Original Article

Prevalence of inflammatory and tumor nasosinus diseases

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Abstract
Introduction. Inflammatory, benign and malignant sinonasal pathology is of utmost importance. Chronic rhinosinusitis can affect up to 5 % of the population. Benign nasal tumors can be of epithelial origin, such as papillomas. Within the malignant sinonasal tumor pathology, the most common is squamous cell carcinoma. **Objective.** Describe the prevalence of inflammatory sinus diseases, benign and malignant tumors in patients of the Otorhinolaryngology specialty of the Salvadoran Institute of Social Security from 2018 to 2023. **Methodology.** A descriptive, cross-sectional design with categorical variables was used, with data from documentary sources. The study took the results of all sinonasal biopsies from all hospital centers of the Salvadoran Social Security Institute (ISSS), between January 2018 and July 2023. **Results.** Depending on the type of inflammatory pathology, 888 (71.9 %) patients presented rhinosinusitis. In benign tumor pathology, 14 (20.6 %) of patients were diagnosed with papilloma. In malignant tumor pathology, it was found that 12 (31. 6 %) patients presented squamous cell carcinoma. **Conclusion.** The most frequent malignant nasosinusal tumor disease is squamous cell carcinoma, with the majority of patients being male, and the age range in which it occurs most frequently is between 50-59 years.

Keywords
Paranasal Sinusesl Tract, Neoplasms, Benign Neoplasm.

Resumen
Introducción. La enfermedad nasosinusal inflamatoria, tumoral benigna y maligna, es de suma importancia. La rinosinusitis crónica puede presentarse en el 5 % de la población. Los tumores nasales benignos pueden ser de origen epitelial, como los papilomas. Dentro de la enfermedad tumoral maligna nasosinusal, el más frecuente es el carcinoma epidermoide. **Objetivo.** Describir la prevalencia de las enfermedades nasosinusales inflamatorias, tumorales benignas y malignas en pacientes de la especialidad de otorrinolaringología del Instituto Salvadoreño del Seguro Social durante el 2018 al 2023. **Metodología.**Se utilizó un diseño descriptivo, transversal, con datos provenientes de fuentes documentales. El estudio tomó los resultados de todas las biopsias nasosinusales de todos los centros hospitalarios del Instituto Salvadoreño del Seguro Social, entre enero del 2018 hasta julio del 2023. **Resultados.** Según el tipo de enfermedad inflamatoria, 888 (71,9 %) pacientes presentaron rinosinusitis. En la enfermedad tumoral benigna, 14 (20,6 %) de los pacientes tenían papiloma. Respecto a la enfermedad tumoral maligna, se encontró que 12 (31,6 %) presentaron carcinoma de células escamosas. **Conclusión.** La enfermedad tumoral maligna nasosinusal más frecuente es el carcinoma de células escamosas, siendo a mayoría de pacientes del sexo masculino y el intervalo de edad en el que se presenta con mayor frecuencia es entre 50-59 años.

Palabras clave
Tracto Sinonasal, Tumores Malignos, Neoplasia Benigna.

Introduction

Acute rhinitis is one of the most common inflammatory diseases. Chronic rhinosinusitis (CRS) can be classified into two types according to the presence or absence of nasal polyps (NP): CRS with NP (CRSNP) and CRS without NP (CRSnNP). These two types of CRS differ in pathophysiological mechanisms and response to different treatment options, and worldwide, it is a disease with great impact on health.

Generally, asthma with comorbid CRSPN is driven by type 2(T2) inflammation that predisposes to more severe, often untreatable disease.[i-vi] CRS (or acute exacerbations of CRS) consists of the presence of acute nasosinusal symptoms and is diagnosed endos-

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Prevalencia de las enfermedades nasosinusales inflamatorias y tumorales

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copically by visualizing purulent rhinorrhea in the middle meatus most frequently.[vii]

There are a variety of benign nasosinus tumors, among the most common being nasal papilloma inverted type.[viii-x] Nasosinus ameloblastomas are rare tumors; according to the literature, they comprise approximately 0. 11 % of all tumors of the sinonasal tract.[xi]

Nasal cavity hemangiomas are rare, benign vascular tumors in which the exact etiology is unclear.[xii,xiii]

Sinonasal glomangiopericytoma (SNGP) is a neoplasm arising in the nasal cavity and paranasal sinuses showing perivascular myoid differentiation.[xiv,xv] Sinonasal hemangiopericytoma is a soft tissue tumor most commonly seen in the ethmoid sinus (44. 8 %) and usually forms unilateral polypoid tissue in the nasal cavity.[xvi] Extranasopharyngeal angiofibromas (ENA) are benign tumors originating in areas other than the sphenopalatine foramen.[xvii]

It is important to mention that among the malignant neoplasms of the sinonasal tract, some are mentioned such as sinonasal undifferentiated carcinoma (SNUC), sinonasal adenocarcinoma (SNAC), sinonasal squamous cell carcinoma (SNSCC) and stesioneuroblastoma.[xviii-xx]

Lymphoepithelial carcinoma is an undifferentiated carcinoma, defined by the presence of a neoplastic population accompanied by significant lymphocytic infiltration. Morphologically, this neoplasm is similar to undifferentiated nasopharyngeal carcinoma (NPC).

