

## Distribution of haptoglobin phenotypes in oesophageal and gastric cancer

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**SUMMARY** Haptoglobin (Hp) phenotypes were studied in 72 oesophageal and 104 gastric cancer patients and compared with 100 healthy controls to see if there is any association between oesophageal and gastric cancer and haptoglobin type. There was a significantly increased frequency of Hp 2-1 (59.7%) and Hp 2-2 (91.3%) in oesophageal and gastric cancer patients. Our results suggest that genetic factors play a role in the aetiology and pathogenesis of gastrointestinal tract malignancy.

It is believed that genetic factors play a significant role in the aetiology and pathogenesis of gastrointestinal tract diseases. The aetiology of oesophageal and gastric cancer is complex and multifactorial. Hereditary factors in oesophageal cancer have been shown in tylosis, a rare autosomal dominant disorder characterised by hyperkeratosis of the palms and soles and multiple oesophageal papillomas.<sup>1,2</sup> Family and population studies have shown a genetic association with the diffuse type of gastric cancer, an increased risk for persons with blood group A, and first degree relatives of patients being seen in this type of cancer.<sup>3,4</sup> Gastric cancer has also been reported in identical twins.<sup>5</sup> Recently Habibullah *et al*<sup>6</sup> reported an association between the genetic marker pepsinogen and gastric cancer. Several studies have been carried out to correlate the haptoglobin (Hp) phenotypes with different types of cancer.<sup>7-11</sup> Increased frequency of the Hp<sup>1</sup> allele has been observed in leukaemia, particularly in acute

lymphatic, acute myeloid, and chronic myeloid leukaemia.<sup>7,8</sup> These studies suggest a possible role of genetic factors in the aetiology of oesophageal and gastric cancer, and the present study was undertaken to search for a possible association between Hp phenotypes and cancer of the oesophagus and stomach. To our knowledge, there are no other published reports on Hp types in oesophageal or gastric cancer.

### Material and methods

Seventy-two patients with oesophageal cancer and 104 with gastric cancer, attending the Gastroenterology Unit at Osmania General Hospital, Hyderabad, India, were selected for our study. Controls were taken from the same (Hyderabad) population, the city where the study was conducted. Diagnosis of the disease was confirmed by endoscopy and histopathological examination of tissue obtained at biopsy. A sample of serum was obtained and used to determine the Hp phenotypes. The Hp types were analysed by the method of Clarke.<sup>12</sup>

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TABLE Distribution of haptoglobin types in patients with oesophageal and gastric cancer and controls.

	No of cases	Hp types			Gene frequency	
		Hp 2-2	Hp 2-1	Hp 1-1	Hp <sup>1</sup>	Hp <sup>2</sup>
Oesophageal cancer	72	29 (40.3%)	43 (59.7%)*	—	0.30	0.70
Gastric cancer	104	95 (91.3%)*	9 (8.7%)	—	0.04	0.96
Controls	100	71	26	3	0.16	0.84
Hardy-Weinberg predicted frequencies		70.56†	26.88†	2.56†		

\* $p < 0.001$ .

†Calculated from control frequencies.

## Results and discussion

The table summarises the results. Statistical analysis showed a significantly increased frequency of Hp 2-1 and Hp 2-2 in oesophageal and gastric cancer patients when compared with 100 healthy controls. Relative risk analysis showed a risk of 4.04 ( $\chi^2=17.73$ ,  $df=1$ ,  $p<0.001$ ) and 3.86 ( $\chi^2=10.49$ ,  $df=1$ ,  $p<0.001$ ) for subjects with Hp 2-2 and Hp 2-1 for predisposition to oesophageal and gastric malignancy. The reasons for the different influences of Hp phenotypes on susceptibility to oesophageal and gastric cancer are interesting. Since two different cell types (columnar and squamous epithelium in the oesophagus and adenocarcinoma which arises from normal or metaplastic mucus cells in gastric cancer) are involved in malignant transformation in these two cancers, it is likely that different Hp types may contribute to these transformations.<sup>13 14</sup>

Our findings suggest that genetic factors play a role in the aetiology and pathogenesis of oesophageal and gastric carcinoma.

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