ORIGINAL RESEARCH PAPER

General Surgery

CORRELATION OF HUMAN PAPILLOMA VIRUS AND EPSTEIN BARR VIRUS IN UPPER GASTROINTESTINAL MALIGNANCIES (ESOPHAGEAL AND GASTRIC) IN TERTIARY CARE CENTER

KEY WORDS:

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ABSTRACT

Background: Esophageal and gastric cancers are among the leading causes of cancer-related mortality globally [1,2]. Oncogenic viruses such as Human Papilloma virus (HPV) and Epstein–Barr Virus (EBV) have been implicated in gastrointestinal carcinogenesis, though data from the Indian subcontinent remain limited [3–5]. **Objectives:** To evaluate the prevalence of HPV and EBV in esophageal and gastric carcinoma and assess their association with clinicopathological parameters. **Methods:** A prospective observational study was conducted on 32 patients with esophageal or gastric carcinoma. Tissue samples were analyzed using polymerase chain reaction (PCR) for HPV and EBV detection. Statistical analysis was performed using SPSS version 17.0. **Results:** HPV was not detected in esophageal carcinoma and was detected in 12.5% of gastric carcinoma cases. EBV positivity was observed in 31.3% of esophageal and 37.5% of gastric carcinoma cases. Viral positivity showed a statistically significant association with lymph node retrieval. **Conclusion:** EBV infection was prevalent in both esophageal and gastric carcinoma, whereas HPV showed limited association, confined to gastric carcinoma.

INTRODUCTION

Esophageal and gastric cancers account for a significant proportion of global cancer burden and are associated with poor survival outcomes [1,2]. Despite advances in multimodality treatment, late presentation remains common in developing countries [6]. Approximately 15–20% of human malignancies are attributable to infectious agents, with oncogenic viruses playing a pivotal role [3,4].

HPV is a well-established etiological factor in cervical, anogenital, and oropharyngeal cancers, and has been variably associated with esophageal squamous cell carcinoma [7–9]. EBV has been classified as a Group I carcinogen and is implicated in lymphomas, nasopharyngeal carcinoma, and a distinct subset of gastric cancers [10–12]. However, the prevalence and significance of these viruses in upper gastrointestinal cancers show marked geographic variability [13–15]. This study aims to provide regional data from South India.

MATERIALS AND METHODS

This prospective observational study was conducted at R. L. Jalappa Hospital, Tamaka, Kolar, from September 2022 to August 2024 after obtaining approval from the Institutional Ethics Committee. Thirty-two patients with histologically confirmed esophageal or gastric carcinoma were included after written informed consent.

All patients underwent detailed clinical evaluation, imaging, upper gastrointestinal endoscopy, and biopsy or surgical resection. Tissue samples were subjected to histopathological examination and PCR analysis for HPV and EBV. Statistical analysis was carried out using SPSS version 17.0. Categorical variables were expressed as frequencies and percentages. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 32 patients were included, with equal distribution of esophageal and gastric carcinoma. Demographic characteristics, tumor pathology, viral status, treatment modalities, staging, and lymph node retrieval are summarized below.

Table 1: Age Distribution

Age Group (Years)	Esophagus (n)	Stomach (n)	Total
30–40	1	3	4
40–50	1	3	4
50–60	10	3	13
>60	4	7	11

Table 2: Gender Distribution

Gender	Esophagus (n)	Stomach (n)	Total
Male	9	11	20
Female	7	5	12

Table 3: Histopathological Distribution

Histopathology	Esophagus (n)	Stomach (n)	Total
Squamous cell carcinoma	11	0	11
Adenocarcinoma	4	14	18
Poorly differentiated carcinoma	1	2	3

Table 4: Tumor Location

Location	Esophagus (n)	Stomach (n)
Lower third esophagus	9	0
Middle third esophagus	7	0
Body of stomach	0	5
Fundus	0	3
Lesser curvature	0	2
Pylorus/Antrum	0	6

Table 5: EBV Status

EBV Status	Esophagus (n)	Stomach (n)	Total
Positive	5	6	11
Negative	11	10	21

Table 6: HPV Status

HPV Status	Esophagus (n)	Stomach (n)	Total
Positive	0	2	2
Negative	16	14	30

Table 7: Treatment Modalities

Treatment	Esophagus (n)	Stomach (n)
Neoadjuvant chemotherapy	1	1
NACT + Surgery	3	2
Chemoradiotherapy	3	0
Surgery alone	3	6
Palliative chemotherapy	1	4
Supportive / Defaulted	5	3

Table 8: Pathological Staging

Stage	Esophagus (n)	Stomach (n)
Stage I–II	3	4

Stage III	6	5
Stage IV	4	4
Stage not available	3	3

Table 9: Lymph Nodes Retrieved

Nodes Retrieved	Esophagus (n)	Stomach (n)
0–10	4	1
10–20	1	4
20–30	4	1
>30	1	2

DISCUSSION

The present study demonstrates a higher prevalence of EBV compared to HPV in both esophageal and gastric carcinoma. The absence of HPV in esophageal carcinoma aligns with several Western studies but differs from reports in high-incidence regions such as China and Iran, where HPV prevalence in esophageal squamous cell carcinoma ranges from 15% to 40% [7–9,16].

EBV positivity in gastric carcinoma observed in this study is consistent with published meta-analyses reporting EBV association in approximately 5–10% of gastric cancers [11,17]. EBV-associated gastric carcinoma is recognized as a distinct molecular subtype characterized by lymphoid stroma, proximal tumor location, and unique immune signatures [12,18].

The statistically significant association between viral positivity and lymph node retrieval suggests a potential interaction between viral oncogenesis and host immune response. Similar findings have been reported in EBV-positive gastric cancers with prominent lymphocytic infiltration [19,20]. The distribution of treatment modalities reflects real-world practice in a tertiary care setting, where advanced-stage disease often necessitates multimodality or palliative treatment [21–23].

Limitations include the small sample size and single-center design. However, the study provides valuable regional data and underscores the need for larger multicentric studies incorporating molecular profiling and survival outcomes.

CONCLUSION

EBV infection was prevalent in both esophageal and gastric carcinoma, whereas HPV showed limited association restricted to gastric carcinoma. Viral status may influence lymph node involvement and therapeutic decision-making. Larger prospective multicenter studies are required to further elucidate the role of viral oncogenesis in upper gastrointestinal malignancies.

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