Despite the available evidence, determining the optimal treatment for SNUC remains difficult. Aggressive trimodal therapy, comprising surgery, radiotherapy, and chemotherapy, is recommended for patients with good functional status.[xxiv,xxv]

Sinonasal inflammatory disease and benign and malignant tumors have become a field of great interest in rhinology worldwide in recent years, so data should be sought to establish the prevalence of these diseases at the level of El Salvador since no current published statistics on these diseases were found. Therefore, this study aims to describe the prevalence of inflammatory nasosinus diseases and benign and malignant tumors in patients of the otorhinolaryngology specialty of the Salvadoran Institute of Social Security from 2018 to 2023 .

Methodology

A descriptive, cross-sectional design was used, with data from documentary sources (patient biopsies) being the unit of analysis of the result of the nasosinusal tissue biopsy of patients undergoing functional nasal endoscopic surgery in all hospital centers of ISSS between January 2018 and July 2023 .

The records of patients with nasosinusal disease who underwent functional nasal endoscopic surgery and had a nasosinusal biopsy report were included. Additionally, cases seen by healthcare personnel between January 2018 and July 2023 were considered. Incomplete or lost clinical records were excluded.

The records of all patients who met the previously described inclusion criteria during the study period were reviewed. A total of 1,341 nasosinus biopsies performed by the Pathology Service were subjected to analysis. These corresponded to patients who had undergone surgical procedures in the Otorhinolaryngology Service of ISSS.

A data collection sheet was elaborated for each record reviewed containing the variables under study: age, sex, type of nasosinusal disease and anatomical distribution of the nasosinusal disease.

The data analysis was performed using the descriptive statistics method. For qualitative variables, frequencies and percentages were calculated, while for quantitative variables, measures of central tendency, dispersion, and confidence intervals at 95 % were calculated. All statistical processing was performed in SPSS® version23 statistical software.

The researcher conducted the study using the ethical principles established in the 2013 version of the Declaration of Helsinki, as well as good clinical practice, respecting the data, not falsifying data, and not making inappropriate use of them.

Results

A total of 1341 patients were analyzed, of which 752 (56. 1 %) were female. The most frequent age range was 40-49 years with 342 patients (25. 5 %) (Table 1). The mean age of the patients was 47 years (SD = 13. 6), (95 % CI = 46. 6; 48. 0) (Table 1).

According to the type of disease, 1235 patients (92. 1 %) had inflammatory disease, 68 patients (5. 1 %) had benign tumor disease and 38 patients (2. 8 %) had malignant tumor disease (Table 1). In anatomical location, 509 patients (38. 0 %) had maxilloethmoidal involvement and 411 (30. 6 %) had maxillary involvement. Other locations include the right maxilla, ethmoid, turbinates and nasal septum.

Within the inflammatory nasosinusal disease, a total of 1235 patients were analyzed, of which 712 (57. 7 %) were found to be female. The mean age of the patients was 46. 85 years (SD = 13. 4). The age range with the highest number of patients with inflam-

matory disease included in the study was 40-49 years with 317 patients (25. 7 %), while the age range with the lowest frequency was 90-99 years with 2 (0. 1 %) (Table 2). Of the patients with inflammatory disease, 888 (71. 9 %) presented CRSnPN, 207 (16. 8 %) presented CRSPN; other described diseases are: mucoceles and cysts (Table 2). According to the anatomical location, 499 patients (40. 4 %) presented maxillo-ethmoidal involvement (Table 2).

A total of 68 patients with benign tumorous nasosinusal disease were analyzed, of which 40 (58. 8 %) were found to belong to male patients. The mean age of the patients found was 49 years (SD = 13. 4). The most frequent age range was 50-59 years, with 20 (29. 4 %) patients (Table 3).

When the type of benign tumor disease was reported, 19 patients (27. 9 %) had exophytic sinonasal papilloma and 17 patients (25. 7 %) had inverted sinonasal papilloma. There were no cases of oncocytic sinonasal papilloma. According to anatomical location, 25 patients (36. 8 %) had involvement of the nasal fossa; glomangiopericytoma and neurofibroma were described in the category of others. According to their origin, 41 patients (60. 3 %) had epithelial involvement (Table 3).

