

## Association between a Naso Pharyngeal Carcinoma and other Cancers

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### ABSTRACT:

**Introduction:** The advent of a cancer is a tragedy for the patient, family and for society as a whole. What does one say when the occurrence of 2 consecutive cancer? **Objective of study:** is to research a relationship between Epstein Barr Virus (EBV) and other cancer associated with nasopharyngeal cancer. **Materials and Methods:** Our study is retrospective from 2021 to 2023. We collected 5 patients 3 Male / 2 Female with a sex ratio = 1.5. All patients had nasopharyngeal cancer. The average age at first cancer diagnosis is 46 years (30-65) Revealing signs of nasopharyngeal cancer were node cervical in 80%, ear signs in 80%, rhinologic signs in 80% and neurological signs in 15%. Associated cancers were, **Breast cancer:** 2 cases. **Hodgkin's disease:** 2 cases. **Adenocarcinoma of prostate:** 1 case. The average age at diagnosis of second cancer is 48 years (31-66). The average time between onsets of cancer is 2 to 16 months (14-28). 20% patients has a family history for malignant neoplasms (Breast cancer and NPC) All patients had a positive EBV Serology. **Results:** we look for LMP1 in Tumor Biopsies with Immunohisto chemistry. LMP1 was found in all NPC (100%), in one Breast cancer (1/2) and it was negative in Hodgkin's lymphoma (0/2) and prostate cancer (n=0/1) **Conclusion:** The role of Epstein-Barr virus in the genesis of cancer associated with nasopharyngeal cancer is not yet established and deserves further research.

**Keywords:** Naso Pharyngeal Carcinoma, Other cancer, Epstein Barr Virus.

### INTRODUCTION:

Naso-Pharyngeal Carcinoma (NPC) is rare in Europe and North America but it's remains a major public health problem in several areas of Asia and north Africa (1) Most NPC have minimal epithelial maturation and are classified as undifferentiated (WHO type III), or poorly differentiated (WHO type II). A few cases are differentiated (WHO type I). Epstein-Barr virus (EBV) association is constant regardless of patient origin and tumor differentiation except for some very rare cases of differentiated NPC is one of the best examples of a human solid tumor which is consistently associated with a virus. EBV infection in NPC cells is mainly latent. Several copies of the EBV genome (about 170 kb) are contained in the nuclei of malignant cells, generally in the form of circular independent DNA molecules called episomes (2). Other EBV genes consistently transcribed in NPC encode viral proteins with proven or suspected oncogenic properties like Epstein-Barr nuclear antigen 1

(EBNA1), latent membrane protein 1(LMP1) and LMP2, and the BARF1 protein. LMP1 has a role in the malignant phenotype of NPC cells. In addition, we have found that LMP1 expression is more consistent and abundant in the juvenile form of North African NPCs, which differs from the adult form by several clinical and biological characteristics.

### AIM OF THE STUDY:

- To determine the LMP1 expression by immune histochemical technic with monoclonal antibody.
- To analyse the correlation between LMP1 expression and the association between NPC and the others cancer (3,4)

### MATERIALS AND METHODS:

Our study is retrospective from 2021 to 2023. We collected 5 patients 3 Male / 2 Female with a sex ratio

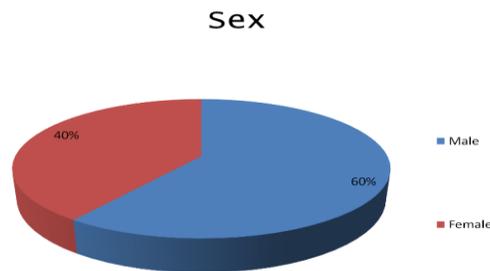
= 1.5 (figure 1 ). All patients had nasopharyngeal cancer . The average age at first cancer diagnosis is 46 years (30-65) (figure 2) Revealing signs of nasopharyngeal cancer were node cervical in 80%, ear signs in 80%, rhinologic signs in 80% and neurological signs in 15%. (Figure 3) Associated cancers were (figure 4), (5)

