



DIABETES INDUCED MICROALBUMINURIA - A CRITICAL REVIEW

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ABSTRACT

Microalbuminuria is a marker and a risk factor of diabetic renal complications commences its role in pathogenesis of nephropathy at its third stage, the stage of incipient nephropathy. Microalbuminuria is followed by overt nephropathy and end-stage renal disease of irreversible renal damage. Early detection of microalbuminuria has a decisive role in the healthy survival of diabetics. Urine albumin excretion rate and albumin creatinine ratio on timed urine samples, early morning samples or spot urine are of beneficial use. Ayurveda describes diabetes mellitus as *Prameha roga* in which the major pathogenesis takes precedence in *Mootrasaya*. Microalbuminuria can be described as *Prameha Janya Vrikka Roga*. It occurs due to *Sanga* (obstruction), *Vimarga Gamana* (abnormal movement) of albumin; one of the constituents of *Raktadhatu* (blood) through *Rakta* and *Mootra Vaha Srotas* (channels of blood and urine). Medicines which are *Pramehaghna* (anti-diabetic), *Mootra* and *Raktavaha Srothosodhana* (cleanse the channels) may be of good worth to rectify the pathology of microalbuminuria providing an improved life for diabetics.

Keywords: Binsha Salim, Madhuri Devi, microalbuminuria, Ayurveda

INTRODUCTION

An unusually increased glycemic status in blood vessels can do certain scornful effect on the acceptable purpose of vital organs. The regular victims of this

metabolic catastrophe are retina, nephron and neuron guide to the development of retinopathy, nephropathy and neuropathy in uncontrolled diabetics. Among them

diabetic nephropathy is one of the most leading cause of mortality.^[1] The 5 stages of pathogenesis in diabetic nephropathy are Stage of hypertrophy and hyper filtration, Stage of structural change without functional alteration, Stage of microalbuminuria, Stage of overt nephropathy and Stage of advanced nephropathy.^[2] Early detectable stage of diabetic nephropathy is microalbuminuria. It is characterized by excretion of albumin 30-300 mg/day in 24- hour urine sample.^[3] International Diabetic Foundation recommends the annual screening of microalbuminuria after every 5 years of onset of type 1 diabetes mellitus and at the time of the diagnosis of type 2 diabetes mellitus and yearly thereafter.^[4] Ayurveda is popular among public in treatment of diabetes, hence a prompt discussion of microalbuminuria in Ayurvedic vista is adequate. Almost all classical compendiums of Ayurveda describe *Prameha roga* (obstinate urinary disorder) which is nearly equivalent with the features of diabetes mellitus.

The findspot of microalbuminuria in Prameha

In Ayurveda, the pathology of any disease is described as 6 opportunity for treatment named *Shad- kriya kala* include *Sanchaya* (accumulation), *Prakopa* (excitement from the principal abode), *Prasara* (movement from the abode), *Sthana samsraya* (localization), *Vyatka* (manifestation) and *Bheda* (split up into complications).^[5] The findspot of microalbuminuria in *Prameha* is at 6th *kriyakala*- the stage of *Bheda*. It can be termed as a *Prameha Janya Upadrava* (diabetes induced complication)

Etiology of microalbuminuria in diabetes mellitus

Etiology of microalbuminuria can be compared with the cause of *Prameha Upadrava* depicted in the *Nyayacandirika Vyakhya* (commentary on *Susruta Samhita- Nidana Sthana*) by *Acharya Gayadasa* (Table 1).

Table 1: Etiology of microalbuminuria

Ayurveda- Etiology of <i>prameha upadrava</i> ^[6]	Modern – Etiology of diabetic nephropathy ^[7]
1. <i>Prameha upekshaya</i> (lack of adequate treatment)	1. Long standing uncontrolled diabetes.
2. <i>Prameha atiyoga</i> (severity of disease)	Persistent hyperglycemia
a. <i>Roga atiyoga</i> (hyperglycemia)	2. Chronicity
b. <i>Kala atiyoga</i> (chronicity)	3. Hypertension
3. <i>Dushtamedas</i> (vitiation of <i>Medo Dhatu</i>)	4. Dyslipidemia

Pathogenesis: It can be termed as a *Prameha janya vrkkaroga*. Therefor all *dosha* factors takes part in *Prameha roga* appears as a factor of pathogenesis in microalbuminuria.

