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CYSTATIN C LEVEL AND MICROVASCULAR COMPLICATIONS IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

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INTRODUCTION
Most patients with type 2 diabetes mellitus usually develop diabetic microvascular complications. Cystatin C (CysC), a cysteine protease inhibitor, is freely filtered by the renal glomeruli, metabolized by the proximal tubule, and identified as a promising marker of renal failure. The role of CysC as a marker of diabetic microvascular complications is also shown in different clinical scenarios. Moreover, CysC has the potential to be an early predictor of glycemic control and microvascular complications in these patients.

METHODOLOGY
A total of 73 patients with type 2 diabetes mellitus were included in this cross-sectional hospital-based analytical study which was conducted at No. (2), Military Hospital (500-bedded), Yangon. The study aimed to determine the relationship between cystatin C level and microvascular complications in patients with type 2 diabetes mellitus.

RESULTS
The mean age of the study population was 56.23 ± 9.31 years. There was a preponderance of female patients (52.1%) over male (47.9 %) patients in this study. Thirty out of 73 patients (41.1%) had diabetic retinopathy (DR), and 43 patients (58.9%) had no features of diabetic retinopathy. Among them, 34 patients (46.6 %) were found to have diabetic nephropathy (DN) and 39 patients (53.4 %) had no diabetic nephropathy. Thirty-eight patients (52.1%) were found to have diabetic peripheral neuropathy (DPN) based on the Michigan Diabetic Neuropathy Screening Instrument while 35 patients (47.9 %) had no diabetic peripheral neuropathy. Moreover, 31 patients (42.5%) were found to have serum cystatin C levels of >1.09 mg/l, and 41 patients (56.2 %) had serum cystatin C levels of 0.47 to 1.09 mg/l. Only one patient (1.4 %) had serum cystatin C level <0.47 mg/l. The mean serum cystatin C level was 1.13 ± 0.37 mg/l, the highest was 2.40 mg/l whereas the lowest was 0.46 mg/l. The mean HbA1c was 8.63 ± 2.09 %. Serum cystatin C increased along with the rise of HbA1c but it was not statistically significant ($r = 0.2$, $p = 0.07$). A significant association between serum cystatin C level and diabetic retinopathy ($p < 0.0001$) was found in this study population. Moreover, serum Cystatin C level was positively correlated with urine albumin creatinine ratio, and it was statistically significant ($r = 0.55$, $p < 0.0001$). However, a significant association between serum Cystatin C level and diabetic peripheral neuropathy was not found in this study population ($p = 0.09$).

CONCLUSION
High serum Cystatin C level indicated that there was a significantly increased risk of microvascular complications especially DR and DN in this study population. It was found that serum Cystatin C estimation was useful for the detection of DR and DN, but longitudinal studies are required to confirm its usefulness as a screening and predictor of the development of microvascular complications.

KEYWORDS
type 2 diabetes mellitus, cystatin C, diabetic retinopathy, diabetic nephropathy, diabetic peripheral neuropathy