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Original Research Paper

Pathology

STUDY OF NEUTROPHIL LYMPHOCYTE RATIO, PLATELET LYMPHOCYTE RATIO, RDW AND HBA1C IN SUBJECT WITH TYPE 2 DIABETES MELLITUS AND THEIR CORRELATION WITH DIABETIC NEPHROPATHY AND RETINOPATHY

Dr. Neelesh Kumar Dwivedi Post Graduate Resident Department of Pathology N.S.C.B Medical College, Jabalpur

Dr. Pushpraj Singh Associate Professor Department of Pathology N.S.C.B Medical College, Jabalpur

Dr. Sanjay Totade Professor and H.O.D Department of Pathology N.S.C.B Medical College, Jabalpur

ABSTRACT

Background: 17% in the world with diabetes is from India. NLR should be used as a marker of diabetic control level along with HbA1C in type 2 diabetic subjects. RDW considered as an effective predictive index in the evaluation of diabetic nephropathy or diabetes associated complications. MPV is higher In those who have microvascular complications such as retinopathy or Microalbuminuria. **Material and method:** It's a case control study included 200 sample -100 case (diabetic) and 100 control (non-diabetic). **Results:** In these study 100 cases (diabetic) has 57.8% male and 42.2% female. Most of the age group between 55-65yrs of age (38%) has diabetes. NLR raised in diabetic group shows significant value (0.001). MPV raised in diabetic group and is significant (0.0001). PLR raise in diabetic group shows significance (0.0001) and HbA1c raised in patient with microvascular complication. RDW significantly raised in case than control group. **Conclusion:** In this study with non- diabetic group as control, haematological parameter in diabetic patients in OPD and during hospital stay found that patient with microvascular complications and with raised HbA1C (>7.5%) has significantly raised NLR, PLR, MPV, RDW. Simple complete blood count can be used as an effective tool to monitor glycemic regulation in type 2 DM.

KEYWORDS : Neutrophil Lymphocyte ratio, Platelet Lymphocyte ratio, HbA1c, Red distribution width.

INTRODUCTION

Diabetes mellitus is a chronic metabolic disorder with high morbidity and mortality.[1] Chronic inflammation plays a central role in the development and progression of diabetes and in the pathogenesis of its complication. WBC and their subtypes have been widely considered as inflammatory marker in various disease including type 2 DM. [2] Neutrophil-Lymphocyte ratio is an effective marker of inflammation as well as an important predictor for microvascular complications in type 2 diabetes. RDW is considered a potential, innovative biomarker for improving risk assessment of developing diabetes and prediction of diabetic complications. A symptom of nephropathy is Albuminuria usually initiating with microalbuminuria, which was found to be marker of vascular endothelial damage. Albuminuria is a predictor of poor renal functions in type 2 diabetes mellitus and in essential hypertension and as such it is important to monitor and diagnose in order to treat early. Increased MPV is an Indicators of inflammation due to increased destruction to platelets. MPV is higher patients with microvascular complications such as retinopathy or Microalbuminuria.

AIMS & OBJECTIVES

1) To assess Neutrophil/lymphocyte ratio, platelet/lymphocyte ratio, mean platelet volume (MPV), HbA1c and RDW as a predictive inflammatory marker in type 2 diabetic mellitus
2) To correlate the hematological changes in type 2 diabetes mellitus patients associated with diabetic nephropathy and retinopathy.

MATERIAL AND METHODS

This is a prospective analytical study was conducted at N.S.C.B Medical College & Hospital (M.P.) Tertiary Health care center. Duration of Study: 1st March 2021 To 31 Aug 2022. The sample size more than 100 patients of Type2 diabetes with Nephropathy and retinopathy and 100 healthy individuals served as the control group. A prospective patient details to collect information on hemoglobin, mean platelet volume (MPV), glycosylated hemoglobin (HbA1c), hematocrit (HCT), neutrophil and lymphocyte count, neutrophil/lymphocyte ratio (NLR), platelets (PLT), platelet/lymphocyte ration (PLR), and microvascular complications (retinopathy, nephropathy). A prospective patient details to collect information on hemoglobin, mean platelet volume (MPV), glycosylated hemoglobin (HbA1c), hematocrit (HCT), neutrophil and lymphocyte count, neutrophil/lymphocyte ratio (NLR), platelets (PLT), platelet/lymphocyte ration (PLR), and microvascular complications (retinopathy, nephropathy).

INCLUSION CRITERIA:	EXCLUSION CRITERIA
1. Patients diagnosed with Type 2 Diabetes Mellitus	1. Hypothyroidism / proven vascular complication
2. Patients having complications related to Type 2 Diabetes Mellitus	2.Acute / chronic infection
3. Age included 20-70 yrs	3.pregnant or lactating diabetic mother

RESULTS

Table no 1 showing demographic distribution of case and control in present study.

