Neutrophil-Lymphocyte ratio and its relationship with insulin resistance in obesity

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AIM

In our study we aimed to investigate neutrophil/lymphocyte (N/L) ratio, variations in leukocytes and leukocyte subtypes and relationship between N/L ratio and insulin resistance (IR) in obesity.

MATERIALS AND METHODS

In this study 250 obese patients data were scanned retrospectively and 96 patients that are convenient to inclusion criteria and has complete file information were included in the study. Forty healthy individual with similar age and sex distribution were selected among 120 personal medical records and included the study as control group. Patients 8 hours fasting blood glucose levels, insulin levels and hemogram parameters were determined. BMI and HOMA-IR values were calculated from patients weight and height.

FINDINGS

White blood cells were significantly found to be increased in obese patients (8764 ±2023 and 7712± 1932 respectively, p=0.006). Neutrophil and lymphocyte counts were significantly higher in obese patients than control group (for neutrophils 5359±1.788 and 4585±1.473 respectively, p=0.017, for lymphocytes 2615±627 and 2287±553 respectively, p=0.005). However there was no statistical significant difference for N/L ratios between two groups (2.18±1.00 and 2.10±0.83 respectively , p=0.658). Neutrophil numbers were found to be higher in IR obese than non IR obese (5780±1628 and 4980±1838 , p=0.02). N/L ratio was found to be higher in IR obese compared to non IR obese (2.39±1.06 - 1.97±0.91 p=0.04). A positive correlation was found between insulin resistance and neutrophil, WBC counts. Another positive correlation was found between insülin level and N/L ratio, WBC and neutrophil counts.

Table -1. Laboratory Parameters of obese and non obese individuals

	Control (n=40)	Obesity (n=96)	P value
Age(year)	33,38± 9.41	36,75±11.11	0,095
Gender (F/M)	31/9	78/18	0,415
BMI (kg/m²)	22,14±2.61	32,71±5.57	<0,001
Neutrophil (number/micL)	4585±1473	5359±1788	0,017
Lymphocyte (number/micL)	2287±553	2615±627	0,005
N/L ratio	2,1011±0.8348	2,1813±1.0071	0,658
WBC(number/micL)	7712±1932	8764±2023	0,006

Table 2. Laboratory Parameters of obese individuals with insulin resistance and obese individuals without insulin resistance

	IR obese patients (n=51)	Non IR obese patients (n=46))	P value
Age(year)	36,63±11.20	36,89±11.01	0,907
Gender (F/M)	43/8	36/10	0,081
BMI (kg/m²)	30,52±3.82	35,00±6.37	<0,001
Insulin(mIU/ml)	9,38±2.79	20,32±6.06	<0,001
HOMA IR	2.04±0.62	4.61±1.44	<0,001
Neutrophil (number/micL)	4980±1838	5780±1628	0,026
Lymphocyte (number/micL)	2649±637	2595±625	0,879
N/L ratio	1,9772±0.9134	2,3947±1.0622	0,040
WBC(number/micL)	8386±2156	9276±1857	0,033

RESULTS

In our study leukocyte numbers and leukocyte subtypes were determined to be higher in obese compared to healthy individuals. However N/L ratio was significantly increased only in obesity with insulin resistance. Further studies are needed to clearly demonstrate the relationship between N/L ratio and insulin resistance or inflammation.