RESEARCH

EVALUATION OF EFFECT OF DEVIATED NASAL SEPTUM ON MEAN PLATELET VOLUME IN A TERTIARY CARE TEACHING HOSPITAL

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Abstract

Background: The average platelet size is reflected in mean platelet volume, and studies have shown that larger platelets are more metabolically and enzymatically active and have prothrombotic potential. The mean platelet volume increases in chronic upper airway conditions such as marked nasal septal deviation, and vice versa. A septoplasty operation reduces the mean platelet volume over time, which in turn lessens other related comorbidities. **Materials and Methods:** This current study sought to determine the association between MPV levels and nasal obstruction brought on by a deviated nasal septum. It was carried out in the department of otorhinolaryngology and head and neck surgery at the World College of Medical Sciences Research and Hospital, Jhajjar, on 65 patients with clinical evidence of DNS and 65 healthy age-matched subjects as a control group (DNS). **Result:** 32 cases (49.2%) were of the Obstructed DNS type, 21 cases (32.3%) were of the Impacted DNS type, and 12 cases (18.5%) were of the Simple DNS type. MPV was highest in the DNS Impacted type (10.21±1.32) and lowest in the Obstructed and Simple kinds (9.29± 0.24, 8.67 ±1.25, respectively). **Conclusion:** The current investigation reaffirmed the idea that MPV increases in chronic nasal obstruction caused by DNS and that this increase is correlated with DNS severity.

INTRODUCTION

Nasal blockage can be caused by a variety of diseases, including turbinate hypertrophy, adenoid hypertrophy, and nasal polyposis. Nasal septal deviation (NSD) is a major cause of nasal obstruction.[1] Approximately 80% of the general population is thought to have a nasal malformation of some kind.[2] Chronic nasal obstruction caused by a deviated nasal septum increases upper respiratory tract resistance, which causes chronic hypoxia due to alveolar hypoventilation.[3] It is generally understood that prolonged hypoxia can alter coagulation as well as platelet quantity and function. As a sign of larger, more reactive platelets arising from greater platelet turnover, mean platelet volume (MPV), which is connected to platelet function and activation, may constitute a risk factor for overall vascular mortality, including myocardial infarction.[4] The specific mechanism of platelet aggregation in alveolar hypoxia patients is unknown. The most likely cause is increased sympathetic activity due to higher epinephrine and norepinephrine concentrations as a result of hypoxia. As a result, increased circulating catecholamines may promote platelet activation that is concentration dependent.[5] Another possibility is that platelet activation might be caused directly by persistent intermittent hypoxia. Inflammation and endothelial dysfunction caused by persistent hypoxia in DNS can also activate platelets.[6] MPV levels have been found to be higher in inflammatory disorders.[7] MPV is a measure that is utilised as a marker for platelet activation. It's a figure that represents the total number of platelets in the blood.[8] MPV, which is linked to platelet function and activation, has been employed as an atherosclerosis marker.[9] High MPV's involvement as a potential risk factor for arterial thrombosis has been a source of heated dispute.[10] MPV readings, which are used as a marker of atherosclerosis, were found to be higher in patients with a deviated nasal septum in some investigations (DNS). Restoration of hypoxia, regardless of the origin, can enhance platelet function as well as cardiovascular morbidity and mortality in DNS-induced hypoxia. The current research compares the mean platelet volume in

patients with DNS who have chronic nasal obstruction.

MATERIALS AND METHODS

The study is a prospective observation carried out on 65 patients attending the department of otorhinolaryngology and head and neck surgery in collaboration with department of pathology, World College of Medical Sciences Research and Hospital, Jhajjar, Haryana, India, during the period from January, 2020 to June, 2022. Nasal endoscopy was performed on all individuals who had clinical signs of nasal blockage. All patients who presented with nasal obstruction and were diagnosed with a deviated nasal septum after an anterior rhinoscopy and nasal endoscopy were included in the study. Simple = S, Obstructed = O, and Impacted = I were used to categorise DNS. Patients were additionally divided into groups based on the direction of DNS: left sided = L, right sided = R, S shaped = S, C shaped = C, and spur associated = Sp. Hypertension, CAD, cancer, infectious or autoimmune disease, diabetes mellitus, condition that may alter blood pressure, COPD, Hypercholesterolemia, any relevant drug history, including nonsteroidal anti-inflammatory medicines, corticosteroids, obesity, and bleeding diathesis are all exclusion criteria. An automated haematology analysis machine was used to examine EDTA blood samples taken at the time of the patient's admission. To avoid bias due to significant platelet swelling, all patients' samples were processed within 2 hours of venipuncture, as indicated in the literature.[11] The average platelet volume is typically between 7.2 and 11.7 fl. This is essentially equivalent to spheres with a diameter ranging from 2.65 to 2.8 micrometres.[12]

