

PRE AND POST FESS CHANGES IN MEAN PLATELET VOLUME IN PATIENTS WITH BILATERAL ETHMOIDAL POLYPOSIS

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Abstract

Background: Bilateral ethmoidal polyposis is one of the most common causes of nasal obstruction and has strong association with chronic alveolar hypoxia. Mean Platelet Volume (MPV) is an important marker for chronic hypoxia. This study aims at studying pre and post fess changes in mean platelet volume in patients with bilateral ethmoidal polyposis. **Material and Methods:** Ninety-eight patients with symptomatic bilateral ethmoidal polyposis were enrolled for the study and operated. Pre-operative and post-operative Mean Platelet Volume (MPV) were recorded and compared. **Results:** The pre-operative Mean Platelet Volume (MPV) levels of the patients who underwent FESS were significantly higher than the post-operative Mean Platelet Volume (MPV) levels. **Conclusion:** As a conclusion, Mean Platelet Volume (MPV) may be a helpful marker for ENT surgeons to evaluate chronic nasal obstruction caused by ethmoidal polyposis, which may cause chronic hypoxic complication.

INTRODUCTION

Bilateral ethmoidal polyposis is one of the most common causes of nasal obstruction. Patient presents with nasal obstruction mostly bilateral, headache, allergic symptoms. It blocks osteomeatal complex (OMC) causing head ache and facial pain. Chronic fixed upper airway obstruction can affect lower airway and lead to prolonged alveolar hypoxia, pulmonary hypertension, COPD, cardiac disease and vascular complications, also worsen obstructive sleep apnea and sleep-related breathing disorder. There is no single mode to measure the impact of ethmoidal polyps on such systemic complications possibly induced by chronic alveolar hypoxia.

Mean Platelet volume (MPV) is a platelet activation marker in chronic hypoxia. Mean Platelet volume (MPV) is a parameter in routine blood count and is a most widely used surrogate marker of platelet function. It is proved that MPV increase in conditions like adenoid hypertrophy, pulmonary hypertension and atherosclerosis. There are studies showing MPV as a marker for atherosclerosis.

There are studies relating Mean Platelet Volume and Acoustic Rhinometry (nasal resistance) with no relevance to surgical outcome.

This study aims at establishing a relationship between ethmoidal polyps and mean platelet volume (MPV) and impact of FESS on MPV.

MATERIALS AND METHODS

Our study was approved by the local ethics committee and conducted in accordance with the ethical principles. Written informed consent form was obtained from all participants before the study. Ninety-eight patients above 15 years of age and below 55 years of age with symptomatic ethmoidal polyposis for more than 6 months at Government Coimbatore medical College and hospital were enrolled for the study from March 2022 to March 2023.

Patients with concurrent nasal pathology and other causes of nasal obstruction like nasopharyngeal pathology/OSA syndrome, palatal pathology, chronic drug intake including non-steroidal anti-inflammatory drugs/ corticosteroids, systemic disease such as any known cardiac diseases, Hypertension, CAD, diseases that potentially affect blood pressure, any arrhythmias, or lung disease like COPD, diabetes mellitus, chronic renal or hepatic disease, cancer, Hypercholesterolemia, obesity, bleeding diathesis and autoimmune disease were excluded.

Patients enrolled to study were thoroughly evaluated, detailed history, complete clinical examination including vitals recorded and examined for any other primary ENT pathology. Then patient evaluated with radiological investigation.

CT Paranasal sinuses (coronal, axial and sagittal cuts) were taken. Complete blood hemogram with bleeding time and clotting time done. Mean Platelet Volume were noted down in all patients. After obtaining anesthetic fitness the patients were posted for surgery. Under general anesthesia patient underwent functional endoscopic sinus surgery and polyp removal.

Post-operative complete blood count taken and Mean Platelet Volume were noted at one week, one month and after 6 months after surgery.

Statistical analysis of pre-operative MPV (patient and controls) and post-operative MPV were done using Two Sample T-test. p value was calculated to determine if any significant relationship exists between these variables.

RESULTS

Present study includes 98 patients, out of which, 50 patients (51.02%) were males while 48 patients (48.98%) were females. Male to female ratio being 1.04:1.

In the present study maximum number of patients, 37 patients (37.76%) were reported in the age group of 16-25 years, male patients in this group were 20 (20.41%) and female patients were 17 (17.35%), followed by age group 26-35 years with total of 33 patients (33.67%), male patients in this group were 19 (19.39%) and female patients were 14 (14.29%), followed by age group 36-45 years with 19 patients

(19.39%), male patients in this group were 9 (9.18%) and female patients were 10 (10.20%), and least number of patients in age group 46-55 years with 9 patients (9.18%), male patients in this group were 2 (2.04%) and female patients were 7 (7.14%). The association between MPV and increasing age showed no significant difference. (See in Table 1).

