

STUDY ON MICROALBUMINURIA IN APPARENTLY NORMAL POSTMENOPAUSAL WOMENDEEPTI GN^{1*}, LAKSHMI K², SUMATHI S³

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ABSTRACT

Introduction: Microalbuminuria is usually estimated in diabetic and in patients with risk of renal problems.

Objective: Our aim is to study the occurrence of microalbuminuria in apparently normal postmenopausal women and also to find out the relationship between microalbuminuria and cardiovascular risk factors.

Methods: The study was conducted in a tertiary care hospital for a period of 4 months. Serum and urine samples were taken from forty four apparently normal postmenopausal women. Urea, Creatinine, Uric acid levels and lipid profile from serum samples and microalbumin, creatinine levels from urine samples were estimated. Urine albumin creatinine ratio and Glomerular Filtration Rate were calculated using standard methods.

Results: 48% of the women in our study had microalbuminuria. Microalbuminuria positive subjects had higher TC, LDL, TGL and VLDL levels when compared to microalbuminuria negative subjects.

Conclusion: Occurrence of microalbuminuria in normal postmenopausal women and significantly higher risk of abnormal lipid profile in them favours the importance of screening of microalbuminuria in apparently normal postmenopausal women also.

Keywords: Microalbuminuria, Postmenopausal women, lipid profile, renal parameters.

INTRODUCTION

Microalbuminuria (MA) is defined as the excretion of 30–300 mg/dl of albumin per day in urine. Excretion of 17–250 mg/g of creatinine in men and 25–355 mg/g of creatinine in women in spot urine samples is also considered as microalbuminuria [1]. When the permeability of albumin is high in the renal glomerulus, the chances of microalbuminuria increase to a greater extent. MA is usually considered as a common risk factor for renal diseases, but recent studies have showed that MA could also occur due to general arterial processes [2].

Microalbuminuria is usually characterized by arterial hypertension, diabetic nephropathy, peripheral neuropathy and nephropathy. High excretion of albumin in urine could also be one of the risk factors of developing hypertension and chronic kidney disorder [3,4]. Smoking and obesity are considered as common precipitating factors for microalbuminuria. MA is more commonly considered to check the occurrence and prognosis of renal diseases, but nowadays literatures have shown the relationship between microalbuminuria and cardiovascular problems. MA is now used as a monitory tool to assess the risk of cardiovascular risk.

The menopause is defined as the permanent cessation of menses[5]. Estrogen hormone usually helps to maintain cardiac functions by increasing the level of HDL and lowering the LDL and triglycerides. Previous studies have proved that postmenopausal women with microalbuminuria had a higher prevalence of diabetes, obesity, hypertension and dyslipidemia when compared with other postmenopausal women without microalbuminuria[6]. Few studies have shown that the apparently normal postmenopausal women are even at risk of many infections [7].

Various studies have showed that endothelial dysfunction may be a risk factor for the development of diabetes and hypertension, making MA a possible coexisting pathogenic factor, if present[8]. As per The Framingham Heart Study, the low-grade albuminuria in apparently healthy and normal individuals may be a considered as a marker for subclinical vascular damage that may precipitate future CVD and death[9].

To the best of our knowledge, very few studies have been done in the past to study the occurrence and prevalence of MA in apparently normal postmenopausal women. In the present study we tried to find out the occurrence of microalbuminuria in apparently normal postmenopausal women and also to find out the relationship between microalbuminuria and cardiovascular risk factors.

MATERIALS AND METHODS

This study was a cross sectional case control study, conducted in a tertiary care hospital, Pondicherry for a period of four months, after getting approval from the institutional ethical committee. Study subjects were apparently normal postmenopausal women within the age group of 45 – 70 years. Subjects with known case of renal disorders, urinary tract infection, hypertension, Diabetes mellitus, acute illness and Patients on OCP or HRT were excluded from the study. Out of the 80 women enrolled, 44 were apparently normal postmenopausal women, included in the present study. After explaining the nature of the study, informed consent was obtained from the study subjects. From all subjects relevant history was taken and recorded in a structured protocol format. Blood pressure was measured in all, to rule out hypertension. Blood and urine sample were collected from the subjects after an overnight fast of about 10-12 hours. 4 ml of venous blood was collected in a clot activator tube. Serum was separated after centrifugation and analyzed for blood glucose, urea, creatinine, uric acid, total cholesterol(TC), triglycerides(TGL), high density lipoprotein(HDL), low density lipoproteins(LDL) and very low density lipoprotein(VLDL). Urine microalbumin and urine creatinine were estimated. Urine albumin creatinine ratio was calculated and GFR was calculated using MDRD formula. For urinary creatinine measurement, urine was diluted 20 times. All serum parameters and urinary creatinine was analyzed in fully Auto analyzer – Cobas Mira Plus EIA RS 232, Switzerland. Urine microalbumin was analyzed in semiautoanalyser – BIOTRON BTR 830.

Subjects with urine albumin creatinine ratio more than 25mg/g and less than 355mg/g are considered as microalbuminuria positive and were taken as cases and the rest were considered as controls.

Statistical analysis was done by using SPSS software. Statistical probability was seen by using Student's t-test represented by P value. Statistical significance was considered at P value < 0.05.

