Pathology of Nasopharyngeal Carcinoma in Sudanese Patients and its Association with Epstein-Barr Virus: A Report from a Single Center in Khartoum

Ameera A.M. Adam¹, Nazik E. Abdullah², Eman H. Khalifa³, Lamyaa A.M. El Hassan⁴, E.M. Elamin⁵, K.M. Hamad⁶, M.E. Ibrahim⁷ and A.M. El Hassan⁸

¹Department of Molecular Biology, Institute of Endemic Diseases, University of Khartoum, Khartoum, Sudan. ²Department of Surgery, Faculty of Medicine, University of Khartoum, Khartoum, Sudan. ³Department of Histopathology and Cytology, Faculty of Medical Laboratory Sciences, University of Khartoum, Khartoum, Sudan. ⁴School of Medicine, Ahfad University for Women, Omdurman, Higher Specialization in Histopathology, Khartoum, Sudan. ⁵Faculty of Medical Laboratory Sciences, Alzaeim Alazhari University, Khartoum, Sudan. ⁶Faculty of Medicine, University of Khartoum, Khartoum, Sudan. ⁷Department of Molecular Biology, Institute of Endemic Diseases, University of Khartoum, Khartoum, Sudan. ⁸Institute of Endemic Diseases, University of Khartoum, Khartoum, Sudan. Corresponding author email: amiera_adam2001@yahoo.co.uk

Abstract

Objectives: The aim of this study is to describe the pathology of nasopharyngeal carcinoma in Sudanese patients and to investigate its association with the Epstein-Barr virus (EBV).

Study design: This is a prospective descriptive cross-sectional study conducted at the ENT Khartoum Teaching Hospital, Khartoum City, Sudan.

Subjects and methods: Patients with suspected nasopharyngeal carcinoma reporting to our centre between 2006 and 2008 were studied. Biopsy samples from the nasopharynx were obtained from 68 patients suspected to have NPC. Part of the biopsy was fixed in neutral 10% formalin and processed for light microscopy. The other part was not fixed and was used to extract DNA for the detection of EBV genome. The tumours in the formalin-fixed paraffin-embedded biopsies were classified according to the WHO system of classifying NPC. Genomic DNA was extracted from the fresh unfixed biopsies of patients with histologically confirmed NPC and individuals who had other non-NPC lesions or a normal mucosa. The majority of the lesions in the non-NPC cases were adenoids. The EBV genome was detected by PCR using EBNA-1, and LMP-1 primers.

Results: Of the 68 patients studied, 58 had histologically proven nasopharyngeal carcinoma. The tumours were classified as type 2 in 23 patients, type 3 in 32 and mixed types 2 and 3 in 3 patients. EBV genome was detected in 77.6% and 84.5% of the tumours by EBNA-1 and LMP-1 primers, respectively. Of the non-NPC cases, the highest infection with EBV was in patients with adenoids. The virus was detected in 8 of the 44 adenoids (18.2.%) with EBNA-1 primer and in 11 (25%) samples with LMP-1 primer. The significance of these findings is discussed.

Conclusion: In Sudan, EBV is strongly associated with nasopharyngeal carcinoma at a frequency comparable to that in countries with intermediate degree of endemicity for the tumour.

Keywords: Nasopharyngeal carcinoma, Sudan, Epstein-Barr virus, EBNA-1, LMP-1, PCR