Possible relation between *H. pylori* and bilateral nasal polypi

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Abstract:

Background: *H.pylori* is a Gram-negative bacterium known to be associated with peptic ulcer disease, gastric cancer, gastric lymphoma. Recently it was detected in mucosa of patients with CRS, but relation with bilateral nasal polyposis has not been demonstrated yet.

Objectives: *H. pylori*is a pathogen that lives in the gastrointestinal tract (GIT) and has extragastric manifestations. Nasal polypi may be one of these manifestations. This study aims to detect the relation between *H.pylori* and bilateral nasal polypi.

Patients and methods: This study includes 80 cases of nasal polypi, 40 of them were *de novo* bilateral nasal polypi and 40 were recurrent nasal polypi, biopsies of nasal polypi were taken under sterile conditions and stained with Giemsa stain and Hematoxylin and eosin(H&E) stain. Stool analysis was done to detect presence of *H.pylori* using rapid urease test.

Results: Both groups are age and sex matched. Nasal polyp biopsies showed positive results in 10 % of *denovo* group and 15 % of recurrent group with p value 0.449 which is not statistically significant. Stool antigen test showed positive results in 52.5 % of *denovo* group and 60 % of recurrent group with p value 0.449 which is not statistically significant.

Conclusion: There is no statistically significant relation between *H.pylori* and the pathogenesis of bilateral nasal polypi, further studies with large number of patients is recommended.

Keywords: Bilateral Nasal polypi; *H. pylori*; Giemsa stain; Modified McMullen's; Stool antigen test.

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Introduction

Chronic rhinosinusitis (CRS) means inflammation of the Sino nasal mucosa lasting for at least 12 weeks. About 15 % of the adult population is affected all over the world and it can be classified into 3 categories: CRS with nasal polyps (CRSCNP), CRS without nasal polyps (CRSSNP) and allergic fungal rhino-sinusitis (AFRS).

Diagnosis of CRS is established by the EPOS (European Position Paper on Rhinosinusitis and Nasal Polyps) in 2012 by the following criteria: nasal blockage, nasal discharge (antenasal or postnasal), facial pain or headache, anosmia or hyposmia in addition to endoscopic signs e.g.: polyps, muco-purulent discharge, edema of the middle meatus mainly and changes within the Osteomeatal complex and sinuses on C.T (computerized tomography) **(Katle et al.,2013).**

The exact cause of nasal polyp formation is still unknown, but they are usually associated with allergy, asthma, infection, cystic fibrosis, and aspirin sensitivity **(Bateman et al., 2003).**

Gastroesophageal reflux disease (GERD) is also a common condition, which affects about 10%-20% in western Europe and North America. **(Vakil et al.,2006)**

According to the 2006 Montreal definition, GERD is defined as reflux of gastric contents causing symptoms and/or complication, and can be further subclassified as an esophageal or extraesophageal syndrome.**(Vakil et al.,2006)**

Big number of GERD patients have also *H. pylori* infection making nasal mucosa indirect contact with the bacterium **(Wu et al.,2001)**.

H. pylori is a spiral shaped gram-negative bacterium that selectively colonizes the gastric epithelium of more than half of the world's population **(Alzahrani et al.,2014).**

Active colonization of *H. pylori* in the stomach can lead to variety of upper gastrointestinal disorders including chronic gastritis, peptic ulcer disease, gastric mucosa-associated lymphoid tissue (MALT) lymphoma, and gastric malignancies.**(Kusters et al.,2006)**.

H. pylori has also some extragastric manifestations due to immunological response induced by the host resulting in variety of diseases outside the stomach such as hematological, cardiovascular, respiratory, neurological disorders, diabetes mellitus, ear and eyes diseases, and head and neck tumors has also been reported **(Figura et al.,2010)**.

H. pylori Colonization has also been discovered in dental plaque, saliva, tonsils, and adenoids**(Unver et al.,2001)**, and alsomiddle ear cavity **(Saki et al.,2014)**.

In this study we tried to detect possible role of H pylori in the pathogenesis of bilateral nasal polypi by histopathological examination of biopsies of nasal polypi and Stool analysis searching for *H. pylori* antigen using rapid urease test to correlate active gastrointestinal colonization with *H. pylori*.

Patients and methods

During the period from January 2020 to February 2021 eighty patients (40 with *denovo* bilateral nasal polypi and 40 with recurrent bilateral nasal polypi) were selected from Otorhinolaryngology out patient's clinic. The subjects included in this study were chosen age and sex matched. Full history and clinical examination for all patients, all patients were asked about history of GERD in the form of acid regurgitation, heartburn and gastric distention. Informed oral and written consent was taken from all patients before collection of samples. The history of GERD, and results of stool antigen test were unknown to the pathologist While interpretation of various bacteriological tests.

