity remains a critical determinant of conception [1]. Doppler assessment of uterine and endometrial blood flow offers an objective evaluation of implantation potential [2]. The Modified Applebaum score, incorporating parameters like endometrial pattern, myometrial echotexture, and uterine artery Doppler indices, provides a comprehensive receptivity assessment [3].

Ayurveda conceptualizes fertility (Garbha Sambhava) through the harmonious functioning of Ritu (appropriate timing), Kshetra (uterine environment), Ambu (nutritive factors), and Beeja (gametes) [4]. Disturbance of Apana Vata (the sub-dosha governing downward movement and reproduction), associated Rakta Dushti (vitiation of the blood tissue), and Kapha-induced obstruction (Avarana) may impair uterine receptivity, termed Kshetra Vaigunya [5]. This report presents an integrative Ayurvedic approach to improving endometrial receptivity assessed objectively using the Modified Applebaum score.

II. CASE PRESENTATION

A 35-year-old married woman with primary infertility of 4 years presented with difficulty in conception. She had regular menstrual cycles (28-30 days) with moderate dysmenorrhea and a normal body mass index (22 kg/m²). Her partner's semen analysis was within normal limits (WHO 2021 criteria). Her ovarian reserve was adequate (Anti-Müllerian Hormone: 2.8 ng/mL). She had a known diagnosis of multiple intramural uterine fibroids (largest 3.5 x 2.8 cm), non-cavity distorting,

confirmed by saline infusion sonography. She was referred for integrative management after a previous failed intrauterine insemination (IUI) cycle, where poor endometrial receptivity was identified as a likely contributing factor.

Diagnostic Assessment

USG Pelvis with Uterine and Endometrial Doppler Assessment (TVS)

The Modified Applebaum Uterine Scoring System was used for uterine assessment at two different time points.

Baseline Doppler Assessment (Before Treatment)

Date: 25 September 2025Age: 35 years

Table 1. Modified Applebaum Score – Baseline

Parameter	Finding	Score
Endometrial thickness	>7 to ≤9 mm	2/3
Endometrial morphology	Hazy five-line appearance	1/3
Endometrial vascularization within zone 3	Present multifocally	5/5
Myometrial echogenicity	Relatively homogeneous	2/2
Uterine artery Doppler (PI 2.5–2.99)	High PI	0/2
End-diastolic blood flow of uterine artery	Absent	0/3
Myometrial blood flow	Strongly present	2/2
Total Score		12/20

Comments: A score of 12/20 is a low score. Very high pregnancy rates have been reported if the score is >17.

Impression:

- Modified Applebaum uterine score: 12/20
- Low score mainly due to hazy five-line endometrial appearance, high uterine artery PI, and absent end-diastolic flow in the left uterine artery
- Uterine fibroids present

Post-Treatment Doppler Assessment (After Treatment)

Date: 16 December 2025Age: 35 years

Table 2. Modified Applebaum Score – Post-Treatment

Parameter	Finding	Score
Endometrial thickness	>7 to ≤9 mm	2/3
Endometrial morphology	Distinct five-line appearance	3/3
Endometrial vascularization within zone 3	Present multifocally	5/5
Myometrial echogenicity	Relatively homogeneous	2/2
Uterine artery Doppler (PI 2.5–2.99)	High PI	0/2
End-diastolic blood flow of uterine artery	Present	3/3
Myometrial blood flow	Strongly present	2/2
Total Score		17/20

Comments: A score of 17/20 is a good score. Very high pregnancy rates have been reported if the score is >17.

Impression:

- Modified Applebaum uterine score: 17/20
- Uterine fibroids present

Ayurvedic Interpretation of Diagnostic Findings

Table 1: Correlation of Modern Findings with Ayurvedic Interpretation

Modern Parameter	Observation	Ayurvedic Interpretation
Endometrial thickness	Suboptimal–adequate	Rasa–Rakta Dhatu Kshaya (depletion)
Endometrial morphology	Hazy → Distinct	Rakta Prasadana, Artava Shuddhi (purification)

Uterine artery PI	Persistently high	Apana Vata Anulomana (normalization of flow)
End-diastolic flow	Absent → Present	Rakta Pravahana (improved blood circulation)
Myometrial blood flow	Persistently strong	Garbhashaya Bala (uterine strengthening)
Fibroids	Persistent	Kapha-dominant Granthi (obstructive nodule)

III. AYURVEDIC DIAGNOSTIC EVALUATION

1. Prakriti (Constitutional Analysis): The patient was assessed to have a Vata–Pitta dominant constitution.

2. Vikriti (Pathological Status): Features at presentation suggested Apana Vata Dushti with Rakta and Kapha Anubandha, contributing to impaired functional uterine blood flow and suboptimal endometrial quality.