The pre-operative MPV for the total patients who underwent FESS was 11.11 ± 0.586 , of which male patients had a pre-operative MPV of 11.09 ± 0.592 and female patients had a pre-operative MPV of 11.13 ± 0.585 . The post-operative first week MPV of all patients were 9.726 ± 0.732 , of which male patients had MPV of 9.67 ± 0.67 and female patients had MPV of 9.79 ± 0.777 . The post-operative first month MPV of all patients were 8.51 ± 0.575 , of which male patients had MPV of 8.51 ± 0.593 and female patients had MPV of 8.51 ± 0.561 . The post-operative 6 month MPV of all patients were 8.201 ± 0.531 , of which male patients had MPV of 8.18 ± 0.541 and female patients had MPV of 8.23 ± 0.525 . (See in Table 2).

It was observed that the post-operative MPV markedly reduced with statistically significant levels than the pre-operative MPV of all patients.

The MPV values in accordance with age and sex were also studied but the observations were not statistically significant for age or between genders pre-operatively and post-operatively. (See in Table 3).

Table 1:

Variable		Male	MPV(fl)	Female	MPV(fl)	Total	MPV(fl)
		50	11.09 ± 0.59	48	11.13 ± 0.59	98	11.11 ± 0.59
Age	16-25	20	11.06 ± 0.69	17	11.13 ± 0.58	37	13.14 ± 1.72
	26-35	19	11.12 ± 0.56	14	11.16 ± 0.71	33	12.96 ± 1.48
	36-45	9	11.14 ± 0.53	10	11.05 ± 0.55	19	12.26 ± 1.53
	46-55	2	10.85 ± 0.35	7	11.19 ± 0.45	9	11.79 ± 1.16

Table 2:

Variables	Pre-operative MPV(fl)	Post-operative MPV(fl)		S.E	P value
Total	11.11 ± 0.586	Week 1	9.72 ± 0.732	0.0947	<0.001
		Month 1	8.51 ± 0.575	0.0829	<0.001
		Month 6	8.201 ± 0.531	0.0799	<0.001
Male	11.09 ± 0.592	Week 1	9.67 ± 0.69	0.129	<0.001
		Month 1	8.51 ± 0.593	0.119	<0.001
		Month 6	8.18 ± 0.541	0.113	<0.001
Female	11.13 ± 0.585	Week 1	9.79 ± 0.777	0.14	<0.001
		Month 1	8.51 ± 0.561	0.117	<0.001
		Month 6	8.23 ± 0.525	0.113	<0.001

DISCUSSION

Ethmoidal polyposis is one of the commonly faced clinical diagnoses in patients presenting with nasal obstruction in ENT out-patient department. It can cause chronic nasal obstruction and produce chronic alveolar hypoventilation and subsequently lead to hypoxia. Chronic hypoxia thus produced stimulates IL-6 causing platelet activation and can lead to changes in platelet structure and function.^[6] This adversely affects the platelet indices like Platelet Distribution Width (PDW) and Mean Platelet

Volume (MPV). MPV is a novel and potential indicator for platelet function, in literature there are several articles regarding association of MPV to CAD and atherosclerosis, implying inflammatory, cardiac and thrombotic risk with platelet dysfunction. Limited number of studies exist regarding MPV and nasal polyp relationship.

In this study the post-operative MPV were taken at 1 week, 1 month and 6 months after surgery, these mean MPV values at 1 week, 1 month and 6 months after surgery were compared with the pre-operative mean MPV individually and it was found that all three post-operative mean MPV had reduced

drastically with a statistical significance of <0.001 with that of the pre-operative MPV.

There was no age or gender associated relationship found between the study populations MPV, pre-operatively and post operatively. Also there were no significant relationships noted between other variables in the study with MPV like haemoglobin level, Red Blood Cell count or platelet count.

CONCLUSION

The present study reveals that chronic hypoxia caused by ethmoidal polyps alters platelet function, which in turn was shown by increase in preoperative MPV of all patients in this study and MPV levels reduces following FESS (with a statistical significance) indicates that this marker can be used as one of the baseline indicator for FESS, yet ENT surgeons should not overlook MPV values while evaluating patients because it might speed up operation decision to prevent the complications. Study proves that MPV has a correlation with ethmoidal polyp yet the exact mechanism by which it affects is in shadows to explore.

Conflicts of Interest Statement

We hereby declare that we have no financial interests or personal conflicts that may affect the study in this article.

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