ABSTRACT

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Title: Microsatellite instability of large intestine cancer carcinoma and comparison of two workplaces

Bachelor thesis

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Study field: Laboratory Diagnostics in Healthcare

Colorectal cancer is one of the most common cancers and its correct diagnosis plays a very important role in the choice of subsequent treatment. Microsatellite instability is one of the important markers that helps to distinguish sporadic carcinomas from hereditary forms such as Lynch syndrome.

The aim of this study is to review the determination of MSI in colorectal cancer and to compare the statistical results of two workplaces.

The theoretical part of this work focuses on the characteristics of colorectal cancer, its association with microsatellite instability and diagnostic methods. The methodological part describes the determination procedures. It focuses on the methods that were used, namely, histological processing of samples, immunohistochemical examination of MSI and then molecular genetic testing of MSI by PCR together with determination of hypermethylation of the MLH1 gene promoter. The determinations were performed on intestinal tissue samples of patients diagnosed with colorectal cancer.

A total of 293 patients were examined in two laboratories for microsatellite instability. Of these, 30 patients were identified with loss of expression in MMR (mismatch repair), and Lynch syndrome was confirmed in 8 patients, and only in one of the laboratories. In the others, the cancer was diagnosed as sporadic. The results highlight the differences in assays between the two laboratories and also the presence of MLH1 promoter hypermethylation in patients with Lynch syndrome.

The conclusion of this paper highlights the importance of the appropriate choice of method for MSI determination and the need for standardization of laboratory steps. It would also be considered beneficial to consider supplementing the diagnostic workup with BRAF gene mutation testing, which may help to confirm the sporadic origin of the cancer.

Keywords: colorectal cancer, microsatellite instability, Lynch syndrome, HNPCC, promoter hypermethylation, immunohistochemistry, molecular genetics