



CLINICAL STUDY

THE EFFECT OF GASTROESOPHAGEAL REFLUX DISEASE ON THE ETIOLOGY OF RHINOSINUSITIS IN ADULTS

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SUMMARY

Objective: Rhinosinusitis (RS) and gastroesophageal reflux disease (GERD) are common diseases in the community. The pathophysiological mechanism of RS is reported to begin with mild edema leading to obstruction in the draining sinus ostium. The initial obstruction in the sinus ostium of GERD is thought to be one of many possible triggers. In study, we aimed to investigate the relation between RS and GERD.

Material and Methods: In study, 68 patients (38 females, 29 males) between the ages of 24-53 who were diagnosed with GERD by the Gastroenterology department and 35 healthy adults (19 females, 16 males) between the ages of 28-49 were included. The relation between RS and GERD was investigated by evaluating the Ear nose throat (ENT) symptoms and computerized sinus tomography (CT) results of patients diagnosed with GERD.

Results: In this study, the most common ENT symptom in GERD was throat discomfort (83%), followed by coughing (71%). Postnasal discharge (52%), nasal congestion (32%), and facial pain (19%), which are the 3 main symptoms of RS, were found to be common in these patients. While RS findings were detected on CT in 76% of 67 patients with GERD, this rate was found as 17% in the 35 healthy adults. According to CT results, the relation between GERD and RS was statistically significant ($p<0.05$).

Conclusion: Although a close relation was found between RS and GERD as a result of in this study, a scientifically valid relation remains unclear. Further studies are needed to reinforce and support this relation.

Keywords: Rhinosinusitis, gastroesophageal reflux disease, etiology, adults

ERİŞKİNLERDE GASTROÖZOFAGEAL REFLÜ HASTALIĞININ RİNOSİNÜZİT ETİYOLOJİSİNE ETKİSİ ÖZET

Amaç: Rinosinüzit (RS) ve gastroözofageal reflü hastalığı (GERD) toplumda sık görülen hastalıklardır. RS'nin patofizyolojik mekanizmasının drene olan sinüs ostiumunda obstrüksiyona yol açan hafif ödem ile başladığı rapor edilmektedir. GERD'nin sinüs ostiumundaki ilk tıkanıklığın birçok olası tetikleyiciden biri olduğu düşünülmektedir. Bu çalışmada, RS ve GERD arasındaki ilişkiyi araştırmayı amaçladık.

Gereç ve Yöntemler: Çalışmaya, Gastroenteroloji bölümü tarafından GERD tanısı almış 24-53 yaş arası 68 hasta (38 kadın, 29 erkek) ve 28-49 yaş arası 35 sağlıklı erişkin (19 kadın, 16 erkek) dahil edildi. GERD tanısı alan hastaların Kulak Burun Boğaz (ENT) semptomları ve bilgisayarlı sinüs tomografi (CT) sonuçları değerlendirilerek RS ile GERD arasındaki ilişki araştırıldı.

Bulgular: Bu çalışmada GERD'nda en sık görülen KBB semptomu boğazda rahatsızlık (%83), ardından öksürük (%71) idi. RS nin 3 ana semptomu olan postnazal akıntı (%52), burun tıkanıklığı (%32) ve yüz ağrısının (%19) bu hastalarda sık olduğu görüldü. GERD olan 67 hastanın %76'sında CT'de RS bulguları saptanırken, kontrol grubundaki 35 sağlıklı yetişkinlerde bu oran %17 olarak bulundu. CT sonuçlarına göre GERD ile RS arasındaki ilişki istatistiksel olarak anlamlıydı ($p<0.05$).

Sonuç: Bu çalışma sonucunda RS ile GERD arasında yakın bir ilişki bulunmasına rağmen, bilimsel olarak geçerli bir ilişki belirsizliğini korumaktadır. Bu ilişkiyi pekiştirecek ve destekleyecek ileri çalışmalara ihtiyaç vardır.