Sample Processing

The specimens were fixed at 10% formalin. Paraffin embedded blocks were prepared and thin sections were stained by Hematoxylin and eosin stain for routine diagnosis.

Then another slide was stained by Giemsa stain for detection of H. pylori organisms

1- On a clean dry microscopic glass slide, make a thin section of the specimen.

2- The section was deparaffinized and hydrated in distilled water.

3- The slides were incubated in freshly made *H. pylori*solutions for 15-30 min.

4- *H.pylori* solutions was made by Giemsa stain solution/distilled water (1:20) with 12.5%methanol.

Then the slides were mounted and covered with cover glass.

Stool analysis for *H. pylori* antigen was also done using rapid urease test.

Statistical analysis

Data managed and analyzed using statistical package for social sciences (SPSS) version 26. Descriptive statistics will be done in the form of frequencies, mean and standard deviation then analytic statistics will be done as chi square, independent sample t test. Values will be considered significant when p value equal or less than 0.05.

Results

This study included 80 patients with mean age 48.3 years. There were 31 males accounting for 38.75 % and 49 females accounting for 61.25 % totally.

According to GIT symptoms; group A (*denovo*) 28 patients complain GIT symptoms accounting for 70 %, while in recurrent group (B) 27 patients had GIT symptoms accounting for 67.5 % with no statistically significant difference as shown in (**Table .1**).

Table1. Comparison between demographic data of both groups of bilateral nasal polypi.

Variables		Groups		P value
		A	B	
Age		40±13	48.3±17.8	.07
Sex	Male	16(40%)	15(37.5%)	.818
	Female	24(60%)	25(62.5%)	
GIT symptoms	Positive	28(70%)	27(67.5%)	.809
	Negative	12(30%)	13(32.5%)	

As regard presence of *H. pylori* antigen in stool; it was positive in 21 patients with *de novo* nasal polypi (A) and 24 with recurrent nasal polypi (B) representing 52.5 % and 60 % respectively as shown in (**Table .2**).

Table 2. comparison between *H. pylori* antigen in stool of both studied groups.

Variables		Groups		p value
		A	B	
H. Pylori antigen in stool	Positive	21(52.5%)	24(60%)	0.499
	Negative	19(47.5%)	16(40%)	

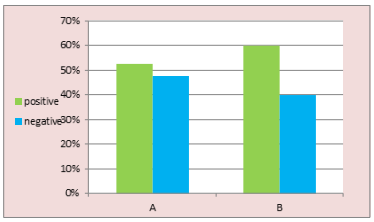

Fig.1 Comparison between *H. pylori* antigen in stool of both studied groups.

Results of nasal polypi biopsy showed *H.pylori* bacteria in 4 cases of *denovo* group (A) and 6 cases of recurrent group (B) representing 10 % and 15 % respectively with p value 0.499 which is not statistically significant as shown in (**Table .3**).

Table 3. comparison between biopsies of nasal polypi as regard presence of *H. Pylori* bacteria in both studied groups.

Variables		Groups		p value
		A	B	
Biopsy for *H. pylori*	Positive	4(10%)	6(15%)	0.499
	Negative	36(90%)	34(85%)	

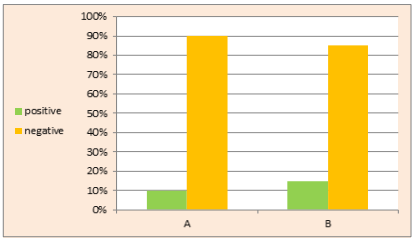

Fig.2. Comparison between biopsies of nasal polypi as regard presence of *H. Pylori* bacteria in both studied groups.

This study found that patients who had positive biopsies (10 % of *de novo* group and 15 % of recurrent group) also had positive stool antigen test.

Results of this study concluded that no statistically significant relation between *H. pylori* and bilateral nasal polypi.

