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Examining the Impact and Complexity of Sinusitis Complications in the Iraqi Population and Their Treatment

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Abstract: Background: Sinusitis is the most prevalent of all known chronic diseases, affecting 35% of the population in Iraq. The complications of sinusitis are serious due to the importance of the anatomical structures surrounding the paranasal sinuses, resulting in high morbidity and mortality (18–20%). Objective: This study was specialized to analyze the impact of sinusitis complications and its treatment on Iraqi patients. Patients and methods: We conducted a cross-sectional study of patients with sinusitis that recruited 102 patients who underwent surgery for endoscopic sinusitis in different hospitals in Iraq for the period between February 15, 2022, and February 27, 2023. This study recorded all clinical and surgical data of patients during and after endoscopic surgery, which included the duration of the surgical procedure, the percentage of patients admitted to the intensive care unit, the percentage of patients who experienced nausea or vomiting after surgery, the duration of follow-up, the complication rate, the pain rate, and the quality of patients after endoscopic sinusitis surgery. Results: The rate of male patients was highest at 68.63%, compared to the rate of female patients, which was 31.37%. The most common symptoms that patients experienced were nasal congestion, which affected 30 patients, and cough, which affected 26 patients. Patients with recurrent acute sinusitis (25.49%) were second, making up 40.20% of the total. The length of hospital stay was 2.85 ± 0.34, one patient was admitted to the intensive care unit, and the rate of non-operative ventilation was 4.9%; postoperative complications were 5 cases out of the total number of patients; psychological function was 67.98 ± 8.86; and after surgery, it was 92.44 ± 4.35; the physical aspect was 40.79 ± 21.68 before surgery and 89.77 ± 6.55 after surgery. Conclusion: The current study demonstrates that sinusitis surgery is the most effective surgical procedure, as it lowers complication and pain rates and enhances the quality of life for sinusitis patients.

Keywords: Sinusitis; Anesthesia; Endoscopic sinus surgery; postoperative complications; Length of stay in hospital; and Quality of life.

INTRODUCTION

Diseases that affect the nose and paranasal sinuses are one of the most prevalent pathologies, and their impact on health is very high in terms of individual involvement and from a socio-economic point of view (Hirsch, A. G. *et al*., 2017; Shi, J. B. *et al*., 2015). Acute rhinitis is the disease that we suffer from most frequently. It is estimated that any human being suffers from an average of two processes per year (de Mendonca Pilan, R. R. *et al*., 2012). Allergic rhinitis (AR) is the most prevalent of all known chronic diseases, affecting 35% of the population in Iraq. Chronic rhinosinusitis is also very prevalent, with the percentage of patients suffering from it estimated to be around 11% in Europe (Hastan, D. F. W. J. *et al*., 2011). The importance of upper airway diseases lies not only in their high prevalence but also in the high impact they cause at the individual level and on society (Tokunaga, T. *et al*., 2015).

It has been found that the annual cost per patient of RA is higher than that of patients with hypertension (Soler, Z. M. *et al*., 2009). It has also been shown that patients with RA value their quality of life below how patients with symptomatic depression, poorly controlled hypertension, or type II diabetes mellitus value it (Lou, H. *et al*., 2015). Additionally, having a significant negative impact on quality of life and having a high socio-health cost, chronic rhinosinusitis is frequently underdiagnosed and consequently difficult to manage (Brunner, J. P. *et al*., 2017). At this point, there is enough scientific proof to show that upper airway pathology plays a big role in the development, clinical severity, and control of lower airway pathology. This supports the idea of a single airway from both a physiological and a pathogenic point of view (Roland, L. T. *et al*., 2020).

There are epidemiological data that show that around 50% of patients with rhinitis suffer from asthma (a prevalence much higher than 2% of the general population), as well as that between 70 and 90% of patients with asthma suffer, in turn, from rhinitis (also a prevalence higher than 21% of the general population) (DelGaudio, J. M. *et al*., 2017). It has been shown that suffering from rhinitis is a risk factor for developing asthma. Patients with rhinitis have more severe asthma, worse control, and consume more health resources (Hamizan, A. W. *et al*., 2017).

Nosocomial infections are one of the main complications that occur in patients in the Intensive Care Unit (ICU) and are associated with an increase in morbidity and mortality, hospital

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stay, and healthcare costs. Pneumonia, urinary tract infections, and infections related to vascular catheters are the most frequently involved (White, L. J. *et al*., 214).

