

## Assessing the Inflammatory Blood Markers in Subjects having Sinonasal Inverted Papilloma: A Clinical Evaluation

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### Abstract

**Background:** Sinonasal inverted papillomas represents the benign neoplasms of the paranasal sinus and nasal cavities with associated high recurrence risk and potential for malignant transformation.

**Aim:** The present study aimed to assess the relationship between inflammatory blood markers and Sinonasal inverted papilloma.

**Methods:** In 130 subjects with a confirmed histologic diagnosis of Sinonasal inverted papilloma and in age and gender-matched controls (n=130) inflammatory blood markers were assessed and compared including the platelet distribution width (PDW), mean platelet volume (MPV), red cell distribution width (RDW), platelet-lymphocyte ratio (PLR), and neutrophil-lymphocyte ratio (NLR).

**Results:** The difference for the lymphocytes, neutrophils, hemoglobin, platelets, and white blood cells was statistically non-significant in the study and control subjects with  $p > 0.05$ . Also, a statistically non-significant difference between cases and controls was seen for PDW, MPV, RDW, PLR, and NLR ( $p > 0.05$ ). However, a decrease in PLR and an increase in NLR were seen as statistically significant factors in the cases.

**Conclusion:** The study concludes that PLR and NLR can help in differentiating controls from the subjects having Sinonasal inverted papilloma being reliable inflammatory blood markers. However, further longitudinal studies are needed to reach a generalized conclusion.

**Keywords:** inflammatory blood markers, mean platelet volume, neutrophil-to-lymphocyte ratio, platelet-to-lymphocyte ratio, sinonasal inverted papilloma.

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### Introduction

Sinonasal inverted papillomas show examination that are characteristic features of endophytic growth patterns on histological Sinonasal inverted papillomas. Sinonasal

inverted papillomas are benign growths of the nasal cavity and paranasal sinuses that develop from the Schneiderian epithelium [1]. They affect a large population and accounts for nearly 4% of all the reported primary nasal neoplasm. Sinonasal inverted papillomas have a high predilection for male subjects and affect the age range of the fifth and sixth decades [2].

The main features characteristic of the Sinonasal inverted papillomas are the potential for malignant transformation, high recurrence risk, and being locally aggressive. Previous literature data report a recurrence rate of 50% with the Sinonasal inverted papillomas [3]. The high recurrence rate of Sinonasal inverted papillomas is attributed to various risk factors including the surgical technique adapted for the surgery, histopathologic tumor characteristics, growth pattern, tumor stage, osseous invasion, and tumor location [4]. High recurrence is also attributed to incomplete removal of the tumor from the site of the resection. Along with high local recurrence risk, Sinonasal inverted papillomas have a high potential for malignant transformation including invasive squamous cell carcinoma. The malignancy can be metachronous or synchronous with overall malignancy rates of 7% to 11% with Sinonasal inverted papillomas [5].

The exact pathogenesis and etiology of the Sinonasal inverted papillomas are yet unknown. Various theories suggested a possible role of HPV (human papillomavirus) as an etiologic factor for Sinonasal inverted papillomas, however, no definitive roles were confirmed and the theories remained inconclusive. On histologic assessment, Sinonasal inverted papillomas showed downregulation in the inhibition of apoptosis and high proliferation rates for the epithelial cells. Owing to these histologic findings, Sinonasal inverted papillomas were considered to have a neoplastic process [6].

With the extensive literature research on Sinonasal inverted papillomas recently, it has

been concluded that a vital role is played by the inflammatory response in the development and prognosis assessment of the various benign and malignant lesions along with various other diseases. To accurately assess the inflammatory response, various hematologic parameters are easy to record with high precision and accuracy including the platelet distribution width (PDW), red cell distribution width (RDW), mean platelet volume (MPV), platelet-to-lymphocyte ratio (PLR), and neutrophil-to-lymphocyte ratio (NLR) [7]. In various inflammatory conditions such as ulcerative colitis, liver steatosis, inflammatory bowel disease, cancer, and/or diabetes mellitus, a significant association of neutrophil-to-lymphocyte ratio (NLR) has been seen. Also, an association has been noted between thyroid malignancy, cardiac conditions, rheumatoid arthritis, functional bowel disease, nasal polyposis, diabetes mellitus to MPV (mean platelet volume). An increase in RDW is also seen with inflammatory conditions including autoimmune diseases, vertebral disc pathologies, and thyroid nodules. Increased PWD had been associated with coronary artery diseases, hepatosteatosis, and diabetes mellitus [8]. The present study aimed to assess the relationship between inflammatory blood markers in Sinonasal inverted papilloma and gender and age-matched controls.

