

Nasopharyngeal Cancer: Incidence and prognosis of HPV and EBV association at a single North American institution

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INTRODUCTION

Epstein Barr Virus (EBV) and Human Papillomavirus (HPV) are known causative agents of nasopharyngeal cancer (NPC).

The incidence and prognosis of HPV association for NPC are not well documented in the North American population.

We aimed to review our institutional experience of NPC and report the incidence of viral association and subsequent impact on patient outcomes.

METHODS

All patients with AJCC 8th edition stage I-IVA NPC who underwent definitive (chemo)radiotherapy were included. EBV+ patients as well as EBV- patients with known HPV status were included.

EBV status was determined by EBV-encoded RNA (EBER) in situ hybridization.

HPV status was determined by p16 immunohistochemistry; positivity was defined as at least 70% nuclear and cytoplasmic expression with at least moderate to strong intensity. Patients with positive p16 were confirmed positive with HPV RNA chromogenic in situ hybridization (CISH).

The primary endpoints were overall survival (OS) and freedom from progression (FFP). Univariate and multivariate analyses (MVA) were performed using Cox regression analyses to assess for association with potential prognostic factors.

RESULTS

Patient Demographics

78 patients treated between 2000 and 2019 met criteria, of whom:

	EBV-	EBV+
HPV-	23 (30%)	43 (55%)
HPV+	12 (15%)	0 (0%)*

Table 1. Number of patients by EBV and HPV positivity. *No patients were EBV+/HPV+, however seven EBV+ patients did not have HPV testing.

EBV+ patients were younger at diagnosis, with a median age of 53.5 years compared to 65.0 and 68.6 for HPV+ and EBV-/HPV-, respectively (p=0.002).

	EBV-	EBV+
HPV-	68.6	53.5
HPV+	65.0	--

Table 2. Age at diagnosis.

EBV+ patients also had higher median KPS of 90 compared to 80 for both HPV+ and HPV-/EBV- (p=0.034).

Smoking history, tumor stage, and receipt of chemotherapy were not significantly different between groups. Median clinical follow-up was 32.2 months.

Univariate and Multivariate Analyses

On multivariate analysis, KPS ≤80 was significantly associated with reduced OS (HR 3.64, p=0.007) and FFP (HR 4.81, p=0.013).

EBV-/HPV- was associated with reduced OS compared to EBV+ (HR 3.74, p=0.009) but not compared to HPV+ (HR 1.46, p=0.497).

HPV and EBV status were not significantly associated with FFP.

Comparing HPV+ to EBV+, there was no significant difference in OS (HR 2.50, p=0.136) or FFP (HR 0.90, p=0.899).

RESULTS

Overall Survival and Progression Free Survival

Three year overall survival (OS) for EBV+, HPV+, and EBV-/HPV- was 89.9%, 69.8%, and 52.5%, respectively (Fig 1).

Three year freedom from progression (FFP) for EBV+, HPV+, and EBV-/HPV- was 82.3%, 77.8%, and 58.8%, respectively (Fig 2).