Nosocomial sinusitis (NS) has been described as a hidden source of infection and should be investigated in patients with fevers of undetermined origin. The incidence of NS reported in ICU patients varies widely, but when diagnostic criteria that combine the presence of purulent discharge and radiographic compromise are used, the incidence ranges from 5 to 35% (Nie, Z. *et al*., 2023).

NS is rarely diagnosed because there isn't much clinical evidence to support it and because critically ill patients often can't show the clinical symptoms of this disease because of the effects of their medicine or how bad their condition is (Shih, L. C. *et al*., 2022).

Several risk factors for NS have been identified, such as nasotracheal intubation, the presence of a nasogastric tube, craniofacial trauma, a low score on the Glasgow coma scale, the use of corticosteroids, the use of barbiturates, and nasal tamponade (Steehler, A. J. *et al*., 2021).

NS has been described as a risk factor for nosocomial pneumonia, central nervous system infection, and bacteremia, highlighting the importance of early diagnosis to avoid infectious complications. Among the microorganisms most frequently involved in the aetiology of NS are Pseudomonas aeruginosa, Staphylococcus aureus, and enterobacteria (Fokkens, W. J. *et al*., 2020).

Regarding the treatment of NS, a consensus has not been established, but the removal of obstructive foreign bodies from the nasal cavity, the semi-sitting position, and parenteral antibiotics are recommended. Sinus drainage should be considered in patients who do not respond to conservative management (Bateman, E. D. *et al*., 2008). Mortality associated with NS can be as high as 11%, although morbidity and mortality have been shown to be decreasing because of earlier diagnosis and treatment (Seidman, M. D. *et al*., 2015).

PATIENTS AND METHODS

Study design:

A cross-sectional study was conducted in different hospitals in Iraq for a period between February 15, 2022, and February 27, 2023. The medical records of 102 patients whose ages ranged between 20 and 60 years were identified, and all these patients were diagnosed with sinusitis. This study recorded the demographic and clinical data of the patients, which included age, gender, body mass index, symptoms (nasal congestion, facial pain, headache, cough, fatigue, and decreased sense of smell and taste), comorbidities, ASA classification, smoking, as well as economic aspects and employment. Moreover, patients were diagnosed with sinusitis, which was determined according to the basic criteria in terms of family medical history of sinusitis, location of sinusitis, and degree of sinusitis (acute sinusitis, subacute sinusitis, recurrent acute sinusitis, and chronic sinusitis).

Regarding the results of patients with sinusitis during and after endoscopic surgery, endoscopic surgery was performed to treat patients with sinusitis, where all surgical and clinical results were recorded during and after the operation, which included both the duration of the surgical procedure, the rate of cases that were exposed to bleeding during surgery, and the anesthesia applied in the endoscopic surgery, (general anesthesia and regional anesthesia), length of stay in the hospital, recovery time, mortality rate, rate of patients admitted to the intensive care unit, percentage of patients who experienced nausea or vomiting after surgery, and duration of follow-up after laparoscopic surgery.

For more clinical outcomes, our results recorded the data of patients who experienced postoperative complications, which included bleeding, infection, scarring, vision changes, nausea and vomiting, and loss of sense of taste or smell. In addition, we evaluated the pain scores of patients with sinusitis to compare before and after the endoscopic surgery using VAS, where 0 means no pain, and ten means there is severe pain during the follow-up, which lasted four months. Also, the quality of life of patients with sinusitis was evaluated during the public health questionnaire that all patients underwent before and after endoscopic surgery during the four-month follow-up, which included the physical aspect, the psychological aspect, the social aspect, and the daily activity aspect.

Data collection and analysis:

One hundred two patients between the ages of 20 and 60 were recruited to assess the complication rate as well as the quality of life in individuals with sinusitis. Medical data for patients was gathered from different hospitals in Iraq, and patients were monitored for four months. The

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study was given between February 15, 2022, and February 27, 2023.

Selection criteria and recruitment of participants:
This study determined the basic criteria for clinical data for 102 patients, and samples were taken from different hospitals in Iraq. The inclusion criteria specified all sinusitis patients under the age group of 20–60 years, while the exclusion criteria included patients whose ages were less than 20 years or over 60 years of age, patients with chronic diseases, and pregnant patients.