### Materials and Methods

The present retrospective clinical study aimed to assess the relationship between inflammatory blood markers in Sinonasal inverted papilloma and gender and age-matched controls in an Indian institute. The study was done at Department of ENT, Government Medical College, YSR Kadapa District, Andhra Pradesh from April 2019 to December 2019. The data for the study were collected in a retrospective manner from the Institute.

On the evaluation of the collected data for subjects with Sinonasal inverted papillomas.

The exclusion criteria were subjects having systemic inflammatory disease, history of myocardial infarction, chronic obstructive pulmonary disease, thyroid disease, kidney failure, liver failure, pneumonia, acute infection, acute inflammation, and recurrent Sinonasal inverted papillomas. After the exclusion of these subjects, a total of 130 subjects were finally included in the study along with 130 genders and age-matched controls without any comorbidity. One week before the surgical treatment for Sinonasal

inverted papillomas, the complete blood count, gender, and age of all the subjects were noted.

The data gathered was analyzed statistically using SPSS software version 21.0 (IBM, NY, USA) and Mann Whitney U test, and student t-test. Non-parametric and parametric tests were used for data with non-normal distribution and normal distribution respectively. The data were expressed in number and percentage and mean and standard deviation. The significance level was kept at  $p < 0.05$ .

## Results

**Table 1: Demographic data of the study participants**

Characteristics	Controls (n=130) Mean $\pm$ S. D	Cases (n=130) Mean $\pm$ S. D	p-value
Gender n (%)			
Males	108 (83.07)	108 (83.07)	1.00
Females	22 (16.92)	22 (16.92)	
Mean age (years)	53.1 $\pm$ 10.4	54.6 $\pm$ 11.4	0.36

**Table 2: Comparison of laboratory parameters in the two groups of study subjects**

Characteristics	Controls (n=130) Mean $\pm$ S. D	Cases (n=130) Mean $\pm$ S. D	p-value
PLR	112.1 $\pm$ 39.4	108.7 $\pm$ 42.6	0.32
NLR	1.84 $\pm$ 0.58	2.2 $\pm$ 0.82	0.27
Lymphocyte counts ( $10^3/\mu\text{L}$ )	2.47 $\pm$ 1.91	2.28 $\pm$ 0.61	0.68
Neutrophil count ( $10^3/\mu\text{L}$ )	3.7 $\pm$ 0.7	4.6 $\pm$ 1.4	0.06
PDW (%)	16.3 $\pm$ 0.2	16.2 $\pm$ 1.4	0.08
MPV (fl)	8.6 $\pm$ 0.7	9.2 $\pm$ 1.6	0.54
RDW (%)	13.6 $\pm$ 1.2	13.6 $\pm$ 1.0	0.82
Hemoglobin (gm/dl)	14.5 $\pm$ 1.2	14.4 $\pm$ 1.5	0.74
Platelet counts ( $10^3/\mu\text{L}$ )	239.4 $\pm$ 52.4	233.1 $\pm$ 52.9	0.56
WBC counts ( $10^3/\mu\text{L}$ )	7.05 $\pm$ 1.32	7.47 $\pm$ 1.54	0.09

**Table 3: Logistic regression analysis**

	OR	95% CI	p-value
PLR	2.584	1.255-5.115	0.007
NLR	0.966	0.954-0.777	0.37

The present retrospective clinical study aimed to assess the relationship between inflammatory blood markers in Sinonasal inverted papilloma and gender and age-matched controls in an Indian institute. The

study assessed 130 subjects having Sinonasal inverted papillomas who were compared against the gender and age-matched controls. The demographic data of the study participants are listed in Table 1. In controls, there were

