UNDERSTANDING DIABETES MELLITUS (DM) WITH AYURVEDA: ADVANTAGES AND CHALLENGES

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Introduction

• 21st century is witnessing a global upheaval of unprecedented proportions in current healthcare models

• Explosive increase in non-communicable diseases (NCDs), primarily cardiovascular disease, cancer, diabetes, chronic respiratory conditions and mental illnesses

• Four metabolic changes which are not only associated with NCDs, but which directly contribute to mortality: raised blood pressure (13% of global deaths), overweight/obesity (5% of global deaths), hyperglycemia (6% of global deaths) and hyperlipidemia (4.5% of global deaths)
Burden of disease

• Diabetes mellitus (DM) is associated with the least mortality amongst NCDs, but contributes significantly by increasing the risk of cardiovascular disease

• Global prevalence diabetes in 2011 was estimated at 366 million, projected to increase to 552 million by 2030. (32)

• Prevalence of diabetes in India was estimated at 62.4 million, with 77.2 million at extremely high risk of progressing to diabetes (33)

• Although discussed primarily as a condition of increased blood sugar (hyperglycemia), DM is a **multisystem disorder** with cardiovascular, neurological, psychiatric, renal and visual complications
# Current diagnostic methods

## Tests to Diagnose Diabetes – Table 2

For all the below tests, in the absence of unequivocal hyperglycemia, results should be confirmed by repeat testing.

<table>
<thead>
<tr>
<th>STAGE</th>
<th>A1C NGSP certified &amp; standardized assay</th>
<th>Fasting* Plasma Glucose (FPG) *No intake 8 hrs</th>
<th>Random Plasma Glucose</th>
<th>Oral Glucose Tolerance Test (OGTT) 75–g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td>A1C ≥ 6.5%</td>
<td>FPG ≥ 126 mg/dl</td>
<td>Random plasma glucose ≥ 200 mg/dl plus symptoms¹</td>
<td>Two-hour plasma glucose (2hPG) ≥ 200 mg/dl</td>
</tr>
<tr>
<td>Increased risk of diabetes</td>
<td>A1C 5.7 – 6.4%</td>
<td>Impaired Fasting BG (IFG) = FPG 100–125 mg/dl</td>
<td>Impaired Glucose Tolerance (IGT) = 2hPG 140–199 mg/dl</td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>A1C &lt; 5.7%</td>
<td>FPG &lt; 100 mg/dl</td>
<td>2hPG &lt; 140 mg/dl</td>
<td></td>
</tr>
</tbody>
</table>

¹ Random = any time of day w/out regard to time since last meal; symptoms include usual polyuria, polydipsia, and unexplained wt loss.

American Diabetes Association Clinical Practice Recommendations. Standards of medical care for patients with DM. January 2015 vol. 38 Supplement 1 S1-S90
Current management strategies

- Pharmacological management - first line of treatment, but drugs for complications such as depression may worsen control of blood sugar (35).

- Standard regimens of oral anti-glycemic (sugar-lowering) drugs work initially, but have poor long-term efficacy with poor treatment adherence. (40)

- Hence, more aggressive pharmacological management, with insulin and drug poly-therapy is recommended even in the early stages of the disease. (41)
Geography specific strategy?

- Increasing evidence that the etiology and pathogenesis of diabetes may be different in South East Asians, with the description of the “Asian Indian Phenotype”, characterized by increased body fat, lower muscle mass and a possible genetic susceptibility to early diabetes (10-15 years earlier than Caucasians) 43.

- The importance of diet, lifestyle and psychological issues, with the need to consider genetic factors that may be unique to India suggest that any integrative model of medicine should be based on a whole-system approach.
Prameha (diabetes)

- The word Prameha is derived from 'Miha sechane' which means "watering".
- "Pra" means excess of urine in both frequency and volume.
- Prameha, holds the twin meanings of "Prabhutha mutratha" or excessive urination and "Avilmutratha" or turbid urine.
- Prameha is a metabolic disorders explained extensively in Ayurveda literature.
Aetiopathogenesis of Prameha

- Intake of excessive Guru, Snigdha, Amla, Lavana aahara, intake of excess amount of food, freshly harvested cereals and wines, excessive sleep, sedentary lifestyle, lack of mental and physical exercise and avoidance of a seasonal Samshodhana karma aggravates Pitta, Kapha, Meda and Mamsa dhatu.