RESULTS

Of the 44 apparently normal postmenopausal women 21 were microalbuminuria positive (cases) and 23 were microalbuminuria negative (controls). Average age (in years) of MA positive subjects was 57.14±4.84 and in negative subjects were 56.09±5.47.

No significant difference was found in FBS level between the positive and negative subjects. FBS level in positive subjects were 91.48±10.53 and negative subjects were 90.26±14.69.

Renal parameters

There is no significant difference in renal parameters in cases and controls

Table 1: Renal parameters in Cases and Controls

| | Microalbuminuria | Mean | SD | P value |
|--------------------|------------------|-------|-------|---------|
| UREA (mg/dl) | Positive | 24.43 | 8.29 | >0.05 |
| | Negative | 21.48 | 6.86 | |
| CREATININE (mg/dl) | Positive | 0.83 | 0.10 | >0.05 |
| | Negative | 0.81 | 0.10 | |
| URIC ACID (mg/dl) | Positive | 5.02 | 1.14 | >0.05 |
| | Negative | 5.33 | 1.48 | |
| GFR (ml/min) | Positive | 76.38 | 11.66 | >0.05 |
| | Negative | 78.91 | 11.80 | |

Lipid profile

Microalbuminuria positive subjects had significantly higher TC and LDL levels when compared to microalbuminuria negative subjects. Though not statistically significant, TGL and VLDL were also found to be higher in MA positive subjects.

Table 2: Lipid profile in MA positive and negative subjects

| | Microalbuminuria | N | Mean | SD | P value |
|--------------|------------------|----|--------|-------|---------|
| TC (mg/dl) | Positive | 21 | 219.52 | 34.23 | <0.05 |
| | Negative | 23 | 193.78 | 37.33 | |
| TGL (mg/dl) | Positive | 21 | 153.33 | 59.57 | >0.05 |
| | Negative | 23 | 129.96 | 45.75 | |
| HDL (mg/dl) | Positive | 21 | 39.67 | 5.96 | >0.05 |
| | Negative | 23 | 39.57 | 11.50 | |
| VLDL (mg/dl) | Positive | 21 | 30.67 | 11.91 | >0.05 |
| | Negative | 23 | 26.09 | 9.18 | |
| LDL (mg/dl) | Positive | 21 | 149.29 | 27.92 | <0.05 |
| | Negative | 23 | 128.22 | 37.76 | |

DISCUSSION

The purpose the study was to find out the percentage of apparently normal postmenopausal women with microalbuminuria and to compare various parameters like renal parameters and lipid profile in subjects with and without microalbuminuria. In our study around 48% of the subjects had microalbuminuria. When comparing cases and controls there was no significant difference in the renal parameters but TC, TGL, VLDL and LDL were higher in cases, of which TC and LDL were significantly high. There was no significant difference in the HDL level between these groups.

Our finding agrees to the previous studies that MA is associated with cardiovascular risk factors like dyslipidemia in general population. Study conducted by Haffner *et al* showed that microalbuminuria is associated with dyslipidemia in non diabetic and non hypertensive individuals compared to the individuals without microalbuminuria[10]. In another study conducted by OS Busari *et*

al, there is significant increase in TC and LDL in microalbuminuria positive patients compared to subjects without microalbuminuria and there was significant decrease in HDL level in MA positive subjects[11]. In contrast to this study, there was no significant change in HDL levels between both groups in our study.

Study conducted by Mark Roest *et al* [2] supported the hypothesis that microalbuminuria can be considered as a marker of early generalized arterial dysfunction. Microalbuminuria may be used as an intermediate point of subclinical arterial damage. Our study also supports the view that microalbuminuria is a reflection of cardiovascular disease not only in diabetic and/or hypertensive subjects but also in postmenopausal women from the general population. Hence microalbuminuria should be considered as a cardiovascular risk factor not only in diabetic and hypertensive patients, but also in postmenopausal women.

It has also been shown that increase in the capillary permeability in the MA subjects has been associated with decrease in Heparan Sulphate Proteoglycan (HSPG). HSPG maintains the glomerular basement membrane permeability and also inhibit the proliferation of smooth muscle which is an important process of atherosclerosis[12].

Various studies done in the past have showed increased incidence of microalbuminuria in diabetes and hypertensive patients and subjects with risk factors of cardiovascular diseases [9, 13-19]. Screening for microalbuminuria has been advised for persons with hypertension or diabetes mellitus by the American Diabetic Association[20]. Whether screening for microalbuminuria should be done for apparently normal individuals is less understood. Our study favours the screening for microalbuminuria in apparently normal postmenopausal women because detecting microalbuminuria may help us in identifying the individuals who are at increased risk for not only renal problems, but also cardiovascular events.

CONCLUSION

Microalbuminuria is found to be prevalent in apparently normal postmenopausal women. Also, it is found to be associated with abnormal lipid profile. Hence, Microalbuminuria may also be considered as a cardiovascular risk factor and early marker of arterial dysfunction. Screening for microalbuminuria should be considered in all postmenopausal women and appropriate steps must be taken to prevent further progression of the disease. Further large scale multicentric studies on this topic are recommended.

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