83.07% (n=108) and 16.92% (n=22) males. Similar gender distribution was seen in the cases group. This difference was statistically significant with  $p=1.00$ . The mean age of the study subjects in cases and controls was  $54.6\pm 11.4$  years and  $53.1\pm 10.4$  years respectively which was statistically non-significant with  $p=0.36$  as shown in Table 1

For the comparison of the hematologic parameters in the study subjects, all the parameters had non-significant differences statistically between the controls and cases where the respective p-values were 0.32, 0.27, 0.68, 0.06, 0.08, 0.54, 0.82, 0.74, 0.56, and 0.09 respectively for PLR, NLR, lymphocyte counts, neutrophil counts, PDW, MPV, RDW, hemoglobin, platelet counts, and WBC counts respectively as depicted in Table 2. PLR was higher in controls compared to the cases and NLR was higher in cases than controls. Lymphocyte counts were higher in controls, whereas, neutrophil counts were higher in cases. RDW, hemoglobin, and PDW were comparable in cases and controls. MPV and WBC counts were higher in cases and platelet counts were higher in controls.

In the logistic regression analysis, for PLR, the odd's ratio was 2.584, 95% CI (confidence interval) was 1.255-5.115, and the p-value was 0.007 showing the statistical significance. For NLR (platelet lymphocyte ratio), the odd's ratio was 0.966, 95% CI was 0.954-0.777, and the p-value was 0.37 as shown in Table 3.

## Discussion

The present retrospective clinical study aimed to assess the relationship between inflammatory blood markers in Sinonasal inverted papilloma and gender and age-matched controls in an Indian institute. The study assessed 130 subjects having Sinonasal inverted papillomas who were compared against the gender and age-matched controls. In controls, there were 83.07% (n=108) and 16.92% (n=22) males. Similar gender distribution was seen in the cases group. This difference was statistically significant with

$p=1.00$ . The mean age of the study subjects in cases and controls was  $54.6\pm 11.4$  years and  $53.1\pm 10.4$  years respectively which was statistically non-significant with  $p=0.36$ . These demographics were comparable to the previous studies of Wang MJ [9] in 2016 and Duman TT *et al* [10] in 2019 where authors assessed subjects with demographics comparable to the present study.

Concerning the comparison of the hematologic parameters in the study subjects, all the parameters had non-significant differences statistically between the controls and cases where the respective p-values were 0.32, 0.27, 0.68, 0.06, 0.08, 0.54, 0.82, 0.74, 0.56, and 0.09 respectively for PLR, NLR, lymphocyte counts, neutrophil counts, PDW, MPV, RDW, hemoglobin, platelet counts, and WBC counts respectively. PLR was higher in controls compared to the cases and NLR was higher in cases than controls.

Lymphocyte counts were higher in controls, whereas, neutrophil counts were higher in cases. RDW, hemoglobin, and PDW were comparable in cases and controls. MPV and WBC counts were higher in cases and platelet counts were higher in controls. These results were consistent with the previous studies of Aktas G *et al* [11] in 2020 and Sincer I *et al* [12] in 2018 where authors reported a non-significant difference in the hematologic parameters of subjects with inflammatory diseases and controls.

The study results showed that for the logistic regression analysis, for PLR, the odd's ratio was 2.584, 95% CI (confidence interval) was 1.255-5.115, and the p-value was 0.007 showing the statistical significance. For NLR (platelet lymphocyte ratio), the odd's ratio was 0.966, 95% CI was 0.954-0.777, and the p-value was 0.37. These findings were in agreement with the studies of Kara M *et al* [13] in 2017 and Liao MJ *et al* [14] in 2018 where authors reported a decrease in PLR and an increase in NLR was seen as statistically significant factors in the cases.

## Conclusion

Considering its limitations, the present study concludes that PLR and NLR can help in differentiating controls from the subjects having Sinonasal inverted papilloma being reliable inflammatory blood markers. However, further longitudinal studies are needed to reach a generalized conclusion.

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