

Original Research Article

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Association of *Helicobacter pylori* in nasal polyposis

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ABSTRACT

Background: A significant number of patients with gastro esophageal reflux disease (GERD) disease are actually infected with *Helicobacter pylori*, transmission of the bacteria from stomach to nose may occur. Few studies have revealed the presence of *Helicobacter pylori* in normal nasal mucosa, in patients with chronic rhino sinusitis and in nasal polyps but the results have been conflicting and further studies are required for its establishment. The aims and objectives of the study were to study the presence of *Helicobacter Pylori* in nasal polyp specimen by using non specific tests- rapid urease test, Giemsa stain and H&E stain, specific tests-immunohistochemistry and culture.

Methods: 35 patients with nasal polyp were underwent endoscopic nasal polypectomy. Specimens were analyzed for presence of *Helicobacter pylori* by urease test, Giemsa stain, Hemotoxylin and Eosin stain, Immunohistochemistry and culture.

Results: Out of 35 patients 10 patients had gastro esophageal reflux disease (GERD), in which 06 patients showed positive for urease test and Giemsa stain and 3 patients picked up by immunohistochemistry test and growth in culture media. Of which *Helicobacter pylori* positive cases by H&E stain showed typical hyperplastic epithelium and lymphoid aggregation.

Conclusions: There exists an association between *H. pylori* and nasal polyps and GERD. Non-specific urease test and modified Giemsa stain were positive in considerable number of cases, but the statistical significance could not be established. Immunohistochemistry and culture can be regarded as the procedure of choice in truly positive cases infected with *H. pylori* along with hyperplastic epithelium in H & E stain, all with co-relative finding but require larger study to establish their association which will help in further research and treatment.

Keywords: Nasal polyp, *Helicobacter pylori*, Gastro esophageal reflux disease, Specific and non specific tests

INTRODUCTION

Helicobacter pylori is a gram negative organisms, which typically survives in micro-aerophilic acidic environment.¹ *Helicobacter pylori* contains large amounts of urease, the enzyme which is present in the cytoplasm and its plasma membrane of its own cell, hydrolyses urea into ammonia and CO₂, the ammonia forms protective cloud called basic 'ammonia cloud' around it, which helps bacteria to survive in acidic medium.² This urease enzyme activity is regulated by a unique pH gated urea

channel urel, which opens at low pH (acidic medium) and shuts the influx of urea into bacterium under neutral condition (alkaline/neutral pH) and it is this property which makes it to typically harbor and colonize in the acidic environment of stomach.³ But *H. pylori* has been isolated from all over the body except brain & has been found in cardiac tissue, liver, spleen, gall bladder, skin, retina, adenoid, tonsil, dental plaques, saliva, sub gingival region, oral lesions or ulcers, middle ear mucosa and also in the pathological specimen of nasal polyp as a causative factor in nasal polyp formation.⁴⁻⁹ Although *H. pylori*

infection is widespread throughout the world with varying incidence across different studies depending on socio-economic condition and hygiene with its exact mode of transmission is not fully understood and is likely to be oral-oral, faeco-oral, waterborne and gastrointestinal routes.¹⁰

The *H. pylori* is detected by non specific urease test, Giemsa stain and H&E stain and specific test immunohistochemistry and culture.¹¹⁻¹⁶ The non specific tests are not reliable because of other urea producing organisms, so immunohistochemistry, PCR and culture are most reliable specifically detecting the *Helicobacter Pylori*.

Many studies conducted on *H. pylori* and nasal polyposis have used non specific stain and very little information is available on specific stain and correlation with culture studies.¹⁷⁻²⁰

Hence the present study has taken to correlate with specific and non specific tests and stain in detection of *H. pylori* in nasal polyp which help in further research and modification of treatment.

METHODS

The present study was conducted in the Department of Otorhinolaryngology, M. R. Medical College, Kalaburagi, from north Karnataka region, between November 2014 to November 2016, after approval from the Institutional Ethical Committee.

35 patients with nasal polyp who underwent endoscopic nasal polypectomy were taken for the study. All the nasal polyp patients attending Out Patient Department for endoscopic polypectomy were included for the study. The Patients with the lesions other than nasal polyps, who are on H₂ Blockers, proton pump inhibitor, antacids and antibiotics were excluded from the study.