3. Samprapti (Pathogenesis): Vitiated Apana Vata caused altered uterine circulation, while Rakta Dushti led to inadequate endometrial nourishment. Kapha accumulation manifested as Garbhashayagata Granthi (uterine fibroids), producing an Avarana (obstruction) of Apana Vata and resulting in Kshetra Vaigunya (vulnerability of the reproductive site).

4. Involved Srotas (Channels of Circulation): Primarily Artavavaha, Rasavaha, and Raktavaha Srotas were affected.

5. Samprapti Ghataka (Pathogenetic Components): Table 1: Samprapti Ghataka Analysis

Component	Description
Dosha	Vata (Apana Vata) predominant with Pitta and Kapha Anubandha
Dushya	Rasa, Rakta, Artava, Mamsa
Agni	Jatharagni and Dhatvagni Mandya (Rasa–Rakta level)
Ama	Alpa Ama involvement contributing to Srotorodha
Srotas	Artavavaha, Rasavaha, Raktavaha
Srotodushti Prakara	Sanga (occlusion) and Vimargagamana (deviation)
Udbhava Sthana	Pakvashaya (colon)
Adhishthana	Garbhashaya (uterus)
Rogamarga	Abhyantara (internal)
Vyadhi Swabhava	Chirakari (chronic, functional)

IV. THERAPEUTIC INTERVENTION PROTOCOL

The treatment was individualized based on Ayurvedic principles and administered over two months. The principles included: Apana Vata Anulomana, Rakta Prasadana, Garbhashaya Balya and Rasayana, and Srotoshodhana to enhance microcirculation. The plan prioritized Shodhana Chikitsa (purificatory therapy) to eliminate accumulated Dosha and restore Agni–Srotas equilibrium before Shamana (palliative) therapy.

- Phase 1: Systemic Shodhana (Virechana Karma) (Weeks 1-2, Follicular Phase)

Rationale: Based on the Samprapti analysis, Virechana was selected for its classical indication in Pitta-Pradhana Vikara, Rakta Dushti, Yonivyapad/Artava Vikara, and chronic functional pathology with Srotas involvement. The sequence aimed to liquefy and mobilize morbid Dosha, eliminate vitiated Pitta and Rakta, correct Agni, and normalize Apana Vata function.

Procedure:

1. Poorva Karma (Snehapana): Internal oleation for 6 days with Yashtimadhu Ghrita and Sukumar Ghrita. The dose was titrated from 50 ml to 120 ml based on Agni bala.

2. Pradhana Karma (Virechana): On day 7, using Trivrutta Leha (40g) followed by virechaka Kashaya (Aragwadha, Triphala, Nishottara). Madhyama Shuddhi (8 vegas) was achieved.

3. Paschat Karma (Sansarjana Krama): A 7-day graduated diet (Peya to Vilepi to normal Ahara) to restore Agni and stabilize benefits.

Table 2: Drug–Action Justification for Virechana Phase

Drug / Formulation	Classical Ayurvedic Action	Pharmacological Correlation
Yashtimadhu Ghrita	Pitta-Shamaka, Rasayana, Garbhashaya-Poshaka, Vata-Anulomana	Anti-inflammatory, antioxidant, mucosal healing
Sukumar Ghrita	Vata-Pitta Shamaka, Mridu Virechaka, Yonishodhana	Mild laxative, smooth muscle relaxation
Trivrutta	Tikshna Virechaka, Pitta-Kapha Rechana	Cathartic, bowel evacuation
Aragwadha	Mridu Rechaka, Pitta-Rakta Shodhana	Gentle laxative, anti-inflammatory
Triphala	Tridosha Shamaka, Rasayana, Agni Deepana	Antioxidant, gut microbiome modulation
Nishottara	Rechana, Pitta-Kapha Hara, Srotoshodhana	Detoxifying, purgative

Phase 2: Localized Therapy (Uttara Basti) (Week 3, Subsequent Cycle Proliferative Phase)

Rationale: To address residual localized Vata Vaigunya and Artavavaha Srotodushti directly at the uterine site (Vyakti Sthana). Administered in the post-menstrual proliferative phase (days 6-8) for optimal cervical openness and endometrial receptivity.