	TYPE 2 DIABETES MELLITUS (CASE)	NON-DIABETES (CONTROLS)
Male N (%)	59(57.8)	58(58)
Female N (%)	43(42.2)	42(42)
Age (yrs)mean	54.9±11.2	52.7±10.7
Family history of type 2 DM (%)	33%	15%
Personal history of smoking (%)	22%	18%
Personal history of alcohol (%)	44%	20%

Table NO. 1 showing 57.8% is male out of 102 diabetic patients and 58% is male in control group out of 100 and 42.2% is female in diabetic group while 42% in non diabetic group. Age in years mean ± SD is 54.9 ± 11.2 yrs in diabetic group while 52.7 ± 10.7 yrs in non diabetic group. 33% patients has family history of DM in diabetic group while 15% has family history of DM in non diabetic group. 22% has personal history of smoking in diabetic group while 18% has personal history of

smoking in control group. 44% has personal history of alcohol while 20% has personal history of alcohol in non diabetic group.

Table No. 2 Showing Various Haematological Parameter With Their Mean And Standard Deviation

	TYPE 2 DIABETES MELLITUS (CASE)	NON DIABETES (CONTROL)
FBS (MEAN SD)	113.3 10.9	80.78.2
PP (MEAN SD)	196.4 41.9	121.8 9.6
HbA1C (MEAN SD)	6.81.3	4.3 0.7
NLR (MEAN SD)	5.31.6	2.6
PLR (MEAN SD)	303.7	119.8
MPV (MEAN SD)	11.9	7.8
RDW (MEAN SD)	46	12.6

Table No. 3 Showing Retinopathy And Nephropathy In Diabetes And Non Diabetes Group

	Type 2 Diabetes Mellitus (case) 102	Non Diabetic (control)100	P Value
Retinopathy N(%)	84(82.4)	0	0.0005
Nephropathy N(%)	48(47.1)	6(6)	0.0005

FIG NO.1 DISTRIBUTION OF DIABETIC CASES AS PER RETINOPATHY STATUS

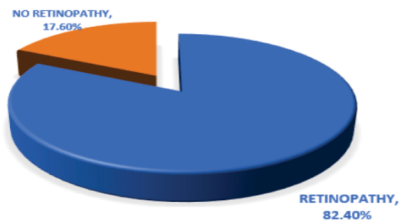
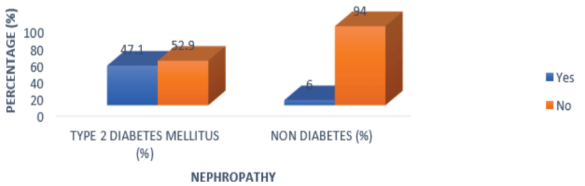


FIG N0.2 NEPHROPATHY STATUS OF STUDY SUBJECTS



DISCUSSION

Diabetes mellitus is a metabolic disease, the deficiency or decreased responsiveness of tissues to insulin and is associated with derangements in the metabolism of carbohydrates, lipids, and proteins.In recent years, evaluation of haematological parameters along with HbA1C played a significant role in the clinical diagnosis and management of diabetes mellitus[2-3] . Papanas et al[4] (2004) had done study found that out of 416, 256 patients were diagnosed 131 was male and 125 were female and in control group had 151 patient out of which 74 were male and 77 were female diabetic patients. In our study male are more in number having diabetes and non-diabetes while in Papanas et al (2014) study male were more number having diabetes and female were more in control group.In present study it is found that majority of participant is belong to age group of 55-65 yr of age having diabetes while in Jindal et al[5] study it was found that maximum subject having diabetes was of age group of 52-62yr of age which is quiet similar with our study.Zhang et al[6] in their study found that RDW in diabetes mellitus has 13.3± 0.9 and in non-diabetes mellitus was 12.4±0.6 while in our study it is found that 10.7±2.1 gm/dl and 11.8 ±1 gm/dl gm/dl respectively in both diabetic and non-diabetic group which is not as same as in our study.

CONCLUSION

This research aimed to study the changes in various haematological parameters in type 2 diabetic mellitus patients, and also to assess Neutrophil/lymphocyte ratio, platelet/lymphocyte ratio, mean platelet volume (MPV), HbA1c cand RDW as a predictive inflammatory marker in type 2 diabetic mellitus and found that it has positive correlation with type 2 diabetes mellitus and associated microvascular change like diabetic retinopathy and nephropathy.

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