Statistical analysis:
Our study analysed and designed a clinical outcomes methodology for patient data based on SPSS version 22.0.

Ethical considerations
Written consent was obtained from patients residing in Iraq at the hospital from which data were collected, and the general administration cooperated to conduct this study.

RESULTS

Table 1: Demographic and preoperative characteristics outcomes of patients with sinusitis.

Characteristics	Number of patients [102]	Percentage [%]
Age		
20 – 29	13	12.75%
30 – 39	24	23.53%
40 – 49	30	29.41%
50 – 60	35	34.31%
Sex		
Male	70	68.63%
Female	32	31.37%
BMI, [kg/m2]		
18.5 – 25.0	20	19.61%
25.5 – 30.0	30	29.41%
> 30.0	52	50.98%
Symptoms		
Nasal congestion	30	29.41%
Facial pain	4	3.92%%
Headaches	12	11.76%
Coughing	26	25.49%
Fatigue	14	13.73%
Reduced sense of smell and taste	16	15.69%
Comorbidities		

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Non – comorbidity	21	20.59%
With comorbidity	81	79.41%
Hypertension	49	60.49%
Diabetes	41	50.62%
Cardiovascular diseases	10	12.35%
Chronic obstructive pulmonary disease	8.9	10.99%
Asthma	26	32.10%
ASA classification		
I	15	14.71%
II	14	13.73%
III	32	31.37%
IV	41	40.20%
Smoking status		
Yes	62	60.78%
No	40	39.22%
Employment status		
Employed	60	58.82%
Non – employed	42	41.18%
Income status, $		
< 700	35	34.31%
700 – 900	41	40.20%
> 900	26	25.49%

Demographic results showed that patients in the age group 50–60 were the most susceptible to sinusitis, at a rate of 34.31%, followed by patients in the age group 40 –49, at a rate of 29.41%. Male patients had the highest rate, with a rate of 68.63%, compared to females, which had a rate of 31.37%. Our results recorded the most common symptoms that appeared in patients, the most prominent of which were nasal congestion, which included 30 patients, and cough, which included 26 patients. Most of the diseases associated with the patients were observed: asthma, which included 26 patients; hypertension, which included 49 patients; and diabetes, which included 41 patients.

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Table 2: determine basic criteria related to sinusitis in terms of size, site, classifications of sinusitis degree, and medical history of the family.

Characteristics	Number of patients [102]	Percentage [%]
Family history of sinusitis		
Yes	33	32.35%
No	69	67.65%
Site of sinusitis		
Frontal sinusitis	36	35.29%
Maxillary sinusitis	66	64.71%
Degree of sinusitis		
Acute rhinosinusitis	15	14.71%
Subacute rhinosinusitis	20	19.61%
Recurrent acute rhinosinusitis	26	25.49%
Chronic rhinosinusitis	41	40.20%

This study recorded the specific results of sinusitis and the severity of the inflammation. The results showed that 32.35% of patients had a previous family history of sinusitis, which increased by 36 patients who developed frontal sinusitis and 66 patients who developed maxillary sinusitis. 40.20% of patients have chronic sinusitis, followed by 25.49% of patients with recurrent acute sinusitis.

Table 3: Clinical outcomes of patients who underwent endoscopic sinus surgery

Clinical outcomes	**Number of patients [102]**	**Percentage [%]**
Operative time, min (mean ± SD)	150 ± 40	
Intraoperative blood loss		
Yes	2	1.96%
No	100	98.04%
Anesthesia used		
General	72	70.59%
Regional	30	29.41%
Hospitalization time, days (mean ± SD)	2.85 ± 0.34	
Recovery time, days (mean ± SD)	11.89 ± 3.92	
Mortality rate, N [%]		
Yes	0	0%
No	102	100%
ICU admission		
Yes	1	0.98%
No	101	99.02%
NOV %		
Yes	5	4.9%
No	97	95.1%
Follow–up time, month (mean ± SD)	Four months	

Our results recorded data for endoscopic sinusitis surgery, where the operation time was (150 ± 40), the rate of patients who underwent bleeding during surgery was two cases, the rate of patients who underwent endoscopic surgery under general anaesthesia was 70.59%, while the rate of patients who underwent endoscopic surgery under general anaesthesia was 70.59% and regional anaesthesia was 29.41%, the length of hospital stay was 2.85 ± 0.34, one case was admitted to the intensive care unit, and NOV% was 4.9%.

