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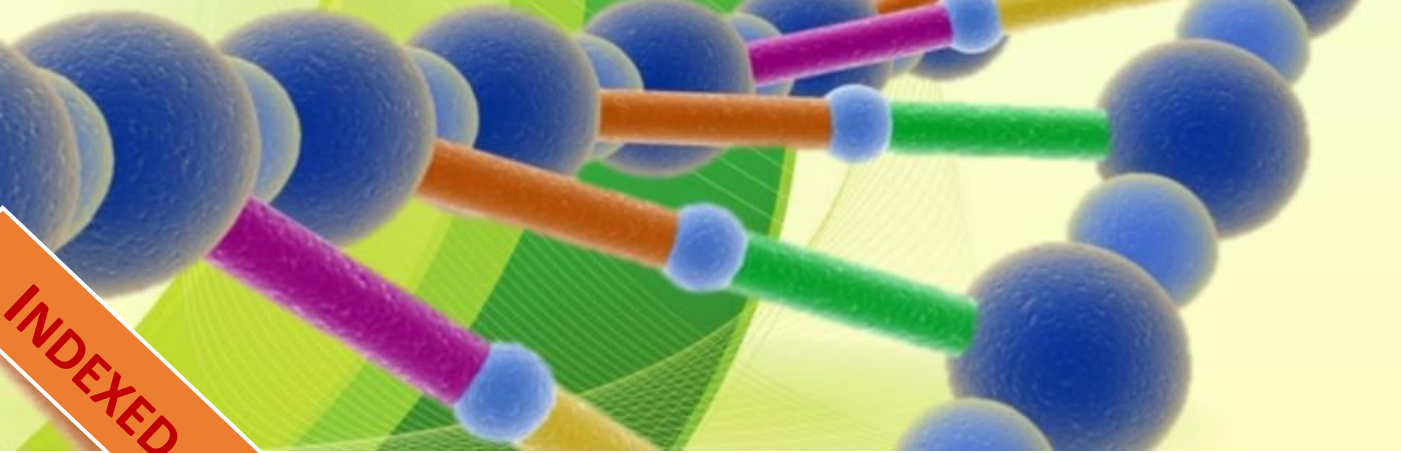

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Correlation of Semen Analysis Parameters with Shukra Dushti: An Integrative Ayurvedic Perspective

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ABSTRACT:

Background Semen analysis serves as the primary investigation for assessing male reproductive potential. Ayurveda considers *Shukra Dhatu* (Semen) as the most refined product of tissue metabolism and describes its pathological alterations under the concept of *Shukra Dushti*, as detailed in classical texts such as *Charaka Samhita*, *Sushruta Samhita*, and *Ashtanga Hridaya*. **Objective** To establish a systematic correlation between modern semen analysis parameters and Ayurvedic descriptions of *Shukra Dushti* based on Dosha involvement. **Materials and Methods** Semen parameters were interpreted in accordance with WHO 2021 guidelines and standard laboratory references. Classical Ayurvedic descriptions related to *Shuddha Shukra Lakshana*, *Shukra Dushti*, *Shukravaha Srotas*, and *Shukra Pariksha* were reviewed and analyzed. A parameter-wise comparative correlation was performed. **Results** Prolonged liquefaction time was associated with *Kapha–Vata Dushti*; alkaline semen pH (>8.5) correlated with inflammatory states resembling *Pitta Dushti*; reduced semen volume (<1.4 mL) reflected *Shukra Kshaya*; diminished sperm concentration aligned with *Tanu Shukra*; leukocytospermia corresponded to *Puti Shukra*; while increased viscosity and sperm agglutination indicated *Picchila* and *Granthibhuta Shukra* respectively. **Conclusion** Integrating semen analysis parameters with Ayurvedic concepts of *Shukra Dushti* provides a comprehensive diagnostic framework. This integrative approach enhances clinical interpretation of male infertility and supports individualized Ayurvedic management strategies.

KEYWORDS: Semen analysis, Shukra Dushti, Male infertility, Ayurveda.

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INTRODUCTION:

Semen analysis is the cornerstone of male fertility assessment, with WHO 6th Edition (2021) providing updated global reference limits. Ayurveda views semen (shukra dhatu) as the final essence of dhatu metabolism and defines several types of its vitiation (shukra dushti).

These are the characteristic features of shuddha shukra (uncontaminated or pure semen)-

- Sphatikaabham – appears like a sphatika (quartz stone), crystalline in shining
- Dravam – liquid in consistency
- Snigdham – unctuous or viscous in consistency
- Madhuram – sweet in taste
- Madhu gandhi – smell of honey
- Taila kshaudranibham – resembles with that of a mixture of taila (oil) and kshoudra (honey)
- Shukla – white in colour

Types of dushti —phenila, tanu, ruksha, puti, picchila, anyadhatu samsrishta(Charaka Saṃhita, Chikitsa sthana 30)

Ashta Shukra dosha (eight characteristics of bad shukra)

- *Phenila* (frothy)
- *Tanu* (transparent)
- *Vivarna* (discolored)
- *Ruksha* (dried, very scanty liquid)
- *Pichchila* (slimy)
- *Poothi* (foul smell)
- Affected by the other *dhatu*
- Precipitant

Parameters and Ayurvedic Interpretation:

- **Color:**

Normal color is gray yellow opalescent [3]

Abnormal findings-Change in color and increased turbidity may be associated with inflammatory condition of genital tract.

