Abstract

**Background:** The current study aimed to assess DNA mismatch repair (MMR) proteins abnormalities among Sudanese colorectal cancer (CRC) patients, mainly by immunohistochemistry (IHC).

**Methods:** CRC cases were retrieved from the records of two Histopathology laboratories in Khartoum, Sudan. The total number of included cases was 42. Sections were cut and stained by immunohistochemical method to assess the abnormalities of four MMR proteins (MLH1, MSH2, MSH6 and PMS2) using anti-MLH1, MSH2, MSH6 (mouse monoclonal antibodies) and anti-PMS2 (rabbit monoclonal antibody). Microsatellite instability (MSI) analysis using mainly BAT 25 & 26 was performed for cases that showed negative or inadequate staining results for any MMR protein by IHC.

**Results:** Of the study population, 25 (59.5%) were males and 17 (40.4%) were females. Their ages ranged between 20-85 years (the age of 4 patients was not provided). The mean age was 56.1 year, and 12 (31.5%) of the CRC patients were among the age groups younger than 50 years.

Of the 42 included cases, 34 (80.95%) were MMR protein positive for all MMR proteins under assessment, 3 (7.14%) MSH2 inadequate, and 1 (2.38%) MSH6 inadequate.

Abnormal MMR proteins expression was found in 4 (9.5%) cases. Of these, 2 (50%) were MSH2&MSH6 negative and 2 (50%) were MLH1&PMS2 negative.

Regarding MSI results, the three cases that were MSH2 inadequate and positive for the rest by IHC showed stable results with both BAT 25& 26. The case that was MSH6 inadequate, showed stable results with both BAT 25&26. The 2 cases with MSH2&MSH6 negative results were unstable with both BAT 25&26. Of the two cases that were MLH1&PMS2 negative, one case showed non-evaluable results with both BAT 25&26 while the other case was unstable with BAT 26 and not evaluable with BAT 25.

**Conclusion:** In this study, the percentage of MMR protein negative cases in Sudanese CRC patients appears to be relatively low compared to what has been generally reported in certain studies done in different countries. Furthermore, MLH1&PMS2 and MSH2&MSH6 abnormal expression detected by IHC seems to be the most common form of MMR proteins abnormalities in Sudanese CRC.
patients. Concerning the results of IHC, MLH1 and MSH2 seem to be the most inactivated MMR genes in Sudanese CRC patients.