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Table 4: Postoperative complications.

Complications	Number of patients [102]	Percentage [%]
Bleeding	0	0%
Infection	2	1.96%
Scarring	1	0.98%
Vision changes	0	0%
NOV %	2	1.96%
Loss of sense of taste or smell	0	0%
Total	***5***	***4.9%***

Our results recorded the rate of complications to which patients were exposed after surgery, which amounted to 5 cases out of the total rate of patients, and the most prominent and widespread were infection, which included two cases, NOV%, which included two cases, and scarring, which included one case.

Table 5: Assessment pain scores of patients with sinusitis in comparison between before and after endoscopic sinus surgery by VAS scale.

Follow–up time (months)	Pre-operative	Postoperative	P - value
First month	7.71 ± 1.02	4.42 ± 0.53	0.0301
Second month	8.01 ± 1.00	3.02 ± 0.51	0.0212
Third month	9.22 ± 0.01	0.80 ± 0.02	< 0.001
Fourth month	7.25 ± 0.84	0	< 0.001

These results showed the pain rates for patients with sinusitis before and after surgery, where the pain rate in the first month was severe at a rate of 7.71 ± 1.02 before surgery, while it decreased sharply at a rate of 4.42 ± 0.53 after surgery, and the second month was 8.01 ± 1.00, and the pain rate before surgery was 3 02 ± 0.51 after surgery, up to the fourth month when the pain average was 7.25 ± 0.84 before surgery and 0 after surgery

Table 6: Assessment of health quality of life-related to patients with sinusitis in comparison between before and after endoscopic sinus surgery.

Follow–up time (months)	Pre-operative	Postoperative	P - value
Physical functions	40.79 ± 21.68	89.77 ± 6.55	< 0.001
Psychological functions	67.98 ± 8.86	92.44 ± 4.35	< 0.001
Social functions	72.45 ± 5.31	82.95 ± 3.88	> 0.001
Activities functions	74.66 ± 5.89	90.26 ± 2.06	< 0.001

The quality-of-life rates for patients before and after surgery showed that the most prominent criteria were the physical aspect, which was 40.79 ± 21.68 before surgery and 89.77 ± 6.55 after surgery. Psychological function was 67.98 ± 8.86 before surgery and 92.44 ± 4.35 after surgery.

DISCUSSION

Both men and women could be impacted by sinusitis, with women having somewhat more predisposed to developing the condition based on past research. This could have been attributed to hormonal variations and disparities in the nasal passageways' anatomy. Sinusitis may impact anyone, irrespective of their gender (Marcus, S. *et al*., 2020).

Sinusitis is a prevalent ailment that may be caused by allergies, infections, as well as structural issues in the sinuses. Sinusitis could affect adults, including elderly individuals, with a higher prevalence between adults. As individuals age, their immune systems can decline, increasing their vulnerability to infections like sinusitis (Lund, V. J., & Kennedy, D. W. 1997). Furthermore, aging may cause the tissues into the nasal passages as well as sinuses to become more delicate, increasing the likelihood of inflammation and obstruction that can result in sinusitis. Nevertheless, individuals of any age might get sinusitis because of variables including allergies, smoking, or a past of respiratory infections (Gevaert, P. *et al*., 2013).

A British study discovered that asthma and smoking were significant risk factors for persons with sinusitis. Asthma is a long-lasting respiratory disorder that can result in inflammation and

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constriction of the air sections, increase the likelihood of sinus infections. Bronchitis may impact the sinuses, causing elevated mucus production and obstruction (Hopkins, C. *et al*., 2009). Smoking may compromise the immune system, increasing vulnerability to diseases like sinusitis. Smoking harms the cilia in the respiratory system, which helps clear mucus as well as debris from the sinuses (DeConde, A. S. *et al*., 2014).

In addition, asthma and smoking were considered at a higher risk of developing sinusitis because of the impact these disorders which have on the respiratory system along with immunological function. Endoscopic surgery has transformed in the medical management for sinusitis through offering a less invasive procedure, which provides several advantages to patients (Stammberger, H., & Posawetz, W. 1990). Endoscopic surgery is a quicker technique than conventional open surgery because of its smaller incisions and improved equipment for accurate navigation in the sinus canals, which leads to decreased operation duration and less pain for patients after surgery (Chen, F. H. *et al*., 2016).