Samprapti ghataka (pathogenic factors): *Dosha* in *Samprapthi*:- *Dosha* involved in the pathogenesis are the factors which participates in urine formation and involves in the pathogenesis of *Prameha* (Table 2)

Table 2: *Dosha* involved in *Samprapthi*

<i>Tridosha</i>	Types of <i>dosha</i> involved
<i>Vata</i>	<i>Samana vayu</i> ; urine formation- <i>Ahara rasa drava bhava</i> (liquid part of the food) turned into urine. <i>Samana vayu</i> present in all <i>Udakavaha srotas</i> (channels of fluids) ^[8]
	<i>Apana vayu</i> ; <i>Mutra utsarga</i> (excretion of urine) ^[9]
	<i>Vyana vayu</i> ; responsible for <i>Gati</i> (movement) ^[9]
<i>Pitha</i>	<i>Pachaka pitha</i> - on <i>Maladhara kala</i> which separates <i>Mutra</i> ^[9]
<i>Kapha</i>	<i>Avalambaka kapha</i> – <i>Udaka karma</i> ^[9]

Table 3: Samprapti of microalbuminuria

	Ayurvedic view	Conventional view
Nidana (etiology)	<i>Deergha kalasthita prameha, Prameha atiyoga</i>	Long duration of diabetes with poor glycemic control
Pathogenic factors	<i>Samanavata vyana vata, Avalambaka Kapha, Kledaka kapha, Pachaka pitta</i> got vitiated [9]	Alteration in the physiology of urine formation
Stage1	<i>Mootradhara kala vrdhi and Mootravrdhi</i>	Stage of hypertrophy and increased GFR. Excess elimination of glucose through urine
Stage 2	<i>Ayanadourbalya of Mootra vahasrotas</i>	GBM thickening, mild or severe mesangial expansion
Stage 3	Excess loss of <i>Dhatu saramsha</i> (albumin) through urine	<i>Nodular sclerosis, lower molecular weight protein-albumin is filtered and appeared in urine. (Microalbuminuria)</i>
Stage 4	<i>Dhatuksaya</i> and worsening of health of <i>Vrkka</i>	Advanced diabetic glomerulosclerosis that includes tubulointerstitial lesions and vascular lesions
Stage 5	Final irreversible damage of <i>Mootravaha samsthana</i>	End-stage kidney disease with GFR < 15 ml/min/1.73 m ² [10]

*GBM – Glomerular Basement Membrane

Dushyas: All *Dushya* of *Prameha* include *Medas, Mamsa, Vasa, Majja, Kleda, Sukra, Sonita, Rasa* and *Ojas* [11]

Structural changes take place in;

- *Mootradharakala* – nephron,
- *Mootravahini, Sira* (vessels)
- *Asaya – Mootrasaya* (urinary system)

Manifestation of the disease microalbuminuria and its prognosis is described in schematic representation comparing Ayurvedic and conventional view (Table 3). In general, *Prameha* causes *Srotodushti on Raktavaha and Mutravaha Srotas* leads to

1. *Vimargagamana* (impaired movement) of one of the constituents of *Raktadhatu* (albumin) into Bowman's capsule
2. *Sanga* – failure of reabsorption of albumin into renal capillaries

Clinical features

Poorvarooopa (prodromal symptoms)

Stage of hyper filtration or hypertrophy

- Glomerular filtration is exceeding than normal, *Prabhoota mootrata* (polyuria) the classical sign of *Prameha*.
- Elevated renal plasma flow
- Increased kidney size by 20%
- It can be correlated as *Mamsopacaya* (hypertrophy) mentioned in *Upadrava* of *Kaphaja Prameha* (complications)

Stage of structural glomerular lesion

- Hemodynamic changes at earlier stage
- Basal membrane thickening and mesangial expansion [2,10]

These are accumulation of *Vaikruta dosha* at nephron level, because of the continuous fatigue created by *Deergha kaala madhumeha* (persistent hyperglycemia).

Roopa (signs and symptoms)

The disease rarely exhibits any distinct symptom. *Lakshanas* like frothy urine – *Aavila mootrata* can be seen in some patients as a clinical sign. The condition cannot be equated with *Phena meha* or *Sandra meha* mentioned as *Kaphaja prameha* varieties in classics. Because microalbuminuria appears as a *Deergha kala sthita prameha janya upadrava*, but the above disease appears a manifestation of *Kaphaja prameha*. [12]

Chikitsa – Diabetes induced microalbuminuria

The goals of treatment are to control blood glucose level, hypertension and to reverse structural damage of nephrons including Bowman's capsules and glomerular capillaries in early stages and to control further renal damage. [13] The modalities of treatments are *Nidana parivarjana* (removal of aetiology) by means of adequate treatment of diabetes (*Pramehahara*) along with early detection of microalbuminuria, *Samprapthi Vighatana* (rectify the pathology) and to clear *Ayana dourbalya of Mootravaha srotas* to provide structural integrity and to prevent the leakage of albumin through

Mootradharakala. This is achieved by the rectification of *Vimarga Gamana* of albumin through *Raktava-hasrotas* as well as *Sanga* of albumin *Mootravahasrotas*. Effective medications can be chosen from *Prameha chikitsa* which are *Pramehahara* (antidiabetic) and *Srotosodhana* (cleansing the channels from impurities-antioxidant anti-inflammatory etc.).

CONCLUSION

Prameha is quite similar in description to the disease of diabetes mellitus in reference to the clinical features and treatment. As regards the pathogenesis of microalbuminuria can be described under the concepts and principles of Ayurveda in its various aspects. Determination of Ayurvedic point of view in microalbuminuria will aid to draw a generalizable new knowledge for the potential treatment scenario which helps in prevention and cure of diabetic renal complications.

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