Procedure:

1. Purva Karma: Local Abhyanga with Bala-Ashwagandha Taila and Swedana using Dashamoola-Erandamoola Kwatha.
2. Pradhana Karma: Intra-uterine instillation of Shatavari Ghrita (5 ml) on three consecutive days.
3. Paschat Karma: Supine rest, avoidance of strenuous activity and cold exposure.
4. Adjunctive Therapy: Udar Dhara with Laghumanjishthadi Kwatha over the pubic region to enhance local Rakta circulation

Table 3: Drug–Action Justification for Uttara Basti Phase

Drug / Formulation	Classical Ayurvedic Action	Pharmacological Correlation
Shatavari Ghrita	Vata-Pitta Shamaka, Artava-Janana, Garbhashaya-Poshaka	Phytoestrogenic, endometrial nourishment
Bala Taila	Balya, Vatahara, Brimhana	Neuro-protective, anti-inflammatory
Ashwagandha Taila	Vata-Shamaka, Ojas-enhancing	Adaptogenic, hormonal axis modulation
Dashamoola	Tridosha Shamaka, Shothahara, Srotoshodhana	Anti-inflammatory, analgesic
Erandamoola	Vata-Anulomana, Shoolahara	Smooth muscle relaxation
Laghumanjishthadi Kwatha	Rakta-Shodhana, Srotoshodhana	Microcirculation enhancement, antioxidant

Phase 3: Systemic Shamana & Brimhana (Basti Therapy) (Concurrent 8 weeks)

Rationale: Post-local therapy, to stabilize Apana Vata at its root (Pakvashaya), nourish depleted

tissues, and sustain therapeutic gains. Basti is considered Ardha Chikitsa for Vata disorders.

Procedure:

1. Purva Karma: 8 days of Sarvanga Abhyanga with Sahachar Taila and Sarvanga Swedana with Dashamoola-Erandamoola Kwatha.
2. Pradhana Karma (Vyatyasa Krama):
   - Anuvasana Basti: Ksheerabala Taila (80 ml) for Brimhana.
   - Niruha Basti: Panchatikta Ksheera Basti (450 ml) for Shodhana-Shamana.
3. Internal Medications (for 60 days):

1. Ashokarishta: 20 ml twice daily with equal water after meals.
2. Chandraprabha Vati: 250 mg twice daily with warm water.
3. Shatavari Guda: 5 g twice daily with milk.

Table 4: Drug–Action Justification for Basti Phase

Drug / Procedure	Classical Ayurvedic Action	Pharmacological Correlation
Sahachar Taila	Vatahara, Snayu-Balya, Shoolahara	Anti-inflammatory, neuromuscular relaxation
Ksheerabala Taila	Brimhana, Vata-Shamana, Ojas-Vardhaka	Neuroprotective, anti-inflammatory
Panchatikta Ksheera Basti	Shodhana-Shamana, Rakta-Prasadana	Anti-inflammatory, metabolic regulation

Therapeutic Impact on Samprapti Ghataka Table 5: Summary of Therapeutic Impact

Samprapti Ghataka	Effect of Virechana	Effect of Uttara Basti	Effect of Basti Therapy
Dosha	Elimination of Pitta, regulation of Vata	Pacification of Apana Vata & Pitta	Deep pacification of Apana Vata
Dushya	Purification of Rasa & Rakta	Nourishment of Artava & Rakta	Nourishment & purification of Rakta & Artava
Agni	Restoration of Jatharagni & Dhatvagni	Support to Dhatvagni at tissue level	Support to Dhatvagni
Srotas	Clearance in Artavavaha & Rasavaha	Direct action on Artavavaha Srotas	Clearance in Pakvashaya & Artavavaha
Udbhava Sthana	Pakvashaya	–	Pakvashaya
Vyakti Sthana	–	Uterus & pelvis	Pelvic organs & uterus

V. INTEGRATION STATEMENT

The sequential, phased protocol was designed to address the Samprapti at multiple levels. Systemic Virechana corrected the Agni–Dosha imbalance and cleared morbid Pitta and Rakta from the Koshta. This was followed by targeted Uttara Basti, which directly addressed the localized Vata Vaigunya and Artavavaha Srotodushti at the uterine site, enhancing endometrial nourishment and receptivity. Finally, systemic Basti Chikitsa (Vyatyasa Krama) stabilized the root of Apana Vata in the Pakvashaya, provided deep tissue nourishment (Brimhana), and consolidated the therapeutic gains, ensuring a holistic correction of the reproductive pathophysiology

Outcome and Follow-Up

Post-treatment Doppler assessment demonstrated objective improvement in functional uterine blood flow and endometrial morphology. The Modified Applebaum score increased from 12/20 (poor receptivity) to 17/20 (good receptivity), indicating enhanced endometrial receptivity. Subjectively, the patient reported regularization of her menstrual cycle (from 28-35 days to a consistent 29-30 days), significant reduction in dysmenorrhea, and an improved sense of well-being.