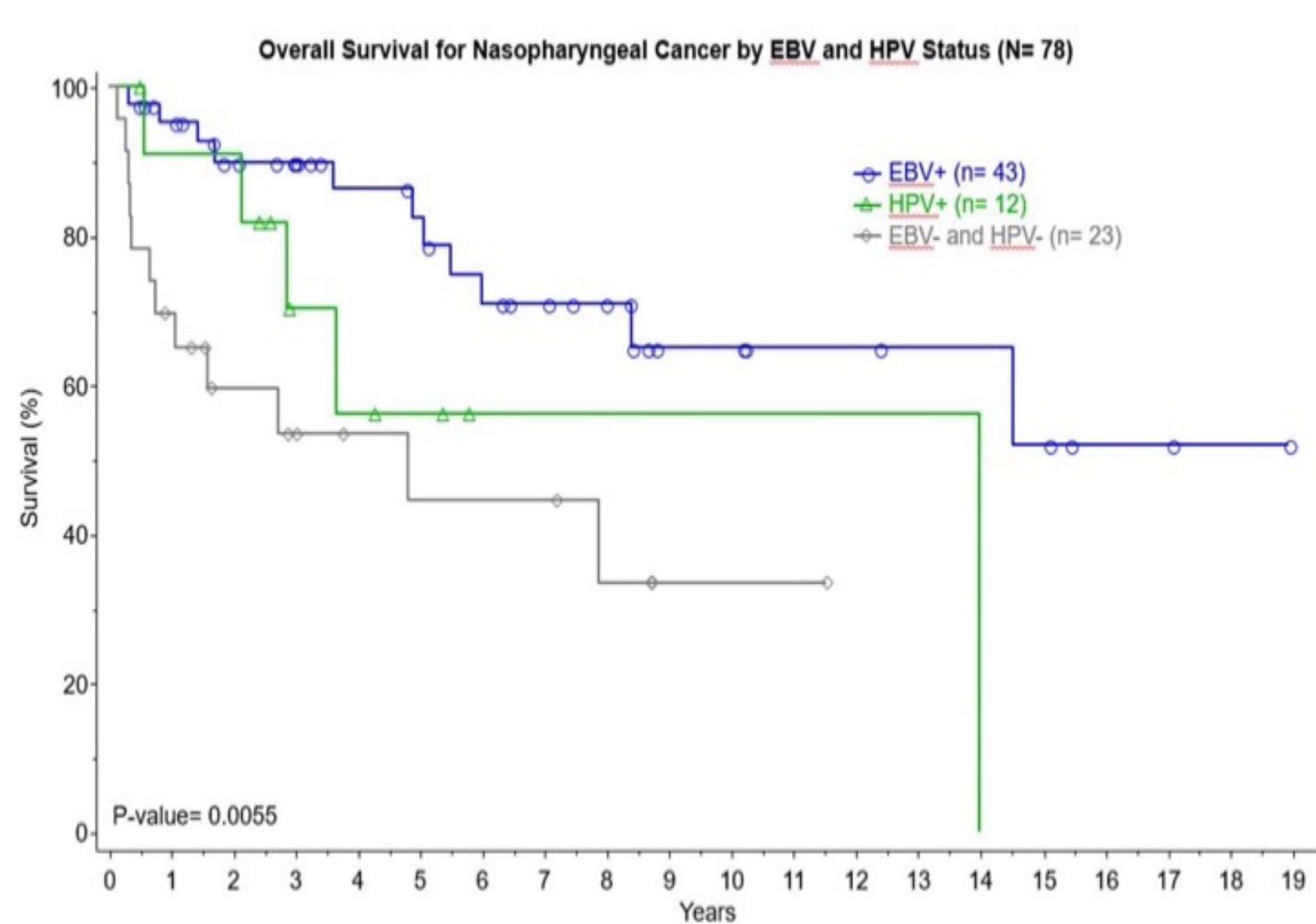


Figure 1. Three year OS.

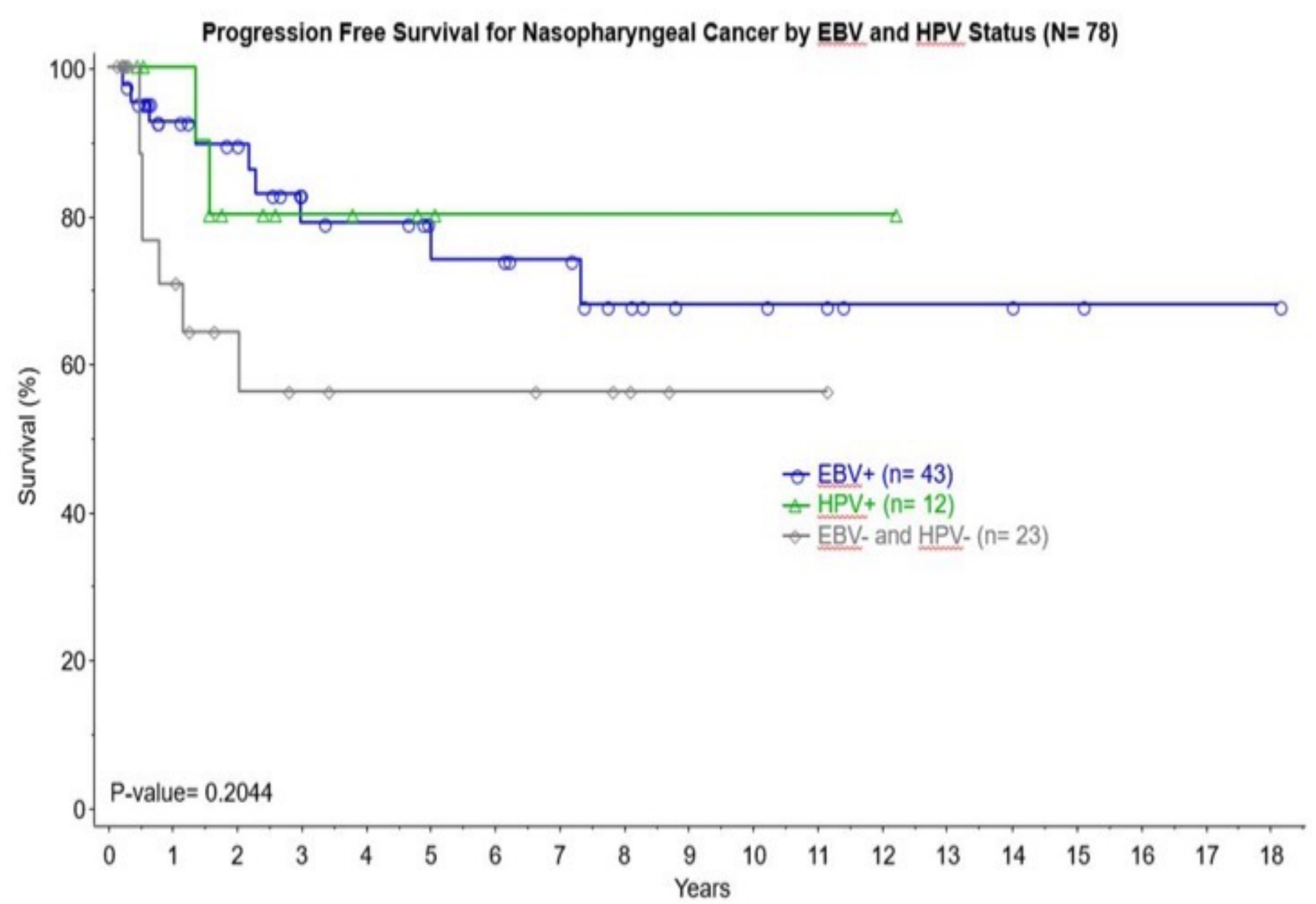


Figure 2. Three year FFP.

CONCLUSIONS

We found a 15% incidence of HPV association among NPC patients and no examples of HPV/EBV coinfection.

EBV+ patients had the longest OS but no difference in FFP, suggesting longer OS may be driven by younger age and higher performance status at diagnosis.

OS and FFP were numerically higher in the HPV+ cohort compared to EBV-/HPV-, however this was not statistically significant.

Disease control appeared similar between EBV+ and HPV+ patients.



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