RESULTS

The current study included 65 patients, 35 of which (53.8 percent) were males and 30 cases (46.2 percent) were girls. The male to female ratio is 1.3 to 1. With a Male to Female ratio of 1.2:1, 37 (56.9%) of the 65 controls were males and 28 (43.07%) were females. MPV was shown to be more prevalent in females than in males (9.53± 0.57 fl vs 8.42± 0.72 fl, p0.02). MPV was found to be greater in females than males among the controls (8.32± 0.89 fl vs 7.52 ± 0.56 fl, p0.02) [Table 1].

In this study, the age group of 25–34 years had the highest number of cases (44.6%), followed by 17 instances (26.2%) in the age group of 15–24 years, 14 cases (21.5%) in the age group of 35–44 years, and five cases (07.7%) in the age group of more than 45 years. The average age of the cases was 32.6 years at the time of presentation. The bulk of the controls, 45 (69.2%), were in the age range of 25–34 years, followed by 12 (18.5%) in the age group of 35–44 years, 5 (7.7%) in the age group of 15–24 years, and 3 (4.6%) above 45 years of age. The relationship between MPV and age showed a decline in levels as people got older [Table 2].

In this study, 32 cases (49.2%) were of the Obstructed DNS type, 21 cases (32.3%) were of the Impacted DNS type, and 12 cases (18.5%) were of the Simple DNS type. MPV was highest in the DNS Impacted type (10.21±1.32) and lowest in the Obstructed and Simple kinds (9.29± 0.24, 8.67 ±1.25, respectively) [Table 3].

In present study, 33 cases (50.8 %) were of Left sided DNS, 27 cases (41.5 %) of Right sided DNS; S shaped DNS was found in four cases 05 (7.7%) [Table 4].

When comparing cases with DNS to 65 controls, MPV was higher (9.67± 0.76 fl vs 8.36 ±0.68 fl, p0.02) [Table 5].

The incidence of different types of DNS in different sexes was also investigated, however the results were statistically insignificant, and no meaningful link was seen between MPV and DNS orientation.

Table 1: Gender distribution

Gender	Controls		Cases	
	n (%)	MPV in controlsMean±sd	n (%)	MPV in casesMean±sd
Male	35 (53.8%)	7.52 ± 0.56	37 (56.9%)	8.32 ± 0.89
Female	30 (46.2%)	8.42 ± 0.72	28 (43.07%)	9.53 ± 0.57
Total	65 (100.0%)		65 (100.0%)	

Table 2: Gender distribution

Age group in Years	Controls		Cases	
	n (%)	MPV in controls (Mean±sd)	n (%)	MPV in cases (Mean±sd)
15-24	05 (7.7%)	7.53 ± 0.48	17 (26.2%)	8.54 ± 1.24
25-34	45 (69.2%)	7.45 ± 0.54	29 (44.6%)	9.27 ± 0.72
35-44	12 (18.5%)	8.56 ± 0.82	14 (21.5%)	9.15 ± 0.32
≥45	03 (4.6%)	7.46 ± 0.43	05 (7.7%)	8.42 ± 0.54
Total	65 (100.0%)		65 (100.0%)	

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Table 3: Classification

Type of DNS	n (%)	MPV in cases (Mean±sd)
Simple	12 (18.5%)	8.67 ± 1.25
Obstructed	32 (49.2%)	9.29 ± 0.24
Impacted	21 (32.3%)	10.21 ± 1.32
Total		

Table 4: Direction of DNS

Direction	n (%)
Left	33 (50.8%)
Right	27 (41.5%)
S shaped	05 (7.7%)
Total	65 (100.0%)

