

**Supplementary Table S1.** Characteristics and survival according to the viral status of cervical metastasis with proven primary tumor

Total (n=64)	HPV-related (n=28, 43.8%)	EBV-related (n=3, 4.7%)	HPV & EBV- unrelated (n=10, 15.6%)	Not determined (n=23, 35.9%)	p-value
Time to the discovery of primary tumor					
Median	0.35	0	0	0.65	
Range	0 ~24.4	0	0	0–105.7	
Age (yr)					.035
<50	8 (28.6)	1 (33.3)	0	6 (26.1)	
50–59	12(42.9)	2 (66.6)	2 (20.0)	9 (39.1)	
60–69	6 (21.)	0	4 (40.0)	8 (34.8)	
≥70	2 (7.1)	0	4 (40.0)	0	
Sex					.033
Male	15 (53.6)	1 (33.3)	1 (10.0)	19 (82.6)	
Female	13 (46.4)	2 (66.7)	9 (90.0)	4 (17.4)	
Smoking status					.978
Non-smoker	13 (46.4)	2 (66.7)	5 (50.0)	6 (26.1)	
Past smoker	7 (25.0)	1 (33.3)	2 (20.0)	7 (30.4)	
Current smoker	8 (28.6)	0	3 (30.)	10 (43.5)	
Smoking duration (pack-years)					.159
Never-smoker	13 (46.4)	2 (66.7)	5 (50.0)	6 (26.1)	
1–20	12 (42.9)	1 (33.3)	2 (20.0)	7 (30.4)	
21–40	3 (10.7)	0	3 (30.0)	6 (26.1)	
≥41	0	0	0	4 (17.4)	
NA					
Lymph node size (cm)					.563
≤3.0	19 (67.9)	3 (100)	5 (50.0)	12 (52.2)	
>3.0, ≤6.0	5 (17.9)	0	4 (40.0)	8 (34.8)	
>6.0	2 (7.1)	0	1 (10.0)	1 (4.3)	
NA	2 (7.1)	0	0	2 (8.7)	
Lymph node level					
Level I	0	0	1 (10.0)	6 (26.1)	
Level II	24 (85.7)	3 (100)	2 (20.0)	21 (91.3)	
Level III	6 (21.4)	1 (33.3)	4 (40.0)	7 (30.4)	
Level IV	4 (14.3)	2 (66.7)	2 (20.0)	3 (13.0)	
Level V	1 (3.6)	1 (33.3)	2 (20.0)	3 (13.0)	
Level VI	0	0	0	0	
Retropharyngeal	0	0	0	0	
Axillary	0	0	0	0	
Supraclavicular	2 (7.1)	0	1 (10.0)	0	
Extranodal extension					.047
positive	4 (14.3)	1 (33.3)	2 (20.0)	7 (30.4)	
negative	18 (64.3)	0	1(10.0)	13 (56.5)	
NA	6 (21.4)	2 (66.7)	7 (70.0)	3 (13.0)	
N category					>.99
1	21 (75.0)	3 (100)	7 (70.0)	15 (65.2)	
2, 2a, 2b	2 (7.1)	0	1 (10.0)	1 (4.3)	
3, 3a, 3b	2 (7.1)	0	1 (10.0)	4 (17.4)	
NA	3 (10.7)	0	1 (10.0)	3 (13.0)	
Keratinization					.293
present	5 (17.9)	0	4 (40.0)	6 (26.1)	
absent	22 (78.6)	3 (100)	6 (60.0)	16 (69.6)	
Cystic change					.003
Present	14 (50.0)	0	0	10 (43.5)	
Absent	13 (46.4)	3 (100)	10 (100)	12 (52.2)	

NA	1 (3.6)	0	0	1 (4.3)	
Basaloid pattern					<.001
Present	25 (89.3)	0	0	12 (52.2)	
Absent	2 (7.1)	3 (100)	10 (100)	10 (43.5)	
NA	1 (3.6)	0	0	1 (4.3)	
Lymphoepithelial lesion					.009
Present	7 (25.0)	3 (100)	1 (10.0)	4 (17.4)	
Absent	20 (71.4)	0	9 (90.0)	18 (78.3)	
NA	1 (3.6)	0	0	1 (4.3)	
p16 IHC					<.001
Positive	11 (100.0)	0	0	0	
Negative	0	3 (100)	10 (100)	1 (4.3)	
NA	17 (60.7)	17 (60.7)	0	22 (95.7)	
p53 IHC					.002
Positive	2 (7.1)	2 (66.7)	9 (90.0)	1 (4.3)	
Negative	9 (32.1)	1 (33.3)	1 (10.0)	0	
NA	17 (60.7)	0	0	22 (95.7)	
T category					.415
1	13 (46.4)	0	2 (20.0)	14 (60.9)	
2	10 (35.7)	0	2 (20.0)	4 (17.4)	
3	1 (3.6)	0	1 (10.0)	0	
NA	4 (14.3)	3 (100)	5 (50.0)	5 (21.7)	
Follow-up duration (mo)					
Median,	72.7	14.3	11.4	55.6	
Range	7–126	1–48	1–18	0–142	
Last status					.014
NED	22 (78.6)	1 (33.3)	3 (30.0)	13 (56.5)	
AWD	4 (14.3)	2 (66.7)	6 (60.0)	2 (8.7)	
DOD/DOC	2 (7.1)	0	1 (10.0)	8 (34.8)	
NA					

HPV, human papillomavirus; EBV, Epstein-Barr virus; NA, not assessed; IHC, immunohistochemistry; NED, no evidence of disease; AWD, alive with disease; DOD, death of disease; DOC, death of other cause.