**Breast cancer:** 2 case

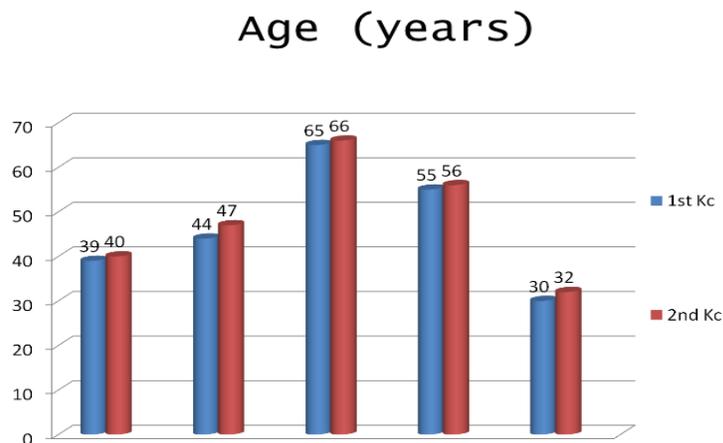
**Hodgkin's disease:** 2 cases

**Adenocarcinoma of prostate:** 1 case

The average age at diagnosis of second cancer is 48 years (31-66 years). The average time between onsets of cancer is 2 to 16 months (14-28). 20% patients has a family history for malignant neoplasms (Breast cancer and NPC) (figure 5). All patients had a positive EBV Serology (Figure 6 ) (6)

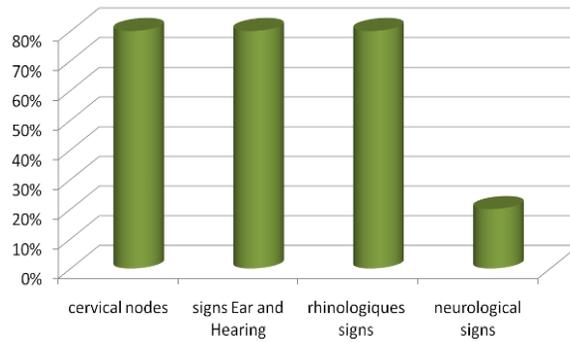


**Figure 1 : Sex Repartition**



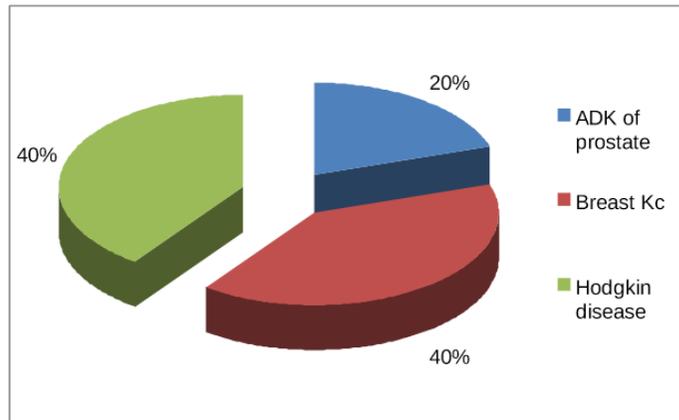
**Figure 2 : Age Repartition (years)**

## revealing signs of nasopharyngeal cancer



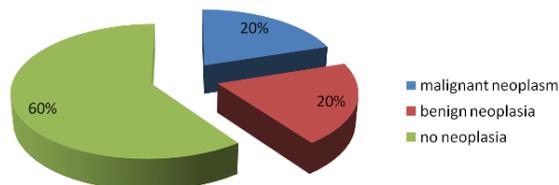
**Figure 3 : Revealing signs of nasopharyngeal cancer**