Anahtar Sözcükler: Rinosinüzit, gastroözofageal reflü hastalığı, etyoloji, erişkinler

INTRODUCTION

Rhinosinusitis (RS) is inflammation of the sinus cavity accompanied by nasal mucosal inflammation. Although the cause of inflammation is mostly due to infection, allergies, irritants, gastroesophageal reflux (GER) and barotrauma also play a role in the

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etiology. The ostium should be open, mucociliary clearance and secretions should be normal for proper physiology of the paranasal sinuses. Although the majority of RS is self-limiting without treatment, it is one of the reasons for frequent hospital admissions as one out of every 6-7 people a year is affected by this condition. Clinically, nasal congestion, nasal and/or postnasal discharge, and facial pain are the three main symptoms and signs of the disease¹⁻³. Computerized sinus tomography (CT) has an important place in the radiological diagnosis of RS. With CT performed in the coronal plane, it is possible to see both the condition of the sinus and the anatomical variations that may predispose to RS⁴.



GER occurs with the retrograde movement of stomach contents towards the distal esophagus and is a physiological condition that can normally be observed approximately 10-15 times a day. According to the definition of gastroesophageal reflux disease (GERD) published in Montreal (2006), this condition becomes pathological due to multifactorial reasons, causing histological and morphological changes in the distal esophagus or causing symptoms and signs of the esophagus, pharynx, larynx and upper respiratory tract, and/or condition that causes complications. GERD is an important health problem that is frequently seen in the community. Its prevalence in the world varies between 7-20%^{5,6}. Studies have shown that there is a close relationship between rhinosinusitis and GERD. GER is thought to be a potential exacerbation factor of sino-nasal inflammatory diseases. Three theories have been proposed that GER may affect the sinonasal cavity. First, the inflammatory process begins, with acid and pepsin directly affecting the mucosa. As a result, mucosal edema occurs and mucociliary clearance is impaired. With these reactions, obstruction of the sinus ostium occurs and results in infection. The second, relates to a neurological mechanism mediated by the vagal nerve. Sinonasal edema and secondary ostium obstruction occur due to dysfunction of the autonomic nervous system. The last mechanism includes the probable role of *Helicobacter pylori*, which plays a major role in gastric ulcer and gastritis, in sino-nasal infections⁷⁻⁹. Although it has been determined that there is a close relationship between rhinosinusitis and GERD in the studies, the mechanisms of GER affecting the sinonasal cavity and causing rhinosinusitis have not been fully elucidated yet.

In this study, the relation between RS and GERD was investigated by evaluating the ENT symptoms and CT results of patients diagnosed with GERD.

MATERIAL and METHODS

In this prospective study conducted in 2016-2018, 68 patients (38 females, 29 males) between the ages of 24-53 who were diagnosed with GERD by the Gastroenterology department and 35 healthy adults (19 females, 16 males) between the ages of 28-49 were included. Adults in the control group consisted of healthy people

who came to the hospital for check-up. Patients who had undergone sino-nasal surgery, patients who used drugs (antibiotics, antihistamines, decongestants and nasal sprays) due to their sino-nasal symptoms were excluded from this study.

ENT examinations of the patients were performed by the same doctor and their ENT symptoms were recorded. CT was performed on both GERD patients and healthy adults. Partial, complete opacification and/or diffuse, focal mucosal thickening in the sinuses on tomography images were considered significant in terms of rhinosinusitis. CT findings of rhinosinusitis in GERD and healthy adults were evaluated.

Ethics Committee Approval for this study was obtained from Kavaklıdere Umut Hospital Ethics Committee (Approval Date/No: 30 December 2015/4). In study was prepared according to the principles of Helsinki and informed consent was obtained from the patients participating in this study.

Statistical analysis

Statistical analysis program (Statistical Package for the Social Sciences (SPSS) version 22.0, SPSS Inc. Chicago, IL, USA) was used to evaluate study results. Chi-square test was used to evaluate differences between groups. Significance level was accepted as $p < 0.05$.

RESULTS

The symptoms detected in the ENT examination of the 67 patients with GERD who attend in the study are shown in Table 1. The most common symptom (83%) was discomfort in the throat (burning, stinging, pain), followed by coughing (71%). It was determined that the 3 main symptoms of rhinosinusitis, postnasal discharge (52%), nasal congestion (32%) and facial pain (19%) were common in these patients. The results of rhinosinusitis tomography findings observed in patients with GERD and in the healthy adults are shown in Table 2. While rhinosinusitis findings were detected on CT in 76% of 67 patients with GERD, this rate was found as 17% in the 35 healthy adults. According to CT results, the relation between GERD and rhinosinusitis was statistically significant ($p=0.029$).