Yellow: leukocytospermia, Jaundice

Red/pink: hematospermia

Brown: old blood

Interpretation-

Normal color of shukra is spatikabha. Deviation from normal color can be correlated with vivarna type of shukra dushti.

Aruna(reddish), krishna(blakish): Rakta+vata dushti

Peeta (Yellowish White): Pitta dushti [4]

Sveta (Milky White): Kapha dushti

Change in color may be due to contamination of semen with urine. Generally seen in mutra shukra.

Pinkish/reddish color to the semen is due to traces of fresh blood. Seen in shukra alpata, history of any agantuja hetu like trauma, shukravaha strotasa viddha lakshana.

- **Volume (ml):**

Normally- 2-5ml [5]

Abnormal finding-< 1.5ml

Low volume indicates:

Partial/complete ejaculatory duct obstruction

Hypogonadism

Retrograde ejaculation

Low Semen Volume: Low ejaculate volume can result from incomplete collection, retrograde ejaculation, or ejaculatory duct obstruction. Retrograde ejaculation is confirmed by post-ejaculate urine analysis, commonly associated with diabetes, multiple sclerosis, spinal injury, or certain surgical interventions. Ejaculatory duct obstruction, when suspected with concurrent low sperm count, can be evaluated using scrotal or transrectal ultrasound.

Interpretation:

In charak samhita, Rashi or quantity of shukra is expressed in Anjali praman and it is mentioned to be ½ Anjali[6]. Low volume (< 1.5 ml) suggests hypospermia. Absolute absence of semen is called as aspermia. Both conditions denoteshukra Alpata (deficiency), which could be due to Vata imbalance. [7][8]

More than 6 ml seminal fluid is termed as hyperspermia which may be due to prolonged sexual abstinence and hormonal

imbalance. This can be seen in kaphaj shukra dushti.

- **Liquefaction Time:**
  Normal liquefaction: 15-30 min [9]
  Abnormal finding : > 60 min indicates prostatic/seminal vesicle dysfunction or infection.
  Liquefaction of semen is due to prostate enzymes which initiate proteolysis. The semen from males with bilateral congenital absence of the vas deferens and seminal vesicles fails to coagulate due to absence of coagulation substrate. [10]
  Interpretation-
  Excessive stickiness = Kapha dushti
  Formation of clots/granthi = Vata–Kapha dushti
  Prolonged liquefaction time suggests an imbalance in Kapha and Vata doshas, leading to granthi Bhuta type of shukra dushti (knots or clots formation).
- **Appearance:**
  Normal-cream/grey opalescent [11]
  Abnormal finding: Mucoid/Gelatinous Bodies, Turbid due to High mucoprotein content, Infection, inflammation, ejaculatory duct pathology.
  Interpretation:
  The presence of mucoid or gelatinous bodies indicates a mixture (Samshrishta) of different dhatus (body tissues) with abnormal characteristics.
  Picchilata type of appearance is due to kapha [12] and pitta is responsible for puthi shukra appearance.[13]
- **pH:**
  Normally 7.2-7.8[14]
  Abnormal finding: > 8.5
  Alkaline pH refers to infection or inflammation in reproductive tract usually found in prostatitis, seminal vesiculitis.
  Interpretation
  Infection → Pitta
  Dryness → Vata
  Alkaline pH (> 8.5) indicates Rukshata (dryness), often associated with Vata dosha.
- **Fructose-**
  Normally-present -150-300 mg/dl [15]
  Disorders of seminal vesicle, blockage in the ejaculatory duct, androgen deficiency may lead to reduction in fructose concentration.
  Interpretation-
  Fructose is a sugar in semen, a vital energy source for sperm motility. It indicates madhurata of shuddha shukra. Low fructose levels may indicate kshina shukra and kshina kapha type of shukra dushti.
- **Viscosity (Grade):**
  Normal viscous semen can be poured drop by drop. Should form a thread < 2 cm when pipetted.
  Abnormal- hyper viscosity indicates poor prostate function. Watery semen linked with hormonal changes and reduced cell content.
  Interpretation:
  Increased viscosity suggests Picchilata (stickiness), linked to Kapha dosha.
- **Sperm Count (Million/ml):**
  Normal:
  Sperm Concentration ≥15 million/mL
  Total sperm number ≥39 million/ejaculate [16]
  abnormal:
  Sperm Concentration < 15 million/ml
  Total sperm number <39 million/ejaculate
  Interpretation:
  Low sperm count (< 20 million/ml) indicates Tanutwa (thinness or scantiness), often related to Vata dosha, Shukra kshaya, Vata and Ojas Depletion. [17]
- **Motility-**
  Normally 60-95% motility is seen in normal semen.
  Abnormal- motility less than 42% of total motility and 30% of progressive motility may be associated with infertility.
  Interpretation-
  Vata disturbances weaken sperm motility. Ksheena shukra among eight types of shukra

dushti can be correlated with oligoasthenospermia.

