

# Assessment of Neutrophil–Lymphocyte Ratio in Patients Undergoing Adenoidectomy

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## ABSTRACT

**Background:** Adenoid Hypertrophy (AH) leads to upper airway obstruction and this situation cause alveolar hypoventilation, which may result in chronic hypoxia and hypercarbia. The present study was conducted to assess neutrophil–lymphocyte ratio in patients undergoing adenoidectomy. **Methods:** 75 children age ranged 6- 12 years admitted to ENT department for enlarged adenoids of both genders. Preoperative and 3rd-month postoperative haemograms were obtained, and the preoperative and postoperative NLRs were compared. **Results:** Pre- operative and post- operative hemoglobin value was 12.4 gm% and 12.9 gm% respectively, haematocrit was 38.1 and 38.7 pre- operative and post-operative respectively, WBC was 7.62 and 7.83 pre- operative and post- operative respectively, platelet count (103) was 342.5 and 327.4 pre- operative and post- operative respectively, MPV was 7.82 and 8.14 pre- operative and post-operative respectively and NLR was 1.0 and 1.7 pre- operative and post- operative respectively. **Conclusion:** NLR is not a statistically significant inflammatory factor in patients undergoing adenoidectomy.

**Keywords:** Adenoidectomy, Hemoglobin, Platelet count.

## INTRODUCTION

Adenoid Hypertrophy (AH) leads to upper airway obstruction and this situation cause alveolar hypoventilation, which may result in chronic hypoxia and hypercarbia. Chronic hypoxia may lead to pulmonary arterial hypertension, cor pulmonale and finally decompensated heart failure.<sup>[1]</sup> These destructive outcomes were found to be reversible with adenoidectomy, which increased the importance of the treatment. Systemic inflammatory markers and pro-inflammatory cytokines are increased in these children and promote lymphoid tissue proliferation. Low-level systemic inflammation and oxidative stress are related to OSA.<sup>[2]</sup>

The most common cause of upper airway obstruction in children and adolescents is adenoid hypertrophy (AH). AH is a natural response to increased immunologic activity in early life.<sup>[3]</sup> Mouth breathing, nasal diseases, asthma, speech problems and obstructive sleep apnea are some of the health issues that can be facilitated, at least partly, by upper airway inflammation and/or obstruction. The outcomes of upper airway dysfunction should not be taken lightly as significant upper airway disorders may lead to even more severe conditions such as sleep apnea, altered craniofacial growth and cognitive impairment.<sup>[4]</sup>

A relatively common treatment approach for obstructive AH is an adenoidectomy.<sup>[5]</sup> Considering the relatively high demand, associated costs and complications of this surgery, precise and timely recognition of AH is imperative. In this regard, a crucial statistic for clinical decision-making and public health management is the prevalence of different AH grades.<sup>[6]</sup> The present study was conducted to assess neutrophil–lymphocyte ratio in patients undergoing adenoidectomy.

## MATERIALS AND METHODS

The present study was conducted among 75 children age ranged 6- 12 years admitted to ENT department for enlarged adenoids of both genders. Parents' consent was obtained for the involvement of patients for the study.

Information pertaining to patients such as name, age, gender etc. was recorded. Adenoidectomy was performed on all patients using the same surgical technique and by the same surgeon. Preoperative and 3rd-month postoperative haemograms were obtained, and the preoperative and postoperative NLRs were compared. Blood samples were drawn from the antecubital vein, and collected in ethylene diamine tetra acetic acid (EDTA) containing tubes. Blood samples were drawn from 08:30 a.m to 10:00 a.m in fasting patients and laboratory analyses were conducted on the same day until 14:00. Haemogram analysis was performed. Results thus obtained were statistically analyzed using Mann Whitney U test. P value <0.05 was considered significant.

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## RESULTS

[Table 1] shows that out of 75 patients, boys were 40 and girls were 35.

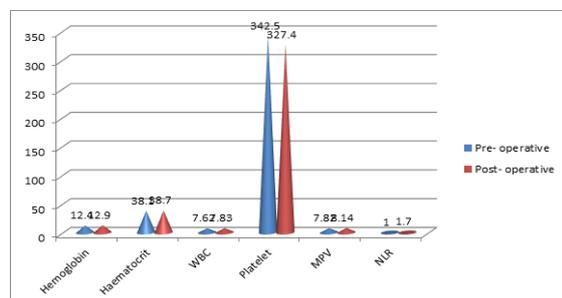
**Table 1: Distribution of patients**

Total- 75		
Gender	Boys	Girls
Number	40	35

**Table 2: Assessment of parameters**

Parameters	Pre-operative	Post-operative	P value
Hemoglobin	12.4	12.9	0.12
Haematocrit	38.1	38.7	0.05
WBC	7.62	7.83	0.19
Platelet	342.5	327.4	0.51
MPV	7.82	8.14	0.02
NLR	1.0	1.7	0.01