Table 1: Distribution of ENT symptoms in patients with GERD

| ENT Symptoms | n | % |
|--------------------------|----|-----|
| Discomfort in the throat | 56 | 83% |
| Caugh | 48 | 71% |
| Postnasal discharge | 35 | 52% |
| Nasal congestion | 22 | 32% |
| Facial pain | 13 | 19% |

Table 2: Distribution of rhinosinusitis CT findings in patients with GERD and healthy adults.

| Rhinosinusitis | Patients with GERD (n=67) | Healthy adults (n=35) |
|-----------------|---------------------------|-----------------------|
| CT findings (+) | 51 (76%) | 6 (17%) |
| CT findings (-) | 16 (24%) | 29 (83%) |

DISCUSSION

The pathophysiological mechanism of rhinosinusitis proposed by Messerklinger is thought to begin with mild edema leading to obstruction in the draining sinus ostium. The obstruction is believed to initiate a cycle of reactive mucosal edema resulting in further obstruction of the ostium. Bacterial proliferation occurs as a result of mucus stasis and respiratory ciliary dysfunction^{10,11}. It is stated that GERH is one of the many possible triggers of the initial obstruction in the sinus ostium¹². Most studies in children and adults have investigated GERD in patients with rhinosinusitis. In this study, The relation between RS and GERD was investigated by evaluating the Ear nose throat (ENT) symptoms and computerized sinus tomography (CT) results of patients diagnosed with GERD. As a result of the study, the most common ENT symptom seen in patients with GERD was found to be discomfort in the throat (burning, stinging, pain). Rhinosinusitis was detected at a high rate (76%) in patients with GERD. In the control group consisting of healthy adults, the rate was found to be 17%. This result suggests that there is a close relationship between rhinosinusitis and GERD when compared to the healthy adults.

Many studies in children and adults have suggested that there is a close relationship between GER and RS. Contencin and Narcy¹³ first stated that it may be associated with GERH and upper respiratory tract inflammations in children. It has been shown that in children with

previously documented reflux, when pH probes are placed, one in the esophagus and the other in the hypopharynx, reflux often extends above the level of the cricopharynx. In the study of Bouchard et al.¹⁴ using a double-probe pH catheter, pathological gastric reflux was found in 40% of children with chronic rhinosinusitis. Phipps et al.¹⁵ reported that pediatric RS patients have GER at a significantly higher rate (63%) than the generality in a healthy people. DiBaise et al.¹⁴ also showed a high generality of GER in adult patients with RS. They reported that as a result of 24-hour esophageal pH monitoring, 78% of patients with RS had GER. Ozdek et al.¹⁷ found *Helicobacter pylori* in 4 of 12 adult patients with RS as a result of their study using polymerase chain reaction. However, *Helicobacter pylori* was not identified in any patient without RS. In this study, 75% of patients with *Helicobacter pylori* had GER-related complaints. Ulualp et al.¹⁸ showed a higher prevalence of GER in patients with RS who did not respond to treatment compared to the normal control group ($P < 0.05$), suggesting that GER is an effective factor in the pathogenesis of RS in adult patients. Chambers et al.¹⁹ detected that the presence of GER after sinus surgery was associated with poor symptomatic results in adults.

Another mechanism thought to cause the formation of sinonasal infections is neurogenic system hyperactivity, which occurs as a result of reflux and results in sino-nasal edema. Infection



occurs with impaired sinus drainage due to edema. Stimulation of the esophagus with hydrochloric acid is thought to cause inflammation in the respiratory tract via the vagus nerve pathways. This theory was first put forward by Lodi et al.²⁰ in lower respiratory tract pathologies. In their study, they reported that vagal response was higher in asthmatic GER patients compared to the control group. Loehrl et al.²¹ also emphasized that there is dysfunction in the autonomic neural system in patients with chronic upper respiratory tract infections. Few studies mentioned that *Helicobacter pylori* also causes rhinosinusitis, found different results²². Currently, it is still unknown whether *Helicobacter pylori* plays a role in the etiology of RS.

CONCLUSION

Although there is a close relationship between RS and GERD as a result of this study, it remains scientifically unclear. To consolidate this relationship, certain criteria must be met. 1. The prevalence of GER in patients with RS should be higher than in patients without RS. 2. Pathophysiological mechanisms between GER and RS should be able to explain the reactions occurring during the disease process. 3. If GER is indeed a factor in the occurrence of RS, then treatment for GER should also treat RS in most patients. Therefore, further studies are needed to support the subject.

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