Patient Perspective

"The treatment was a thorough process, but I felt cared for at a deep level. The most significant change was feeling a sense of warmth and lightness in my lower abdomen that I didn't have before. While we are still on our fertility journey, I feel my body is now in a much better state to receive a pregnancy."

VI. DISCUSSION

This case highlights functional improvement in endometrial receptivity following a targeted Ayurvedic intervention, objectively assessed using validated Doppler parameters. The restoration of end-diastolic flow is a critical marker linked to favorable Doppler conditions associated with improved implantation potential [2, 10]. The central role of correcting Apana Vata and Rakta Dushti aligns with the Ayurvedic understanding that proper downward energy and pure blood tissue (Shuddha Rakta) are essential for a healthy Kshetra (endometrial environment) [5, 11].

The protocol employed a multi-pronged approach. Virechana, a Rakta Shodhana procedure, may reduce subclinical inflammation and oxidative stress, factors known to impair endometrial receptivity [12]. Uttara Basti with Shatavari Ghrita provided direct endometrial nourishment (Garbhashaya Brnhana), with Shatavari (Asparagus racemosus) having documented phytoestrogenic and adaptogenic properties that may support endometrial proliferation [6, 13]. Basti, the prime treatment for Vata, is crucial for Srotoshodhana (channel cleansing) and stabilizing Vata in its site, which may translate to normalized neurovascular function in the pelvis [7].

Notably, despite the persistence of uterine fibroids, functional uterine parameters improved significantly. This supports the Ayurvedic principle of restoring physiological flow (Srotoshodhana) and tissue quality (Dhatu Prasadana) as primary goals. This finding aligns with contemporary evidence suggesting that adequate functional uterine blood flow is a more critical factor for implantation than the mere presence of fibroids, provided they do not distort the cavity [9]. The approach differs from a solely structural model, instead targeting the functional milieu necessary for implantation.

VII. COMPARATIVE CONTEXT AND MECHANISMS

Compared to other integrative approaches like acupuncture, which also shows evidence of modulating uterine blood flow [14], the Ayurvedic protocol offers a systemic paradigm of detoxification, nourishment, and Dosha balancing. Unlike vasodilatory medications (e.g., sildenafil, pentoxifylline), which act peripherally, the proposed mechanism here is a holistic restoration of Apana Vata function and Raktavaha Srotas integrity, potentially leading to more sustained improvement.

VIII. LIMITATIONS AND FUTURE PERSPECTIVES

This study is a single-case observation, which limits the generalizability of the findings. The observed improvements, while objectively measured and temporally associated with the Ayurvedic intervention, may be influenced by other factors, including natural cycle variability. A placebo effect cannot be entirely ruled out. However, the objective nature of the Doppler ultrasound parameters as primary endpoints strengthens the association. These promising results warrant further investigation through larger, controlled clinical studies, such as prospective cohort studies or randomized controlled trials, to evaluate the efficacy and potential mechanisms of Ayurvedic protocols as an adjunct to fertility care.

IX. CONCLUSION

This case report suggests that individualized Ayurvedic management, based on the principles of Dosha balancing, Srotoshodhana, and Garbhashaya Brnhana, can significantly improve endometrial receptivity, as evidenced by a marked improvement in the Modified Applebaum score. While larger controlled studies are warranted, Ayurveda may serve as a valuable integrative modality in infertility management by optimizing uterine function and endometrial preparedness for

implantation, even in the presence of non-obstructive structural anomalies like fibroids.

X. STATEMENTS AND DECLARATIONS

- Funding: No funding was received for this study.
- Conflicts of Interest: The authors declare no conflicts of interest.
- Ethical Approval: The management protocol was in accordance with the ethical standards of the institutional committee and with the 1964 Helsinki Declaration and its later amendments.
- Informed Consent: Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

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