

Influence of Environmental Factors on Rhinosinusal Tumours

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Cancer of the nasal cavity and paranasal sinuses is a rare malignancy. The tumours of the nasal cavity are thus associated with the maxillary and ethmoidal sinuses. Those that start from the nasal vestibule and nasal septum raise particular problems and, although rare, form a particular group of cases among the rhinosinusal tumours. Radiation exposure, viral infections and constitutional factors were associated with the occurrence of rhinosinusal neoplasia also, but the evidence is inconclusive and indicates that only a small proportion of all squamous carcinomas can be attributed. The purpose of this study is the complex retrospective analysis of the cases of rhinosinusal malignancies diagnosed and treated in the Otolaryngology Clinic of the St. Spiridon Emergency Clinical Hospital in Iasi. We evaluated the characteristics of the patient group using a statistically significant analysis of the age, gender, background, and factors of affiliation. Specific tests and indicators have been used. It is not to be neglected the effects of the poor economic conditions and the lack of education of the population, by postponing the moment of presentation to physician, influencing the therapeutic decision, postoperative evolution. These patients often present different degrees of malnutrition, immunodepression, etc. Statistical processing showed that these patients have a twofold risk of developing rhinosinusal tumours.

Keywords: environmental risks factors, rhinosinusal cancers, nasal cavity

Cancer of the nasal cavity and paranasal sinuses is quite rare. For example, in the UK the incidence is 8:1,000,000, while in the United States, where it represents 1% of all neoplasia, it has an incidence of 5:1,000,000. In both countries, the incidence rate for men: women is approximately equal, with the most common occurrence being in the second decade of life [1].

Although many studies give the maxillary sinus topography more frequent than the ethmoid sinus, it is hard to tell how such a conclusion has been reached as long as the clinical signs occur only when the tumour reaches beyond the sinus. 80-100% of patients have radiologic signs of bone destruction.

The tumours of the nasal cavity are thus associated with the maxillary and ethmoidal sinuses. Those that start from the nasal vestibule and nasal septum raise particular problems and, although rare, form a particular group of cases among the rhinosinusal tumours. Cancers that invade only the inferior part of the jaw are better classified as cancers of the upper extension of buccal cavity [2-5].

Given that rhinosinusal neoplasia is not very common, it is difficult to identify favoring or determining factors. For example, smoking, the first favorable cause of other cancers of the respiratory tract, is not associated with rhinosinusal neoplasia [6-8].

Perhaps the best proven factor in the UK and France is working in the wood and coal industry. This was found by epidemiological studies with laboratory confirmation. People working in the wood industry have the same risk of developing an ethmoid adenocarcinoma as smokers to develop a broncho-pulmonary neoplasia. It seems to be a long latency associated with this factor (28-43 years) [9-13].

Radiation exposure, viral infections and constitutional factors were associated with the occurrence of rhinosinusal neoplasia also, but the evidence is inconclusive and indicates that only a small proportion of all squamous carcinomas can be attributed [14-18].

Nickel workers are at a risk of 870 times higher rhinosinusal tumours, most of them appearing after 10 years of exposure, but with improved working conditions, the incidence has fallen rapidly. The average latency period in these cases was 24 years. Patients who have worked in the chromium industry have a 21-fold higher risk of latency of 23 years [19, 20].

Non-occupational agents such as thorium dioxide injected into the maxillary sinus, exposure to hydrocarbons and isopropyl alcohol also increase the risk of rhinosinusal tumours. All of these injuries appear to develop as a result of nasal fossil air currents that trap and deposit irritating particles either at the anterior portion of the nasal septum or at the middle cornet, resulting in squamous metaplasia and then carcinoma [21-25].

The purpose of this study is the complex retrospective analysis of the cases of rhinosinusal malignancies diagnosed and treated in the Otolaryngology Clinic of the St. Spiridon Emergency Clinical Hospital in Iasi between 1990 and 2004. We evaluated the characteristics of the patient group using a statistically significant analysis of the age, gender, background, and factors of affiliation. Specific tests and indicators have been used.

Experimental part

Materials and methods

We used a study group of 143 patients diagnosed with rhinosinusal malignant tumours in the oto-rhyno-

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laryngology clinic of Sfantu Spiridon Hospital in Iasi. These patients were monitored clinically, radiologically, paraclinically and anamnestically, in the pre-surgical period.

As methods, we used statistical series of dynamic variation of periods and dynamic momentum variation. For the square test, the x1 test is a nonparametric test used for statistical deductions in the case of two or more samples randomly drawn from a population and having a different frequency distribution between them.