As for malignant tumorous nasosinusal disease, a total of 38 patients were analyzed, of which 26 (68. 4 %) were found to belong to the male sex. The mean age was 58 years (SD = 17. 0). The age range with the highest number of patients included in the study was 50-59 years, with 9 (23. 6 %) (Table 4).

Of the patients with malignant tumor disease, 12 (31 .6 %) had squamous cell carcinoma and seven (18. 4 %) had basal cell carcinoma (Table 4). When evaluating the anatomical location, 13 patients (34. 2 %)

Table 1. Distribution of subjects included in the study according to sex, age, type of nasosinusal disease and anatomical location

Variables	N = 1341 (%)
Sex	
Female	752 (56.1)
Male	589 (43.9)
Age group*	
10-19	3 (0.2)
20-29	112 (8.4)
30-39	323 (24.1)
40-49	342 (25.5)
50-59	301 (22.4)
60-69	168 (12.5)
70-79	64 (4.8)
80-89	25 (1.9)
90-99	3 (0.2)
Type of pathology	
Inflammatory	1235 (92.1)
Benign tumors	68 (5.1)
Malignant tumors	38 (2.8)
Anatomical location	
Maxillo-ethmoidal	509 (38.0)
Maxilla	411 (30.6)
Nasal fossa	137 (10.2)
Left maxilla	89 (6.6)
Others	195 (14.6)

Source: Pathology Service of the Salvadoran Institute of Social Security.
*Mean age 47 years with standard deviation of 13.6; (95% CI: 46.6-48.0).

Table 2. Distribution of subjects in inflammatory nasosinusal disease included in the study according to sex, ages, histological type and anatomical location.

Variables	N= 1235 (%)
Sex	
Female	712 (57.7)
Male	523 (42.3)
Age group*	
10-19	3 (0.2)
20-29	107 (8.7)
30-39	305 (24.7)
40-49	317 (25.7)
50-59	272 (22.0)
60-69	156 (12.7)
70-79	54 (4.4)
80-89	19 (1.5)
90-99	2 (0.1)
Histological type	
Chronic rhinosinusitis without nasal polyps	888 (71,9)
Chronic rhinosinusitis with nasal polyps	207 (16,8)
Others	140 (11,3)
Anatomical location	
Maxillo-ethmoidal	499 (40,4)
Maxilla	386 (31,3)
Nasal fossa	99 (8,0)
Left maxilla	79 (6,4)
Other	172 (13,9)

Source: Pathology Service of the Salvadoran Institute of Social Security.
* Mean age 46 years with standard deviation of 13.4; (95% CI: 46.1-47.6).

Table 3. Characterization of the subjects in benign tumorous nasosinusal disease included in this study

Variables	N = 68 (%)
Sex	
Male	40 (58.8)
Female	28 (41.2)
Age group*	
20-29	4 (5.9)
30-39	13 (19.1)
40-49	18 (26.5)
50-59	20 (29.4)
60-69	8 (11.8)
70-79	3 (4.4)
80-89	2 (2.9)
Histological type	
Exophytic type sinonasal papilloma	19 (27.9)
Sinonasal papilloma of inverted type	17 (25.0)
Granuloma	6 (8.8)
Fibroma	5 (7.4)
Dentigerous cyst	3 (4.4)
Ameloblastoma	2 (2.9)
Angiofibroma	2 (2.9)
Dysplasia	2 (2.9)
Hemangioma	2 (2.9)
Inflammatory pseudotumor	2 (2.9)
Others	8 (12.0)
Anatomical location	
Nostril	25 (36.8)
Maxillary	15 (22.1)
Maxillo-ethmoidal	10 (14.7)
Left maxilla	6 (8.8)
Others	12 (17.6)
Origin	
Epithelial	41 (60.3)
Non epithelial	27 (39.7)

Source: Pathology Service of the Salvadoran Institute of Social Security.
*Mean age 49 years old with standard deviation of 13.4; (CI 95 %: 45.8-52.4).

Table 4. Characterization of the subjects in malignant tumorous nasosinusal disease included in the study

Variables	N = 38 (%)
Sex	
Female	12 (31.6)
Male	26 (68.4)
Age group*	
20-29	1 (2.6)
30-39	5 (13.2)
40-49	7 (18.4)
50-59	9 (23.6)
60-69	4 (10.6)
70-79	7 (18.4)
80-89	4 (10.6)
90-99	1 (2.6)
Histological type	
Squamous cell carcinoma	12 (31.6)
Basal cell carcinoma	7 (18.4)
Esthesioneuroblastoma	4 (10.5)
Schwannoma	3 (7.9)
Extranodal NK/T-cell lymphoma of the nasal type	2 (5.3)
Sarcoma	2 (5.3)
Adenoid cystic carcinoma	1 (2.6)
Squamous cell carcinoma	1 (2.6)
Squamous cell carcinoma	1 (2.6)
Hemangiopericytoma	1 (2.6)
Neoplasm	1 (2.6)
Lymphoid neoplasm	1 (2.6)
Malignancy positive	1 (2.6)
Recurrence	1 (2.6)
Anatomical location	
Nasal fossa	13 (34.2)
Maxillo-ethmoidal	10 (26.4)
Right maxilla	4 (10.5)
Left maxilla	4 (10.5)
Others	7 (18.4)
Origin	
Epithelial	22 (57.9)
Neurogenic	7 (18.4)
Lymphoproliferative	3 (7.9)
Metastatic	3 (7.9)
Sarcoma	3 (7.9)