All patients with thorough history including GERD symptoms were examined and underwent routine

investigations for polypectomy. The specimen of non exposed part of the nasal polyp after polypectomy were transported to lab immediately one part of polyp in normal saline for rapid urease test & culture and the other part of polyp in formalin solution and was subjected for Giemsa stain, H&E stain and immunohistochemistry.

The statistical analysis for correlation and significance among these parameters were determined by using Pearsons Chi- square test.

RESULTS

The study revealed that, nasal polyps are prevalent in both sexes, but prevalence is higher in females 20 patients (57.14%) compared to males 15 (42.85%). The male:female ratio is 0.75:1.

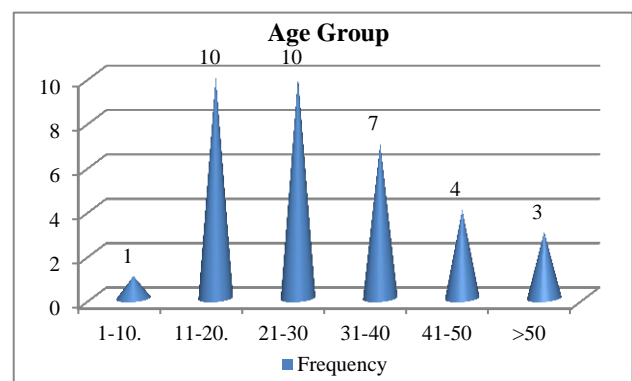


Figure 1. Distribution of patients according to age group.

Out of 35 patients studied, maximum age of the patient was 67 yrs and minimum age was 5 yrs. Maximum number of patients were in age between 11-30 yrs (20/35) (57.14%).

Out of 35 patients, 10 patients were having history of GERD (10/35) (28.57%).

Table 1: Chi-square table showing the association of history of GERD with urease test and Giemsa test.

Test		H/O GERD		Total	P value
		Positive	Negative		
<i>H. pylori</i> in nasal polyp: urease test	Positive	3	4	7	0.796
	Negative	7	21	28	
	Total	10	25	35	
Giemsa stain test	Positive	3	4	7	0.796
	Negative	7	21	28	
	Total	10	25	35	

*represent $p < 0.05$ in chi-square column concluding significance difference.

The above table shows that, urease test was positive in 07 (20%) (Figure 2) patients and Giemsa stain was positive in 07 (20%) patients. Though there exists an association

between *H. pylori* and nasal polyps but Chi-square test shows there is no statistical significance between history of GERD with Urease test and Giemsa test ($p=0.796$).



Figure 2: Urease test and culture positive.

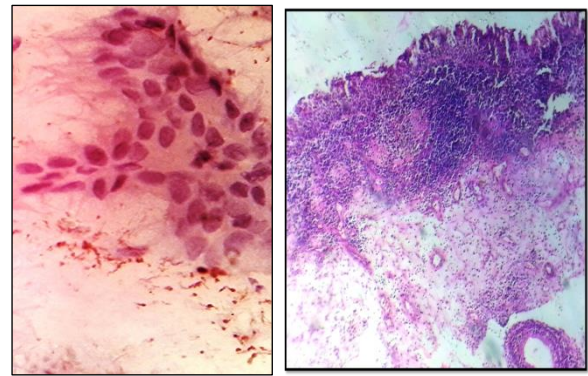


Figure 3: Nasal polyp with *H. pylori* infection showing IHC positive and hyperplasia of lining epithelium and lymphoid aggregates. H&E (100x).

Table 2: Chi-square table shows the association of history of GERD with histopathology- HE, IHC and culture.

Histopathology		H/O GERD		Total	Chi-square
		Positive	Negative		
HE	Allergic polyp	0	25	25	P<0.05*
	Inf. polyp	10	0	10	
	Total	10	25	35	
IHC	Positive	3	1	4	P=0.131
	Negative	7	24	31	
	Total	10	25	35	
Culture	Positive	3	1	4	P=0.131
	Negative	7	24	31	
	Total	10	25	35	

*represent $p < 0.05$ in chi-square column concluding significant difference.