This test compares two or more frequency distributions for two batches from the same population, so with a similar frequency distribution, but with a different feature. Absolute figures are taken into account, thus making it more laborious to compute the average, the dispersion, the moments.

Also, this test applies only to those situations where the expected events exclude each other, in the sense that only one of them is possible.

For $df = 1$ (degree of freedom) and a 95% confidence we have Chi - square $X^2 = 3.84$. If the calculated value is greater than this value means that there is association and the exposure has an influence on the studied disease.

Once the contingency table (or cross classification) is made, we calculated the odds ratio (CR) and the relative risk (RR) ratio.

Results and discussions

Chance report (CR) expresses the chances of those who are exposed to a certain feature are OR or higher than the odds of the unexplored ones.

The risk ratio (RR) expresses the risk of those exposed is RR or higher than those unexposed.

Table 1
PATIENTS DISTRIBUTION BY GENDER

GENDER	NUMBER	PERCENT
Female	40	27.97%
Male	103	72.03%

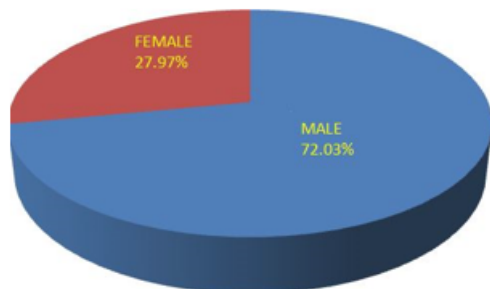


Fig. 1. Cases distribution by gender

The incidence of females cases was 27.97%, small compared to the incidence of male cases.

Table 2
PATIENTS DISTRIBUTION BY DEMOGRAPHIC ORIGIN

DEMOGRAPHIC ORIGIN	NUMBER	PERCENT
Rural	97	67.83%
Urban	46	33.17%

Achieving the contingency table allowed the study of patient involvement in the presence of TMRS.

A control group of patients (60 cases) without TMRS, randomly selected from the ENT Clinic, was used.

The very high values of Chi-square ($x^2 = 20.45$) and the Spearman Rank correlation coefficient ($r = -0.74$) lead to the conclusion that rhinosinus malignant tumors are

Table 3
PATIENTS DISTRIBUTION BY DEMOGRAPHIC ORIGIN AND TMRS

TMR _s	Urban	Rural	Total
Present	46 32.17%	97 67.83%	143
Absent	23 76.67%	7 23.33%	30

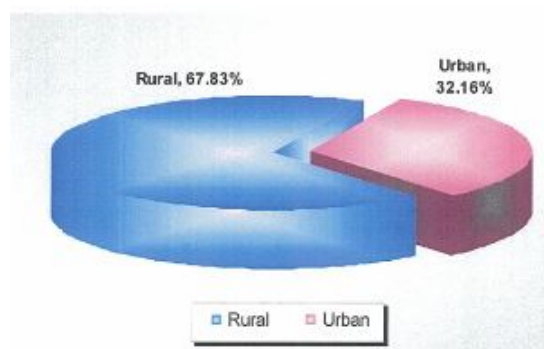
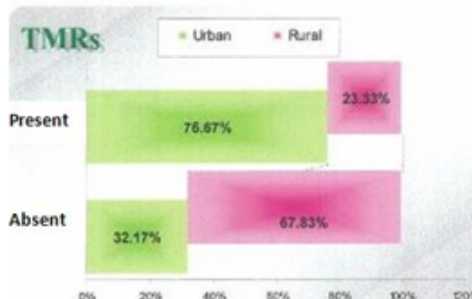


Fig. 2. The incidence of cases by the origin of the patients and TMRS significantly present in rural areas ($p=0.000003$, 0.05), which also results from the analysis of the regression line (table 4, fig. 3).

Table 4
SQUARE-CHI TEST RESULTS

Demographic origin vs TMR _s	Chi-Square test X^2	df	p
M-L-SQUARE-CHI Test	20.45789	1	0.00001
Contingency coefficient	-0.592772		
Spearman Rank correlation coefficient	-0.747748		0.000003

The slope of the regression line indicates the significant correlation between the patient's background and the presence of TMRS.