Source: Pathology Service of the Salvadoran Institute of Social Security.
*Mean age 58 years with standard deviation of 17.0; (95% CI: 52.8-64.1).

presented involvement of the nasal fossa. According to their origin, 22 patients (57 .9 %) presented epithelial involvement, and seven patients (18 .4 %) presented neurogenic origin (Table 4).

Discussion

Inflammatory and nasal-sinus tumor pathology is a great interest in rhinology worldwide. Therefore, it is important to determine the prevalence of these diseases by histopathological examination.[i,ii] It has been described that even asthma in CRS is an additional symptom in these patients and is mainly reflected in the subset of nasal symptoms within the SNOT-22 "Sino-Nasal Outcome Test of 22 indicators ".[iii,iv.]
Worldwide, CRSPN is known to be a disease with a high health impact, which is consistent with this study.[v] The development of CRS is always a subject of debate, as it is considered a possible cause for the formation of nasosinusal polyps.[vi]

Most patients included in this study were female, which contrasts with the findings of a 2020 investigation conducted in Romania, where more than half of the patients were male. The proportion of inflammatory disease in this research was higher than that reported by the Romanian study, which was 68. 9 %. This difference may be due to the fact that this research did not include patients with CRSnPN.[i.]

In this study, one of the most frequent benign nasosinusal tumors is nasal papilloma of the inverted type. It coincides with the update of the fifth edition of the World Health Organization (WHO) classification of tumors of the head and neck: nasal cavity, paranasal sinuses, and skull base, published in 2022.[vii]

According to a study published in 2019, inverted nasal papilloma is more frequent in the fifth decade of life,[x] similar to the data obtained in this study, which could be because patients often consult when nasal obstructive symptoms have worsened. Regarding the anatomical location of benign nasosinus tumors in this study, at least one-third originated in the nasal fossa. This finding is consistent with research describing the nasal fossa as the main area of origin of these tumors.[xii]

In the international literature, malignant sinonasal neoplasms account for less than 5 % of all head and neck neoplasms, with an incidence of 0. 55 per 100 000 persons per year, while outcomes for other head and neck cancers have improved significantly over the past decade, outcomes for nasosinus malignancies have been relatively stable.[xvii]

In this study, the diagnosis of malignant tumor disease was squamous cell carcinoma (SCC), which is the most common malignant epithelial neoplasm of the nasal cavity and paranasal sinuses, which is similar to that found in a study in Cuba[xxvii] and Italy. [xxi] This can be explained by the fact that regardless of the geographic region, patients' exposure to certain risk factors remains the same, such as tobacco use and inhalation of dust generated during the processing of wood, leather, flour, textiles, nickel dust, and chromium.[xxi,xxvi]

In the same study by Bracigliano *et al*.,[xxi] the male: female ratio is 2:1, being similar to the present study since the male is the one who consults later. It is important to mention that the most frequent anatomical location was the nasal fossa, as previously described. [xxi] Most patients with malignant disease evaluated in this research were in the fifth decade of life, similar to a study conducted in Honduras[xxvii] in 2021, which could be because patients consult when the progression of the disease causes clinical deterioration.

According to the ISSS report published in March 2023, ISSS covers only 32 % of the Salvadoran population.[xxvii] This fact limits the ability to extrapolate the data obtained in this research to the rest of the national territory. It is important to consider that the analysis of the samples obtained for biopsies depends on the experience of the person performing the reading, and there is also the possibility of mislabeling the samples.

The microscopic examination of the lesions must be complemented with immunohistochemical techniques for an accurate diagnosis when necessary.[i] The creation of cancer registries and the development of research projects in collaboration with other national and international institutions are essential for the early detection of malignant diseases. These efforts will generate sufficient data to create quality evidence, which will improve treatment options in the future.[xviii]

Conclusion

The most frequent type of nasosinusal disease was an inflammatory disease, followed by benign tumor disease and malignant tumor disease, all of which mainly occurred in the maxillo-ethmoidal region and were concentrated in the age range of 40 to 60 years. The majority of patients with a diagnosis of inflammatory disease were female, in contrast to those with tumor disease, both benign and malignant, who were mostly male. The most frequent malignant tumor was squamous cell carcinoma.

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