Similar to other studies, endoscopic sinus surgery showed a quicker recovery rate than conventional procedures, where patients experienced less discomfort, bleeding, and scars, which can lead to a quicker resumption of regular activities and enhanced general quality of life in people after surgery, as well as endoscopic sinus surgery complications that are often minimal (Snidvongs, K. *et al*., 2012). The surgical intervention lowered the likelihood of problems in terms of infection, heavy bleeding, and harm to surrounding tissue (Ho, J. *et al*., 2018).

CONCLUSION

The current study indicates that endoscopic surgery is a highly effective technique for treating sinusitis patients. It can provide a more accurate and safer surgical treatment, faster recovery, significantly reduced complications and lowered postoperative pain, which will enhance long-term quality of life.

REFERENCES

1. Hirsch, A. G., Stewart, W. F., Sundaresan, A. S., Young, A. J., Kennedy, T. L., Scott Greene, J., ... & Schwartz, B. S. "Nasal and sinus symptoms and chronic rhinosinusitis in a population-based sample." *Allergy* 72.2 (2017): 274-281.
2. Shi, J. B., Fu, Q. L., Zhang, H., Cheng, L., Wang, Y. J., Zhu, D. D., ... & Xu, G. "Epidemiology of chronic rhinosinusitis: results from a cross-sectional survey in seven C hinese cities." *Allergy* 70.5 (2015): 533-539.
3. de Mendonca Pilan, R. R., de Rezende Pinna, F., Bezerra, T. F. P., Mori, R. L., Grecco, F., de Melo Padua, R. F. B., ... & Voegels, R. L. "Prevalence of chronic rhinosinusitis in Sao Paulo." *Rhinology* 50.2 (2012): 129-138.
4. Hastan, D. F. W. J., Fokkens, W. J., Bachert, C., Newson, R. B., Bislimovska, J., Bockelbrink, A., ... & Burney, P. "Chronic rhinosinusitis in Europe–an underestimated disease. A GA2LEN study." *Allergy* 66.9 (2011): 1216-1223.
5. Tokunaga, T., Sakashita, M., Haruna, T., Asaka, D., Takeno, S., Ikeda, H., ... & Fujieda, S. "Novel scoring system and algorithm for classifying chronic rhinosinusitis: the JESREC Study." *Allergy* 70.8 (2015): 995-1003.
6. Soler, Z. M., Sauer, D. A., Mace, J., & Smith, T. L. "Relationship between clinical measures and histopathologic findings in chronic rhinosinusitis." *Otolaryngology—Head and Neck Surgery* 141.4 (2009): 454-461.
7. Lou, H., Meng, Y., Piao, Y., Wang, C., Zhang, L., & Bachert, C. "Predictive significance of tissue eosinophilia for nasal polyp recurrence in the Chinese population." *American journal of rhinology & allergy* 29.5 (2015): 350-356.
8. Brunner, J. P., Jawad, B. A., & McCoul, E. D. "Polypoid change of the middle turbinate and paranasal sinus polyposis are distinct entities." *Otolaryngology–Head and Neck Surgery* 157.3 (2017): 519-523.
9. Roland, L. T., Marcus, S., Schertzer, J. S., Wise, S. K., Levy, J. M., & DelGaudio, J. M. "Computed tomography findings can help identify different chronic rhinosinusitis with nasal polyp phenotypes." *American Journal of Rhinology & Allergy* 34.5 (2020): 679-685.
10. DelGaudio, J. M., Loftus, P. A., Hamizan, A. W., Harvey, R. J., & Wise, S. K. "Central compartment atopic disease." *American journal of rhinology & allergy* 31.4 (2017): 228-234.
11. Hamizan, A. W., Christensen, J. M., Ebenzer, J., Oakley, G., Tattersall, J., Sacks, R., & Harvey, R. J. Middle turbinate edema as a diagnostic marker of inhalant allergy." *International forum of allergy & rhinology*. 7.1 (2017):37–42.
12. White, L. J., Rotella, M. R., & DelGaudio, J. M. "Polypoid changes of the middle turbinate