- It is quite interesting to note that whilst these are mainly Santarpana Hetus (i.e. factors caused as a result of over-nutrition), they still produce the disease Madhumeha in which mainly Apatarpana (under nutrition) of body occurs.
Aetiopathogenesis of Prameha

- Ayurveda classifies causative factors responsible for Prameha into those leading to increase in vata or those that result in dhatukshaya.
- Such causative factors produce a specific etiopathogenesis where in the dhatus are brought to the bladder and excreted out through the urine giving rise to Prameha.

medaśca māmsaṁ ca ṣarīraṁ ca kledaṁ kapho bastigataṁ pradūṣyaḥ
karoti mehān samudīrṇamuṣṭāiṣāneva pittaṁ paridūṣya ca piṣṭiḥ||5||
kṣīneṣu doṣeṣvavakṛṣya bastau dhātūn pramehānanilaḥ karoti|
doṣo hi bastiṁ samupetya mūtraṁ sandūṣya mehānjanayedyathāsvam||6||
Paradox in disease understanding

• Allopathy perceives DM as a condition in which a hormone (insulin) is either not secreted sufficiently to convert the glucose to glycogen or the cells develop resistance to insulin.
• This understanding is reductionist in nature and the management strategy also is simply either to provide insulin externally or enable the cells to increase its production or give chemical agents to alter the receptibility of cells to facilitate exchange of glycogen and glucose.
• Stages of pathological progression and clinical findings that mark each stage have been listed for Prameha.
• It is possible to map many of these clinical findings to current understanding of the disease and thereby to its biochemical correlates.
• However, we must bear in mind is that Ayurveda relies purely on a systemic understanding of human system and bases its management strategies on careful clinical observations that may or may not correlate entirely with the current non-clinical marker of the disease.
Subtle indicators

- Ayurveda views this as an imbalance in the internal milieu of the body due to various external and internal, immediate and remote etiological factors that bring about systemic changes in the body leading to blockage of channels that carry bio-regulatory signals, energy and nutrition, impairment of conversion of tissue materials.
- It proposes that certain body types are predisposed to such changes.
- Eg.: Studies have shown VK Prakriti is correlated with diabetes mellitus, evident by insulin resistance and increased inflammatory markers in these individuals (Mahalle NP, 2012, JAIM).
Exploring Ayurveda theory of pathogenesis

Six stages of progression

1. Accumulation
2. Aggravation
3. Spread
4. Localisation
5. Expression
6. Exacerbate

Factors involved in disease production

Nidana (Cause)

Dosha (V,P,K)

Dushya (Dhatu, Agni, Ama)

Disease

CHALLENGE - IDENTIFYING BIOMARKERS UNIQUE TO EACH STAGE USING OMICS
### Prameha proclivity factors recognised by Shatkriyakala

<table>
<thead>
<tr>
<th>Kapha Prakopa</th>
<th>Upalepa (increased coating over tongue, eyes, external auditory orifice)</th>
<th>Prakopa</th>
<th>Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ati Nidraa</td>
<td>Prakopa</td>
<td>Symptoms</td>
</tr>
<tr>
<td></td>
<td>Swaadu aasyataa</td>
<td>Prakopa</td>
<td>Symptoms</td>
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<tr>
<td></td>
<td>Tandra</td>
<td>Prakopa</td>
<td>Symptoms</td>
</tr>
<tr>
<td>Maamsavaha</td>
<td>Maamsa Vriddhi</td>
<td>Prakopa</td>
<td>Examination</td>
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<tr>
<td>Srotas Dushti</td>
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<td></td>
<td>Keela (Corn/ polyp/ skin tag)</td>
<td>Prakopa</td>
<td>Examination</td>
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<tr>
<td></td>
<td>Alajee (skin rash)</td>
<td>Prakopa</td>
<td>Examination</td>
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<tr>
<td></td>
<td>Acanthosis (Tvak Shyamatva)</td>
<td>Prakopa</td>
<td>Examination</td>
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<tr>
<td></td>
<td>Kha Mala Vriddhi</td>
<td>Prakopa</td>
<td>Symptoms</td>
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<tr>
<td></td>
<td>Mid arm, mid thigh, mid calf circumference</td>
<td>Prakopa</td>
<td>Examination</td>
</tr>
<tr>
<td>Meda Vriddhi</td>
<td>Skin Fold thickness</td>
<td>Prakopa</td>
<td>Examination</td>
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<tr>
<td>Waist Hip ratio</td>
<td>Prakopa</td>
<td></td>
<td>Examination</td>
</tr>
<tr>
<td>Neck circumference</td>
<td>Prakopa</td>
<td></td>
<td>Examination</td>
</tr>
<tr>
<td>Sveda Vriddhi</td>
<td>Prakopa</td>
<td></td>
<td>Symptoms</td>
</tr>
<tr>
<td>Tender Fat</td>
<td>Prakopa</td>
<td></td>
<td>Examination</td>
</tr>
<tr>
<td>Viceral fat</td>
<td>Prakopa</td>
<td></td>
<td>Examination</td>
</tr>
<tr>
<td>Shotha</td>
<td>Prakopa</td>
<td></td>
<td>Examination</td>
</tr>
<tr>
<td>Prameha poorvaroopa</td>
<td>Desire for Shayya sukha, aasya sukha, swapna sukha</td>
<td>Symptoms</td>
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<tr>
<td>Ghana Angata (hypertonia)</td>
<td>Symptoms</td>
<td></td>
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<tr>
<td>Netra, Jihwa, Karna Mala Vriddhi</td>
<td>Symptoms</td>
<td></td>
<td></td>
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<tr>
<td>Coating on teeth and Gums (Spongy gums, bleeding gums) or plaques</td>
<td>Examination</td>
<td></td>
<td></td>
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<tr>
<td>Kesha, Nakha ati vridhi (increase of nails and hair growth)</td>
<td>Symptoms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sheeta priyatwam (desired to have cold things)</td>
<td>History</td>
<td></td>
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<tr>
<td>Shushkasyata [dryness of gala (throat) &amp; talu (pallet)]</td>
<td>Examination</td>
<td></td>
<td></td>
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<tr>
<td>Mukh Madhurya [sweet taste in mouth]</td>
<td>Symptoms</td>
<td></td>
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<tr>
<td>Kara Pada Daha [burning palms and soles]</td>
<td>Symptoms</td>
<td></td>
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<tr>
<td>Snigdha (Oily), Pichchhila (Stickiness), Guru gatra</td>
<td>Examination</td>
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<td>Shukla mootrata (Pale urine)</td>
<td>Examination</td>
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<tr>
<td>Pipasa (Thirst)</td>
<td>Symptoms</td>
<td></td>
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<td>Durgandha shwasa (bad breath)</td>
<td>Symptoms</td>
<td></td>
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<tr>
<td>Jatila kesha (Entangling of hair)</td>
<td>Examination</td>
<td></td>
<td></td>
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<tr>
<td>Mala Aadhikya (quantity of stool/ urine/ increased coating or secretions )</td>
<td>Symptoms</td>
<td></td>
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</tr>
</tbody>
</table>
Agni-Ama understanding