[Table 2, Figure 1] shows that pre- operative and post- operative hemoglobin value was 12.4 gm% and 12.9 gm% respectively, haematocrit was 38.1 and 38.7 pre- operative and post- operative respectively, WBC was 7.62 and 7.83 pre- operative and post- operative respectively, platelet count (10<sup>3</sup>) was 342.5 and 327.4 pre- operative and post- operative respectively, MPV was 7.82 and 8.14 pre- operative and post- operative respectively and NLR was 1.0 and 1.7 pre- operative and post- operative respectively.



**Figure 1: Assessment of parameters**

## DISCUSSION

The adenoids (nasopharyngeal tonsils) are part of Waldeyer's ring of lymphoid tissue. It is located in the posterosuperior wall of the nasopharynx, they hypertrophy physiologically in children between the ages of 6-10 years, then atrophy by the age of 16 years.<sup>[7]</sup> The adenoids consist of unencapsulated lymphoid tissue organized in germinal centres. The term adenoid hypertrophy (AH) indicates non-physiological enlargement of the nasopharyngeal tonsils and is the most prevalent cause of nasal obstruction in childhood.<sup>[8]</sup> Symptoms of AH include open-mouth breathing, hyponasal speech, snoring, obstructive sleep apnoea and rhinorrhoea. Adenoidectomy with or without tonsillectomy and ventilation-tube insertion is one of the most frequently performed operations.<sup>[9]</sup> The main

indications for adenoidectomy are chronic and recurring upper respiratory tract inflammation, such as otitis media with effusion or sinusitis, and obstructive AH.<sup>[10]</sup> The present study was conducted to assess neutrophil-lymphocyte ratio in patients undergoing adenoidectomy.

In present study, out of 75 patients, boys were 40 and girls were 35. Derin et al,<sup>[11]</sup> aimed to contribute about subject of preoperative and postoperative NLR values in patients undergoing adenoidectomy that there is limited information. The study group comprised 76 children undergoing adenoidectomy. A preoperative and 3rd month postoperative complete blood cell count was performed to calculate the NLR values in all patients. The NLR values were calculated as the ratio of neutrophils to lymphocytes in peripheral blood. The mean NLR (min - max) was 1.0 (0.16-3.57) preoperatively and 1.06 (0.35-4.95) 3 months postoperatively ( $p = 0.052 > 0.05$ ). Haemoglobin  $12.9 \pm 0.95$  (preop)  $12.94 \pm 0.91$  (postop) ( $p = 0.522$ ), WBC (min-max) 7.75 (3.90-14.99) 7.8 (4-15.64).

We observed that pre- operative and post- operative hemoglobin value was 12.4 gm% and 12.9 gm% respectively, haematocrit was 38.1 and 38.7 pre- operative and post- operative respectively, WBC was 7.62 and 7.83 pre- operative and post- operative respectively, platelet count (10<sup>3</sup>) was 342.5 and 327.4 pre- operative and post- operative respectively, MPV was 7.82 and 8.14 pre- operative and post- operative respectively and NLR was 1.0 and 1.7 pre- operative and post- operative respectively. Pereira et al,<sup>[12]</sup> conducted a study involving the MASTARI tool assessed the potential risk of bias (RoB) among the studies, while the GRADE approach determined the level of evidence. A total of 5248 patients were included. Seventeen studies were included in the metaanalysis showing an AH prevalence of 49.70% (confidence interval (CI): 39.92 to 59.50). The studies were then divided into 3 groups based on the RoB assessment and patient selection method. The AH prevalence for group 1 (studies having low RoB) was 42.18% (CI: 34.93 to 49.60; n  $\frac{1}{4}$  2794), for group 2 (studies having moderate RoB) was 70.02% (CI: 40.102 to 92.690; n  $\frac{1}{4}$  538), and finally for group 3 (studies with randomly collected samples) was 34.46% (CI: 10.507 to 63.742; n  $\frac{1}{4}$  1446). High heterogeneity between the studies was found. The GRADE approach classified the quality of evidence as moderate. The prevalence of AH was 34.46%; however, in convenience samples the prevalence ranged from 42 to 70%.

The shortcoming of the study is small sample size.

## CONCLUSION

Authors found that NLR is not a statistically significant inflammatory factor in patients undergoing adenoidectomy.

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