Can Head and Neck Cancers Be Detected with Mean Platelet Volume?

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Abstract

Background: Mean platelet volume (MPV) is a marker which has been investigated in many cancers but data for head and neck lesions are limited. We aimed to study the MPV levels in head and neck cancers as a diagnostic marker. Materials and Methods: A total of 96 head and neck cancer patients and 31 control patients who did not meet exclusion criteria were enrolled in the study. The cancer locations, the platelet and MPV levels at the first diagnosis time were collected. Results: The head and neck cancer location distribution between these patients was 2 (2.1%) buccal, 9 (9.4%) tongue, 6 (6.3) lip, 1 (1%) gingiva, 1 (1%) hypopharynx, 1 (1%) ear, 58 (60.4%) larynx, 2 (2.1%) maxilla, 2 (2.1%) nasal, 1 (1%) nasopharynx, 2 (2.1%) palatal, 3 (3.1%) primary unknown, 1 (1%) retromolar, 1 (1%) thyroid, 2 (2.1%) tonsil, and 4 (4.2%) salivary gland. MPV levels were significantly different between cancer and control group (p=0.002). The cut-off point for MPV predicting head and neck cancer is >10 fl (sensitivity=55.21, specificity=87.10). Conclusions: MPV level increase, a readily assessable parameter which does not bring extra costs can warn us regarding head and neck cancer risk.

Keywords: Head and neck cancer - mean platelet volume - risk factor
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Results

96 head and neck cancer patients were involved in this study. 31 control patients were involved. There was no statistically significant difference among groups regarding age and gender (Table 1). The head and neck cancer location distribution between these patients is 2(2.1%) buccal, 9(9.4%) tongue, 6(6.3) lip, 1(1%) gingiva, 1(1%) hypopharynx, 1(1%) ear, 58(60.4%) larynx, 2(2.1%) maxilla, 2(2.1%) nasal, 1(1%) nasopharynx, 2(2.1%) palatal, 3(3.1%) primary unknown, 1(1%) retromolar, 1(1%) thyroid, 2(2.1%) tonsil, 4(4.2%) salivary gland cancers.

The platelets were not significantly different between cancer and control group (p>0.05). MPV levels were significantly different between cancer and control group (p=0.002) (Figure 1). The MPV median values are 10.2 (9.5-11.1) in cancer group and 9.7(9-10) in control group.

Table 1. Demographic Features and MPV, Platelet Results from the groups

|                    | Cancer(n=96) | Control(n=31) | p     |
|--------------------|--------------|---------------|-------|
| Age (years)        | 64.5(57-70.8) | 59(52-69)     | 0.093 |
| Gender (male/female)| 77/19   | 23  8        | 0.646 |
| Platelets (x10^9/l)| 238.5(201.8-310.3) | 241(192-266) | p=0.05 |
| MPV (femtoliters,fL)| 10.2(9.5-11.1) | 9.7(9-10) | 0.002* |

Discussion

This study demonstrated that head and neck cancer patients had higher MPV levels than controls. The other parameters like MCV and platelets showed no difference between cancer and control groups.

The cut-off point from MPV in our study is detected >10 fL with a sensitivity of 55.21 and specificity of 87.10. In a research the MPV value in colon cancer cases was mostly >11.8 fL with a 60% of sensitivity and 80% of specificity (Baldane et al., 2015). In our study the sensitivity from MPV was lower than this study.

MPV shows the activity from platelets. Larger platelets have more reactivity than smaller ones (Mangalpally et al., 2010). The correlation between MPV and cancer was analyzed in different types of cancers (Afsar et al., 2014; Baldane et al., 2015). Thyroid papillary carcinomas had higher MPV levels than benign goiter patients and controls and in the same research the MPV levels decreased after surgical treatment (Baldane et al., 2015).

MPV can be used as a marker for angiogenesis in cancer patients because of the angiogenic, metastatic, proteolytic role of platelets in cancer inflammation (Kisucka et al., 2006). Tumor cells release procoagulant, fibrinolytic factors, mediators, proteases, cytokines which have a direct effect of the platelet production, activation and they directly interact with platelets through adhesion molecules (Noble et al., 2010; Bagoly et al., 2015). A research about this was made by Mutlu et al. (2012) They applied an anti-angiogenic agent bevacizumab which reduced the MPV levels in metastatic colon cancer patients (Mutlu et al., 2012).

Dong et al. (2001) studied the coagulation state in laryngeal cancer patients. They detected a decreased anticoagulant activity and increased fibrinolytic activity in laryngeal cancer patients before operation (Dong et al., 2001). This result can be parallel with our high MPV levels in head ad neck cancers. The majority of our cases were laryngeal cancers. There is a caution for thrombosis in head and neck surgery but we see that even without surgery the head and neck cancer patients have a hypercoagulability associated with tumor cells. The MPV level can be used as a marker for the possibility of cancer and thrombosis in these cases.

An other research about hypercoagulability in laryngeal and pharyngeal cancers detected hypercoagulability in 8 cases of 41 larynx tumors and 6 of 7 pharynx tumors (Niksic et al., 1976).

Baicus et. al. reported that MCV and platelet levels were not associated in cancer patients (Baicus et al., 2011). In our study we also found no difference between groups in MCV and platelets.

The limitations from our study are to be retrospective and a relatively low sample number. Also the high MPV...
level may warn us for the thrombosis risk in these cases. Further researches can be done for the thrombosis in head and neck cancers with high MPV levels.

MPV may be used as a new marker in the diagnosis of head and neck cancers. MPV level increase, such an easy parameter which does not bring extra costs can warn us for the head and neck cancer risk.

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