Aberrant metabolism (Agni)

Toxic, pro-inflammatory, waste-product (Ama)

Blocks micro-channels (Srotas)

Disease

Can we demonstrate these concepts and interventions in suitable biological models?
Management of Prameha in Ayurveda

- Prameha patients may be categorized as
  - Sthoola and balavan - those who are obese & strong
  - Krish and durbala - those who are emaciated & weak

- Manage based on Samanya vishesha siddhanta i.e.
  - Sthoola – Shodhana (elimination therapy)
  - Krisha person – Brimhana (nourishing therapy)
An example of Integrative management

Panchakarma (Purificatory Procedures)
- Abyantara
  - Virechana

Shamana Treatment (Internal medicines)
- Kashaya (herbal decoction)
  - Katakakadiradi
  - Varanadi Kashaya
  - Nisha katalakadi
  - Astavarga Kashaya
- Asava Arishta (traditionally fermented liquid preparations)
  - Varunasava
- Vati (tablets)
- Others (oil, ghee preparations, medicated powder)
  - Amruth
  - Aswajith
  - Tab Diabecon DS
  - Tab Mentat
  - Tab Dia P
  - Tab Geriforte
  - Cap
  - Ksheerababa 101
  - Tab D Nil
  - Tab Abana
  - Tab Hyponidd

Asana
- Pavanamuktasana
- Supta Mukhasana
- Supta Mukhasana
- Naukasana
- Vajrasana
- Tadasana
- Ardha Matsendriyasana
- Tiryakasana
- Bhujangasana
- Kati Chakrasana

Pranayama
- Abdominal breathing
- Yogic breathing

Mudra
- Chin Mudra
- Tadagi Mudra
- Manduki mudra
- Yoga Mudra

Bandha
- Moolabandha bhandha
- Jalandhara bhandha
- Uddayana Bandha
Inherent strengths of Ayurveda

1. **Customised intervention** that varies according to individual constitutional framework (*prakriti*) and the stage & phase of disease.

2. **Multi-component intervention** involving drug, diet, lifestyle, *panchakarma* (*detox*) and yoga.

3. A systemic cleansing of body (*shodhana chikitsa*) using techniques of *Panchakarma* that is unique to Ayurveda

4. A treatment approach that has **homeostasis or restoration of balance as its end point**. In this approach, stress is laid on two things:
   a. **Apunarbhatva**: Achieving a stable state of homeostasis that does not relapse to the prior diseased stage (non-recurring).
   b. **Yonyamanyamudeerayet**: Achieving homeostasis without causing any disturbance to any other systems (without side-effects).
• Secondary complications of DM may be significantly prevented/arrested
• Co-morbidities like obesity, elevated lipid levels can also be targeted simultaneously with the right combination of dravya
THANK YOU