Neutrophil-lymphocyte Ratio Findings and Larynx Carcinoma: a Preliminary Study in Turkey

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Abstract

**Background:** To identify the potential prognostic role of the neutrophil/lymphocyte (N/L) ratio in larynx carcinoma. **Materials and Methods:** Oncologic archive charts of patients with a larynx carcinoma diagnosis between the years 2010 and 2013 were retrospectively reviewed. The inclusion criterion was to be available with hemogram test prior to diagnostic procedure. Patients undergoing septrinoplasty comprised the control group. **Results:** There were 65 cases in the study and 42 cases in control group meeting inclusion criteria. In general a non-significant increase in N/L ratio was observed with increasing tumor size and stage (p>0.05) in larynx carcinoma. The N/L ratio was found to be significantly higher in larynx carcinoma compared to control group (p=0.004). **Conclusions:** In conclusion, the N/L ratio was shown to be significantly increased in larynx carcinomas compared to control group. Further studies are needed to assess any prognostic role.

**Keywords:** Neutrophil/lymphocyte ratio - larynx carcinoma - Turkey

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Statistical analysis

SPSS version 15.0 package program (Illinois, Chicago) was used for statistical analysis. Continuous variables were tested for normality using Kolmogorov-Smirnov or Shapiro-Wilk’s test depending on number of subjects, histograms and P-P plots. Kruskal-Wallis and Mann-Whitney U test were used for group comparisons. In all the tests p<0.05 was considered to be significant statistically.

Results

There were 65 patients with the diagnosis of larynx carcinoma who have satisfied inclusion criteria. Of these 65 individuals 64 (98.4%) were male and only one patient (1.6%) was female. However gender ratio in septrinoplasty group was 1:1 (21 male and female a total of 42 patients). The age of the patients in the study group were ranging between 39 and 80 years old (mean: 60.22±8.74). The mean age in control group was 29.05±10.34 years (ranging between 17-64). The predominant histopathologic type for larynx carcinoma was squamous cell carcinoma (SCC, 60 cases 92.3%), only 5 patients (7.7%) was differently diagnosed with basaloid variant of SCC.

Primarily the hemogram parameters were compared between larynx carcinoma and control group as shown in Table 1. There was an increase in WBC count and N/L ratio in the study group compared to control group. The difference in N/L ratio between larynx carcinoma and control group was significant statistically (p=0.004). The N/L ratio was compared between males and females in the control group and found to be 2.01±0.85 and 2.07±0.97, respectively. There was no difference between genders (p=0.815).

Secondly N/L ratio was compared between different T status of the tumor as well as the different stages of larynx carcinoma as shown in Table 2 and Table 3a-b. However there wasn’t a statistical significance (p=0.141). There wasn’t any significant change in the other hemogram parameters such as WBC count, Hb levels or Plt count with the increasing T status neither (Table 2).

N/L ratio was shown to be increased with increasing stage as it was mean 2.12 and 3.08 in stage I and IV respectively only exception was the decrement from Stage II to III as shown in Table 3a. The same difference was also

Table 1. Comparison of Hemogram Parameters between Larynx Carcinoma and Control Group

| Group          | N   | N/L Ratio | WBC     | Hb        | Platelet |
|----------------|-----|-----------|---------|-----------|----------|
| Larynx carcinoma | 65  | 2.70±1.25 | 8.45±2.73 | 14.55±1.37 | 244.23±62.44 |
| Control         | 42  | 2.04±0.90 | 7.42±1.72 | 14.18±1.62 | 248.91±46.40 |
| P value         | 0.004 | 0.097     | 0.301   | 0.334     |

Table 2. Comparison of Hemogram Parameters between Different T Status in Larynx Carcinoma

| T Status | N   | N/L Ratio | WBC     | Hb        | Platelet |
|----------|-----|-----------|---------|-----------|----------|
| T1       | 19  | 2.16±0.85 | 8.00±2.31 | 14.65±1.31 | 229.11±46.06 |
| T2       | 17  | 2.68±1.11 | 8.74±3.75 | 14.68±1.59 | 251.67±70.07 |
| T3       | 13  | 2.88±1.51 | 8.16±1.95 | 14.48±0.97 | 241.62±52.97 |
| T4       | 16  | 3.18±1.43 | 8.90±2.31 | 14.42±1.55 | 256.41±78.05 |
| P value  | 0.141 | 0.716     | 0.828   | 0.706     |