## Associated cancers



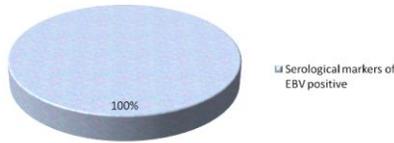
**Figure 4 : Associated cancers**

## Family history



**Figure 5 : Family history**

## Serological markers of EBV

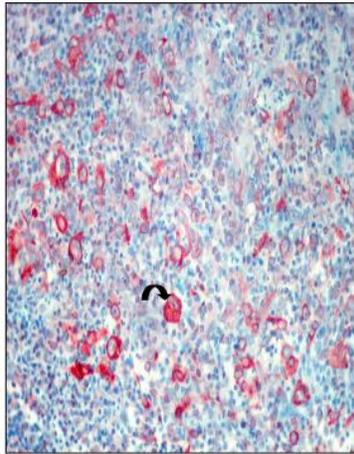


**Figure 6 : Serological markers of EBV**

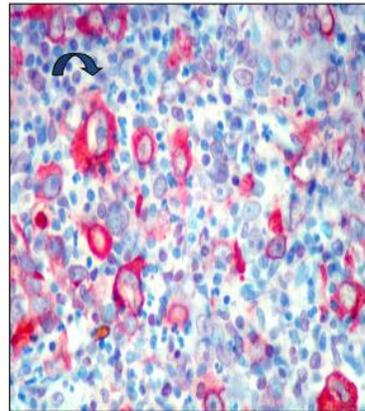
### **RESULTS:**

Is there any relationship between EBV (LMP1) in the association between a NPC and another cancer? To answer this question, we look for LMP1 in Tumor Biopsies with Immunohistochemistry. LMP1 was found in all NPC (100%) (Figure 7), in one Breast cancer (1/2) and it was negative in Hodgkin's lymphoma (0/2) and prostate cancer (n=0/1)

## LMP1 positive



**GX250**



**GX400**

**Figure 7: LMP1 positive**

### **DISCUSSION:**

The association between NPC and breast cancer may seem surprising because they affect different parts of the body. However, there are common risk factors that may contribute to this association. For example, genetic, environmental, or lifestyle factors may increase the likelihood of developing these types of cancer in some people (7). Additionally, studies have suggested that certain viral infections, such as the Epstein-Barr virus (EBV), which is associated with NPC, may also play a role in the development of certain breast cancers (8). However, the exact mechanisms of this association are not fully understood and still require extensive research. The association between NPC and Hodgkin's disease can be explained by several factors. First of all,

Hodgkin's disease is a type of lymphoma that affects the lymphatic system, while NPC is a cancer that forms in the nasopharynx area. Both conditions have been associated with viral infections, particularly Epstein-Barr virus (EBV). This virus is known to infect cells in the lymphatic system and may play a role in the development of both Hodgkin's disease and cavum cancer. Additionally, certain genetic and environmental factors may also contribute to this association. However, despite this correlation, not everyone with cavum cancer necessarily develops Hodgkin's disease, and vice versa. (9). The association between NPC and prostate cancer may seem unexpected because they belong to different parts of the body. However, some studies have suggested a correlation between these two types of cancer,

although the underlying mechanisms are not completely understood. A study published in the journal “Cancer Epidemiology, Biomarkers & Prevention” in 2009 by Huang & al. examined the association between nasopharyngeal cancer and the risk of developing other cancers. The results showed a significant association between nasopharyngeal cancer and prostate cancer, suggesting a possible link between these two diseases. A possible explanation for this association could be related to common environmental or genetic factors. For example, previous studies have suggested that infection with the Epstein-Barr virus (EBV), which is associated with NPC, may also play a role in the development of certain prostate cancers. Additionally, risk factors such as chronic inflammation or certain diets may be shared between these two types of cancer. However, it is important to note that more research is needed to fully understand this association and its clinical implications. Medical specialists should consider these data when assessing the risks for their patients with cavum or prostate cancer, but they should also remain attentive to the results of new studies in this evolving area. (10,11)

#### **CONCLUSION:**

The mechanisms that can explain the multiplicity of primary cancers in the same individual are the existence of risk factors or common oncogenetic events.

In our study, we have only few cases, the clinical implications of this association is not clear, However since EBV has some oncogenic potential in epithelial cells.

The role of EBV in breast cancer, prostate cancer & Hodgkin's disease associated with NPC is not yet demonstrated but deserves further investigations

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