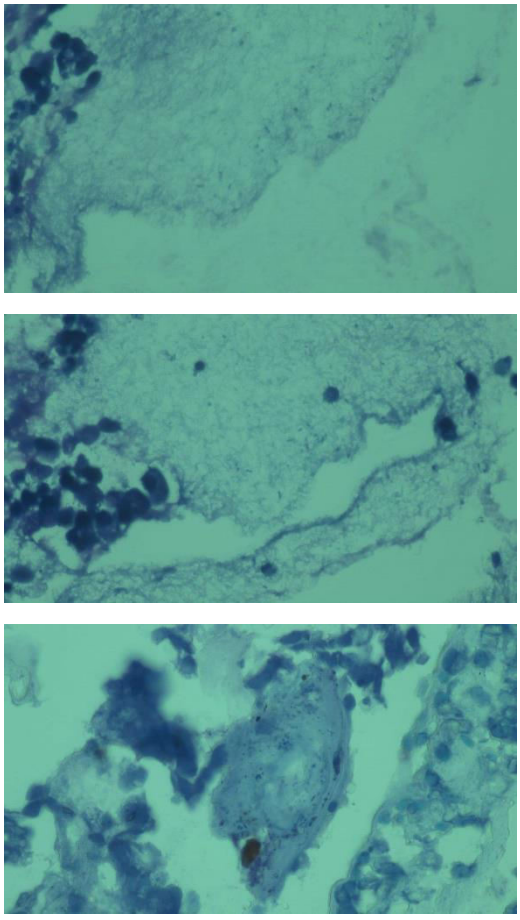

Fig.3. Giemsa stain (*400) revealed the presence of multiple *H.pylori* on the surface mucous film of nasal polyp.

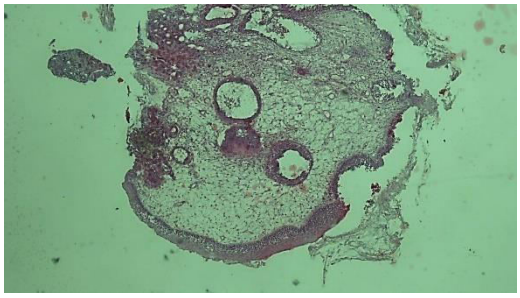

Fig. 4. H&E stain of nasal polyp showing infiltration of subepithelial tissues by chronic inflammatory cells, the surface is covered by respiratory epithelium with squamous metaplasia.

Discussion

The Working Group of the World Health Organization International Agency for Research on Cancer has classified *H. pylori*as a class I carcinogen in humans **(Schistosomes,1994)**. *H.pylori*is known to have several gastric and extragastric manifestations and nasal polypi are claimed to be one of the extragastric manifestations of *H.pylori* infection.

This study included 80 patients divided into two groups; *de novo* group with mean age 40 years and a recurrent group with mean age 48.3 years. This was similar to results of studies done by **Iathi et al.(2011)**and **Zafar et al.(2008)**who reported that second to fourth decade was the target age of affection.

In this study bilateral nasal polypi had slight predilection for females, (female: male ratio of 1.5:1). That is in agreement with**Bakari et al.(2010)** who showed female preponderance with male: female ratio of 1:1.2.

We disagree with **Bansal et al. (2016)**. who reported that nasal polypi had slight predilection for males with male: female ratio of 1,3:1**.**

Results of this study showed positive biopsies for *H. pylori* bacteria detected in 4 cases of *denovo* group and 6 cases of recurrent group representing 10 % and 15 % respectively and 12.5% totally.

This is different from **Al-Abbasi et al.(2012)** and **Cvorovic et al.(2008)** who reported 35 and 26 % positivity in

their study using modified Giemsa staining on nasal polypi.

We also use H & E stain which gave the same results as Giemsastain, it showed positive results in 10 % and 15 % of *denovo* and recurrent groups respectively.

We disagree with **Bansal et al**.**(2016)** who reported that H & E was positive in only 21.4 % of cases while with Modified McMullen's stain showed positive results in 64.2 % of cases**.**

Stool analysis for *H. pylori* antigen using rapid urease test was done to show a relationship with the gastric status of the patients, which is considered non-invasive, rapid, and technically easy procedure to perform, which was positive in 45 cases (21 patients with *denovo* bilateral nasal polypi and 24 with recurrent nasal polypi representing (52.5%) and (60%) respectively.

This study found that patients who had positive biopsies also had positive stool antigen test. This is in agreement with **Bansal et al**. **(2016).**

Results of this study showed that no statistically significant relation between *H.pylori*and bilateral nasal polypi.

This is in agreement with **Al-Abbasi(2008)** who could not find strong relationship between *H. pylori*andnasal polypi**.**

We differ from **Bansal et al.(2016)** who found significant correlation between nasal polypi and *H. pylori*

Conclusion

No significant relation between *H.pylori* and the pathogenesis of bilateral nasal polyposis either *denovo* or recurrent.

Further studies should be done with large number of patients.

List of abbreviations:

1.*H. pylori*: Helicobacter pylori.
2.H&E: Hematoxylin and eosin stain
3.GERD:gastroesophagealreflux disease.
4.CRS: chronic rhinosinusitis.
5. GIT: gastrointestinal tract.
6.C.T: computerized tomography.

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