Table 5: MPV comparison in cases and control

Variable	Cases (n = 65)	Control (n = 65)
MPV (fl)	9.67 ± 0.76*	8.36 ± 0.68

* $p \leq 0.02$ compared to the control group; MPV Mean Platelet Volume

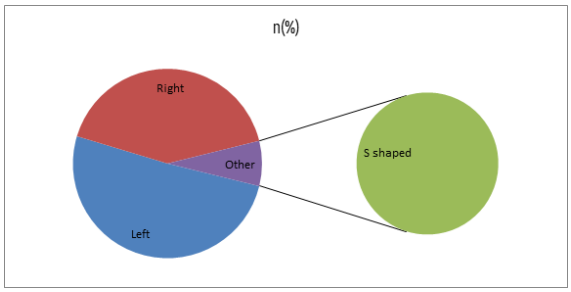

Figure 1: Shows the direction of DNS.

DISCUSSION

In otolaryngology, nasal obstruction is a common presenting symptom. One of the most prevalent clinical findings in individuals who report with nasal blockage is DNS.[13] Platelet function changes as a result of chronic hypoxia caused by nasal obstruction.[14] MPV has been found to be the most accurate method of determining platelet size and consequently function.[15] There are various papers in the literature that link MPV to atherosclerosis and the incidence of coronary artery disease.[16] Increased mean platelet volume has been linked to a number of illnesses, including cardiovascular and thrombotic risk, in several recent investigations.[17] MPV has also been linked to chronic respiratory insufficiency in people who suffer from Obstructive Sleep Apnoea.[18] MPV is a simple and rapid indication of platelet activity, as well as a good sign of inflammation and thrombotic risk.[19] However, to the best of our knowledge, there are only a few studies in the literature that demonstrate a link between MPV and DNS. Due to chronic nasal obstruction produced hypoxia, MPV was shown to be raised in patients with DNS in the current investigation, similar to studies by Sagit et al. and Ulu S et al,[3] and this increase was found to be related to the severity of obstruction, similar to prior studies. The majority of cases (49.2%) were of moderate severity, as in the obstructed type of DNS, followed by severe obstruction, as in the impacted type of DNS (32.3%), and finally mild, as in the simple type of DNS (18.5%). (21 percent). Similar findings were found in a prior study,[20] where considerable deviation was reported in 53% of the time, severe in 25% of the time, and mild in 22% of the time. The majority of patients (44.6 percent) in the current study were in the age category of 25–34 years, followed by 26.2 percent in the age group of 15–24 years, with a mean age of 32.6 years. Other studies have shown mean ages of 31.5 years and 33.5 years.[21,22] These findings by several scientists are consistent with our own. A male to female ratio of 1.3:1 was found in this investigation. Previous studies have indicated ratios of 1.8:1 and 2.2:1.[22,23] The fact that the most prevalent aetiology of deviated nasal septum is nasal trauma, which occurs more commonly in males,[24] explains the preponderance in males. MPV levels were observed to be greater in females in this investigation, similar to Masanori S. et al. and Min et al.[20,22] MPV levels are also higher in women with iron deficient anaemia, according to Kadikoylu et al.[25] The lower haemoglobin levels associated with menstruation women's lower body iron levels are likely related to their greater platelet count, as moderate iron shortage is known to drive platelet synthesis. A hormonal explanation has also been offered,[26] but it has yet to be validated in humans. MPV was observed to decrease with increasing age in the current study, although after a specific age limit, more research into this elderly group is needed. Other studies have observed a decrease in platelet count as people get older. This drop may reflect a reduction in hematopoietic stem cell reserve throughout ageing or a survival advantage in patients with lower platelet counts, according to the processes responsible for age-related alterations. However, these are just ideas, and further research is needed to figure out what's causing age-related alterations.[27] Similar to prior research,[28] a greater proportion of left-sided abnormalities were discovered.

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CONCLUSION

The current study found that individuals with persistent nasal obstruction caused by DNS had higher MPV values than controls. Future prospective research with consistent measures may provide light on the physiological mechanisms that govern MPV inside megakaryocytes, as well as the clinical function of MPV in DNS-related thromboembolic and cardiovascular consequences. In individuals with substantial nasal septal deviation, septoplasty has a key role in lowering the MPV value, and thus additional concomitant disorders can be avoided by doing septoplasty. This supports our findings that septoplasty played a significant effect in lowering the MPV value in patients with MNSD and, as a result, lowering the frequency of other comorbid diseases.

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