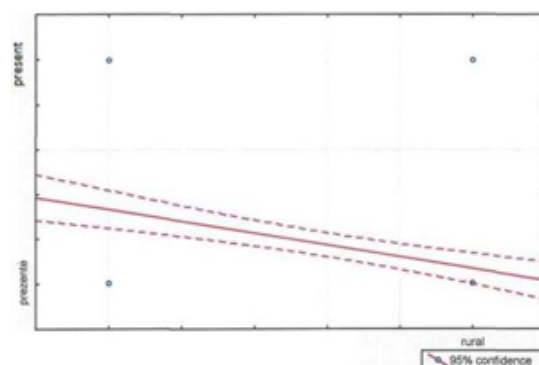


Fig. 3. Correlation of the demographic origin and the presence of rhinosinus malignancies

The histogram of the age of patients with rhinosinus malignancies reveals the normal distribution of cases by age (Gaussian distribution).

Table 5
DISTRIBUTION OF CASES BY AGE OF PATIENTS

AGE	NO. OF CASES	%
≤10	3	2.1
10≤AGE≤20	6	4.2
20≤AGE≤30	12	8.39
30≤AGE≤40	18	12.59
40≤AGE≤50	26	18.18
50≤AGE≤60	30	20.98

Major incidences of cases with rhinosinus malignancies occur in patients aged 50-70 years (20.98%) (table 5, fig. 4).

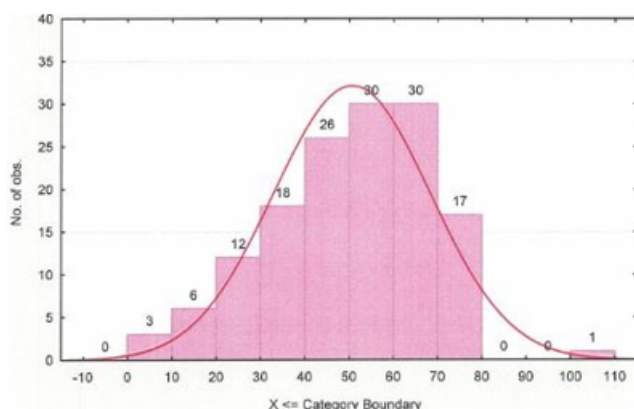


Fig. 4. Distribution of cases by age of patients

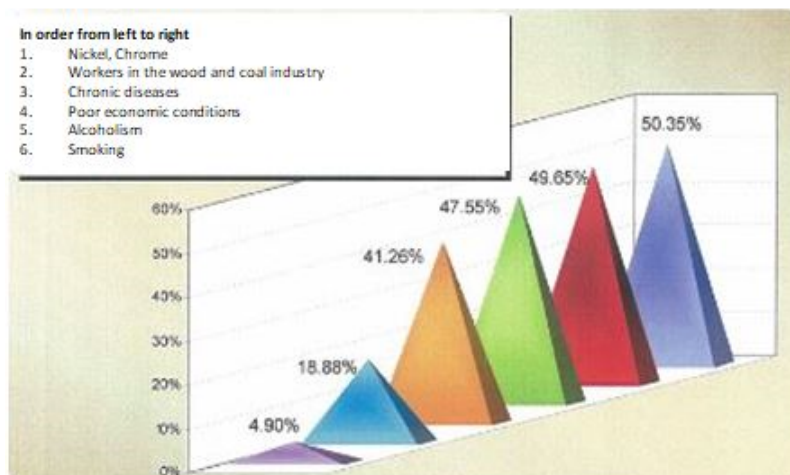


Fig 5. The incidence of risk factors in the the etiopathogenesis of malignant tumors of the hypopharynx

Table 6
THE INVOLVEMENT OF RISK FACTORS IN THE PRESENCE OF TUMORS

Predisposing factors involved in the etiopathogenesis of malignant rhinosinus tumours	CR	RR	X ²	p
	Chance report	Risk Report		
Workers in the wood and coal industry	5.28	2.47	14.07	0.0001763
Nickel, Chrome	4.15	2.26	11.13	0.0008479
Chronic diseases (liver, diabetes, cardiovascular)	3.21	2.02	7.29	0.0069444
Alcohol consumption	2.71	1.86	5.28	0.0215787
Poor economic conditions	2.49	1.78	4.37	0.0366590
Smoking	2.37	1.68	4.12	0.0428729

Conclusions

We can not specify the existence of a determinant or favoring factor of the occurrence of rhinosinusal tumours but the statistical analysis noticed an increased risk for patients working in the wood industry(5.28), which are exposed to chromium, nickel (4.21) as well as to the associated diseases (liver, cardiovascular, diabetes). It is not to be neglected the effects of the poor economic conditions and the lack of education of the population, by postponing the moment of presentation to physician, influencing the therapeutic decision, postoperative evolution. These patients often present different degrees of malnutrition, immunodepression, etc. Statistical processing showed that these patients have a twofold risk of developing rhinosinusal tumours.

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