The above table shows that, among the 35 patients, histopathology with HE test was positive in 25 (71.42%) patients with allergic polyp and 10 (28.5%) patients with infective polyp which is statistically significant. Of which 3 were positive with *H. pylori* infection by IHC and culture. Among them, 10 (28.5%) patients were positive for h/o GERD and 25, (71.42%) patients were negative for h/o GERD. In the above table, IHC test and culture was positive in 3 (8.57%) patients. Though there exists an association between *Helicobacter Pylori* and nasal polyp, but it was statistically not significant ($p > 0.05$).

DISCUSSION

Nasal polyp has multifactorial origin and the recent limited research have shown *H. pylori* in nasal polyp which might change the modality of treatment. The diagnostic profiles to detect *H. pylori* in nasal polyp is by various non-specific (urease test, Giemsa stain and H&E stain) tests which are non-reliable because other organisms produce urease enzymes and whereas specific tests (immunohistochemistry, PCR and culture) are most reliable in detecting the *Helicobacter Pylori*.

Many studies conducted on *H. pylori* and nasal polypoidosis have used non-specific tests which gives rise to false positive results with high incidence and very little

information is available on specific stain and correlation with culture studies. So the present study conducted to evaluate the different diagnostic profiles & correlate them in detection of *Helicobacter Pylori* in nasal polyp.

The non-specific diagnostic profile used in this study (i.e.,) urease test & Giemsa stain detecting urea in *H. pylori* was positive in 7 patients (20%). Urease test in the study conducted by Cvorovic et al and Bansal et al showed higher percentage of patients showed positivity for urease test 26% and 57.1% respectively and by Ozcan et al reported lower percentage (4%) of urease test positivity which is lower than our observations.¹⁷⁻¹⁹ Giemsa stain, in the study conducted by Al-Abbasi et al reported higher rates of 42% were positive when compared to our study.²⁰ Both urease test and Giemsa stain is easy to perform, cheap and has sensitivity 90-92%. But is a non specific due to contamination by other urea producing organism giving varying results hence should not be used solely but can be used as a screening test to detect *H. pylori* in nasal polyp.

We took IHC and culture as the procedure of choice in our study as they directly detect *Helicobacter Pylori* in nasal polyp and 3 cases (8.57%) were positive for *H. pylori* was picked up IHC and growth is seen in culture media. Ozcan et al in his study could not detect any

positive cases; Koc et al detected 20% by IHC in their studies.^{19,21} Nemati et al showed culture test negative in his studies, where as in our study 3 (8.57%) cases showed positive growth in culture media.²² So IHC and culture test can be regarded as highly sensitive and specific which can detect the low concentration of bacteria and truly positive cases, so the true incidence of *H. pylori* in our study is 3 (8.57%). Culture is cheap and easily available method when compare to IHC which is costly and not easily available and particularly used in research purpose. Though there exists an association between *H. pylori* and nasal polyp, but in our study association was statistically not significant.

H&E could not pick up any cases of *H. pylori* in nasal polyps, but a typical hyperplasia of the lining epithelium and lymphoid aggregates as a significant change in the usual morphology of nasal polyps of truly positive cases 3 (8.57%) as the non exposed part of the polyp was sent for H & E stain, were seen (Figure 3) similar finding was seen by Bansal et al.¹⁸ But different and larger studies are required to confirm these findings.

History GERD was seen in 10/35 (28.5%) cases in which only 3(8.57%) were truly positive for *H. pylori* in nasal polyp. Similarly Al- Abbasi et al and Koc et al had 15 & 30 cases had GERD in which only 4 (14%) & 6 (20%) were positive for *H. pylori* in nasal polyp.^{20,21} So GERD is not only route or source for *H. pylori* infection, as other routes like oro nasal reflux and direct source in nose are possible.

However, in all above studies there was a difference in detection rate by urease, Giemsa, H&E and culture method. Similar was the scenario in our study.

CONCLUSION

There exists an association between *H. pylori* and nasal polyps, and GERD might be one of the route of transmission. Non-specific urease test and modified Giemsa stain were positive in considerable number of cases; H&E stain shows typical hyperplastic epithelium and lymphoid aggregations in the infective polyps with *H. pylori*. So all these can be used as screening profile for *H. pylori*. Culture can be regarded as the procedure of choice as it is cheap and its local availability as compared to immunohistochemistry for histological sections, but further study is required to confirm this findings To conclude the study needs larger sample for correlation of these diagnostic profiles in detection of *H. pylori* in nasal polyp which could further help for research and modification of treatment.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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