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as an indicator of atopic disease." *International forum of allergy & rhinology*. 4.5. (2014):376–380.
13. Nie, Z., Xu, Z., Fan, Y., Guo, Y., Chen, C., Liu, W., ... & Chen, F. "Clinical characteristics of central compartment atopic disease in Southern China." *International Forum of Allergy & Rhinology*. 13.3. (2023):205–215.
14. Shih, L. C., Hsieh, B. H., Ma, J. H., Huang, S. S., Tsou, Y. A., Lin, C. D., ... & Tai, C. J. "A comparison of central compartment atopic disease and lateral dominant nasal polyps." *International Forum of Allergy & Rhinology*. 12.11 (2022):1387–1396.
15. Steehler, A. J., Vuncannon, J. R., Wise, S. K., & DelGaudio, J. M. "Central compartment atopic disease: outcomes compared with other subtypes of chronic rhinosinusitis with nasal polyps." *International Forum of Allergy & Rhinology* 11.11 (2021): 1549–1556.
16. Fokkens, W. J., Lund, V. J., Hopkins, C., Hellings, P. W., Kern, R., Reitsma, S., ... & Witterick, I. "European position paper on rhinosinusitis and nasal polyps 2020." *Rhinology* 58.Suppl S29 (2020):1–464.
17. Bateman, E. D., Hurd, S. S., Barnes, P. J., Bousquet, J., Drazen, J. M., FitzGerald, M., ... & Zar, H. J. "Global strategy for asthma management and prevention: GINA executive summary." *European Respiratory Journal* 31.1 (2008): 143-178.
18. Seidman, M. D., Gurgel, R. K., Lin, S. Y., Schwartz, S. R., Baroody, F. M., Bonner, J. R., ... & Nnacheta, L. C. "Clinical practice guideline: allergic rhinitis." *Otolaryngology–Head and Neck Surgery* 152.1_suppl (2015): S1-S43.
19. Marcus, S., Schertzer, J., Roland, L. T., Wise, S. K., Levy, J. M., & DelGaudio, J. M. "Central compartment atopic disease: prevalence of allergy and asthma compared with other subtypes of chronic rhinosinusitis with nasal polyps." *International forum of allergy & rhinology*. 10.2 (2020):183–189.
20. Lund, V. J., & Kennedy, D. W. "Staging for rhinosinusitis." *Otolaryngology–head and neck surgery* 117.3_suppl (1997): S35-S40.
21. Gevaert, P., Calus, L., Van Zele, T., Blomme, K., De Ruyck, N., Bauters, W., ... & Bachert, C. "Omalizumab is effective in allergic and nonallergic patients with nasal polyps and asthma." *Journal of Allergy and Clinical Immunology* 131.1 (2013): 110-116.
22. Hopkins, C., Gillett, S., Slack, R., Lund, V. J., & Browne, J. P. "Psychometric validity of the 22-item Sinonasal Outcome Test." *Clinical otolaryngology* 34.5 (2009): 447-454.
23. DeConde, A. S., Mace, J. C., Bodner, T., Hwang, P. H., Rudmik, L., Soler, Z. M., & Smith, T. L. "SNOT-22 quality of life domains differentially predict treatment modality selection in chronic rhinosinusitis." *International forum of allergy & rhinology*. 4.12. (2014).
24. Stammberger, H., & Posawetz, W. "Functional endoscopic sinus surgery: concept, indications and results of the Messerklinger technique." *European Archives of Oto-rhino-laryngology* 247 (1990): 63-76.
25. Chen, F. H., Deng, J., Hong, H. Y., Xu, R., Guo, J. B., Hou, W. J., ... & Shi, J. B. "Extensive versus functional endoscopic sinus surgery for chronic rhinosinusitis with nasal polyps and asthma: a 1-year study." *American Journal of Rhinology & Allergy* 30.2 (2016): 143-148.
26. Snidvongs, K., Lam, M., Sacks, R., Earls, P., Kalish, L., Phillips, P. S., ... & Harvey, R. J. "Structured histopathology profiling of chronic rhinosinusitis in routine practice." *International forum of allergy & rhinology*. Vol. 2. No. 5. Hoboken: Wiley Subscription Services, Inc., A Wiley Company, 2012.
27. Ho, J., Hamizan, A. W., Alvarado, R., Rimmer, J., Sewell, W. A., & Harvey, R. J. "Systemic predictors of eosinophilic chronic rhinosinusitis." *American journal of rhinology & allergy* 32.4 (2018): 252-257.

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