- **Agglutination (%):**
  No agglutination normally
  Abnormal:> 20% agglutination
  Often indicates antisperm antibodies, infection/inflammation
  Interpretation:
  High agglutination (> 20%) indicates granthi bhuta shukra which is due to kapha and vata dosha dushti.
- **Cellular Elements:**

1. **Pus Cells:**
   Normally 1-2 cells/HPF [18]
   Abnormal:> 5 cells/HPF
   Presence of pus cells indicates infection or inflammation.
   Interpretation-
   Presence of pus cells indicates infection or inflammation, often related to Pitta-kapha dominant disorder and putipuya type of shukra dushti.[19]
2. **Macrophages:**
   Normally 1-2 cells/HPF
   Abnormal: > 5 cells / HPF
   Interpretation-
   Indicates an abnormal mixture of different tissues, suggesting an underlying imbalance which can be correlated with anyadhatu samshrishta type of shukra dushti. [20]
3. **Amorphous Matter:**
   Abnormal: 2+ to 4+
   Interpretation-
   Presence of amorphous matter suggests an abnormal mixture of tissues, indicating dosha imbalance which can be correlated with anyadhatu samshrishta type of shukra dushti.
4. **Sperm Morphology**
   A semen sample should have at least 4% morphologically normal sperm for a healthy range. Abnormal sperm morphology means sperm have misshapen heads, tails or midpieces, impacting fertility. Testicular temperature, genetics, infections, chemical exposures, and lifestyle factors can all cause abnormal sperm.
   Interpretation-
   Morphological assessments identify microcephalic sperm (linked to Vata), macrocephalic sperm (Kapha), coiled tails (Vata-Pitta), and other anomalies, including pinhead or thin-headed sperm, classified via sukshma, laghu, and ruksha properties of vata dosha.

DISCUSSION:

Semen analysis is the cornerstone of male fertility assessment, with WHO 6th Edition (2021) providing updated global reference limits. Ayurveda views semen (shukra dhatu) as the final essence of dhatu metabolism and defines several types of its vitiation (shukra dushti). These are the characteristic features of shuddha shukra (uncontaminated or pure semen)-

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Testicular temperature, genetics, infections, chemical exposures, and lifestyle factors can all cause abnormal sperm.

Interpretation-

Morphological assessments identify microcephalic sperm (linked to Vata), macrocephalic sperm (Kapha), coiled tails (Vata-Pitta), and other anomalies, including pinhead or thin-headed sperm, classified via sukshma, laghu, and ruksha properties of vata dosha.

CONCLUSION:

The present study systematically correlates modern semen analysis parameters, as defined by the World Health Organization 6th Edition (2021) guidelines and modern pathology textbooks, with classical Ayurvedic descriptions of Shukra Dushti documented in Charaka Samhita, Sushruta Samhita, and Ashtanga Hridaya. The analysis demonstrates that objective laboratory parameters such as semen volume, liquefaction time, viscosity, pH, sperm concentration, motility, morphology, agglutination, and presence of inflammatory cells can be meaningfully interpreted through the Ayurvedic framework of Dosha and Dushya involvement. Low semen volume and sperm concentration were found to correlate with Shukra Kshaya and Tanu Shukra, predominantly reflecting Vata vitiation. Increased viscosity, delayed liquefaction, and agglutination corresponded to Picchila and Granthibhuta Shukra, indicating Kapha–Vata predominance. Alkaline pH and leukocytospermia aligned with Pitta-dominant conditions such as Puti Shukra, suggestive of inflammatory pathology. Morphological abnormalities similarly demonstrated Dosha-specific attributes, reinforcing the subtle diagnostic insights described in classical texts. This integrative mapping bridges the gap between traditional and modern paradigms by highlighting the fact that modern science provides measurable values, while Ayurveda explains the underlying Dosha imbalance and dushya weakness. This kind of correlation improves clinical reasoning, increases diagnostic accuracy, and makes it easier to plan individualized treatments based on Dosha predominance rather than just numerical thresholds. Such treatment will provide holistic approach of treatment which considers all other systemic disorders responsible for shukra dushti and not only reproductive system involvement. The findings emphasizes that male infertility should be considered a systemic imbalance impacting Shukra Dhatu and its metabolic pathways rather than just a laboratory anomaly. Clinicians can implement a comprehensive and customized management approach to address the underlying Dosha imbalance, enhance Shukra quality, and support reproductive health by fusing objective semen examination with Ayurvedic interpretation. A scientifically organized route for developing evidence-based Ayurvedic and integrative andrology is provided by this integrative diagnostic approach.

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