Table 3a. Comparison of Hemogram Parameters between Different Stages of Larynx Carcinoma

| Stage | N   | N/L Ratio | WBC     | Hb        | Platelet |
|-------|-----|-----------|---------|-----------|----------|
| I     | 19  | 2.12±0.79 | 7.96±2.27 | 14.75±1.32 | 226.67±46.95 |
| II    | 12  | 2.97±1.07 | 8.02±2.27 | 14.58±1.40 | 263.85±77.85 |
| III   | 15  | 2.73±1.53 | 8.00±1.51 | 14.70±1.16 | 238.19±50.57 |
| IV    | 19  | 3.06±1.37 | 9.56±3.95 | 14.21±1.57 | 254.17±72.45 |
| P value | 0.081 | 0.517     | 0.648   | 0.424     |

Table 3b. Comparison of Hemogram Parameters between Early and Advanced Stages of Larynx Carcinoma

| Stage      | N   | N/L Ratio | WBC     | Hb        | Platelet |
|------------|-----|-----------|---------|-----------|----------|
| Early (I,II)| 31  | 2.45±0.99 | 7.98±2.08 | 14.68±1.33 | 241.06±62.32 |
| Advanced (III, IV) | 34  | 2.92±1.43 | 8.87±3.18 | 14.43±1.40 | 247.12±63.35 |
| P value    | 0.259 | 0.217     | 0.361   | 0.655     |

Table 4. Comparison of Hemogram Parameters in the Presence or Absence of Lymph Node Metastasis

| N status | N   | N/L Ratio | WBC     | Hb        | Platelet |
|----------|-----|-----------|---------|-----------|----------|
| N-       | 48  | 2.61±1.16 | 8.10±2.14 | 14.61±1.37 | 245.71±61.15 |
| N+       | 17  | 2.93±1.51 | 9.43±3.85 | 14.38±1.39 | 240.05±67.73 |
| P value  | 0.511 | 0.119     | 0.339   | 0.526     |
observed between early and advanced stages (Table 3b). However the difference was not significant statistically. No significant difference revealed in the other hemogram parameters with the increasing stage (Table 3a-b).

N/L ratio was also shown to be increased in the presence of regional lymph node metastasis (Table 4). It was 2.61±1.16 and 2.93±1.51 in the absence and presence of metastasis respectively (p=0.511).

In addition loco regional recurrence was observed in 14 cases. The mean N/L ratios in recurrent and non-recurrent cases were 2.83±1.45 and 2.66±1.20, respectively (p=0.646).

**Discussion**

In this study N/L ratio was studied for the first time for larynx carcinoma prognosis. In general N/L ratio was found to be increased with tumor size, stage, lymph node involvement which are already included TNM classification. Therefore it could be used to estimate tumor prognosis in the beginning of the treatment. However the differences were not significant statistically which may be due to limited number of our study group (65 cases). Likewise no significant difference was observed in the N/L ratio of the patient’s developing loco regional recurrence (p=0.05). However we were hypothesizing N/L ratio to be higher in the recurrent cases. Kum et al. first studied N/L ratio in larynx carcinoma. They found a significantly elevated N/L ratio in laryngeal SCC compared to benign and pre-malign laryngeal lesions and postulated that N/L ratio would be a useful inflammatory marker to differentiate benign and malign laryngeal lesions (Kum et al., 2014). We also found a significantly higher N/L ratio (p<0.05) in larynx carcinoma compared to control group whom were randomly selected from the patients undergoing septorhinoplasty. Therefore it may be useful in diagnosis and follow up especially in case of recurrence suspicion or differentiation of malign and pre-malign lesions.

As seen in the literature review N/L ratio were commonly studied for cardiovascular diseases previously. In the study of Sen et al. elevated N/L ratio revealed to be a significant indicator for three-year mortality and major adverse cardiac events in ST-segment elevation myocardial infarction (Sen et al., 2013). Likewise elevated N/L ratio was found to be associated with longer term-mortality in the patients undergoing percutaneous coronary intervention (Duffy et al., 2006).

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