The objective of this study is to identify trends in demographics, symptoms and treatment of laryngeal cancer and to analyze risk factors contributing to the emergence of this cancer. Review of 679 cases with laryngeal cancer diagnosed between the years 2002 and 2011 in ENT SERVICE in University Hospital Center “Mother Teresa”. Analysis of these case records addressed demographics, risk factors and treatment for cases according to stage, site and TNM classifications. In all cases, their diagnosis has been confirmed by histopathological studies.

Results

Epidemiological features

Prevalence: in 10 years, 679 individuals with laryngeal cancer have been reported.

Incidence: in this study incidence is 2.27 per 100,000 inhabitants, meanwhile in the world the incidence is 3.6 per 100,000 inhabitants [1-4].

Distribution by years: From the distribution by years we see it is a 10 year period are diagnosed on average 67.9 cases per year. The year 2011 marks the maximum number of 91 cases, while the lowest number of cases is in 2009 with 52 cases Table 1, Graph 1.

Distribution by age: As seen from the table in the first three decades of life there are no cases diagnosed with laryngeal cancer. It appears in the fourth decade of life, reaching the peak in the 6th decade and then declines [3,4]. Squamous cell carcinomas (SCCs) of the hypopharynx and larynx are uncommon malignancies, usually arising from dysplastic surface epithelium in patients older than 60 years, with the risk factors of smoking and alcohol Table 2, Graph 2 [5].

Distribution by gender: Of the 679 cases reported, 95.7% belong to male and only 4.3% are female. The male/female

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ratio is 22.2:1. According to Stephenson and Perking this ratio is estimated to be very different ranging from 4:1 to 20:1 [6-9].

The British Cancer Research Center reports in 2011, following a detailed study, that in the United Kingdom the percentage of males diagnosed with laryngeal cancer is 82% and women 18%. So there is a big difference in the distribution of tumor to females in Britain and Albania. This can be explained by the fact that the beginning of smoking in UK women is earlier than ours Table 3, Graph 3.

Distribution village/town: From the tables we see that those who live in the city are more affected than those living in the village. Village percentage ratio: city is 44.5%: 55.5%. This report may not be very real, in the context of the major demographic changes that followed the 90s Table 4, Graph 4.

Distribution by profession: We have regrouped professions based on professional exposures, seeking to make a connection between the exposure and the prevalence of the disease Table 5, Graph 5 [10,11].

- Professionals that have contact with gasoline are: driver, tractor, generator, mechanic.
- The professions related to the mineral industry are: miner, geologist etc.
- Employees and others are: teacher, official, officer, economist, mercolog, financier, doctors, agronomist, writer, lawyer and engineer.
- Professions in contact with the wood: carpenter, woodworking, sawdust.
- Other workers are: workers, butcher, waiter, sailor, fisherman, barber, tailor, topographer, baker, technician, pastry, shoemaker.

Tumor characteristics

Histological type: From the table it seems quite obvious that the epidermoid carcinoma dominated by 99.5% and rhabdomiosarcoma type 0.5%. The classification of histological type of our data is made according to World Health Organization’s (WHO) Classification of Head and Neck Tumours Table 6, Graph 6 [5].
Table 5: Distribution by professions.

| Professions by contact | Professions in contact with gasoline | Official | Workers in agriculture | Professions in contact with the wood | Other workers | Worker working with metals | Occupations exposed to toxic dust | Mineral industry | Unclassified |
|------------------------|--------------------------------------|---------|------------------------|-------------------------------------|--------------|---------------------------|-------------------------------|----------------|-------------|
| Cases                  | 117                                  | 119     | 186                    | 20                                  | 178          | 23                        | 20                           | 34             | 2           |
| %                      | 16.8                                 | 17.5    | 27.3                   | 2                                   | 26.2         | 3.3                       | 2                            | 5              | 0.2         |

Graph 5: Distribution by professions.

Table 6: Histological type.

| Type                  | Epidermoid Carcinoma | Rhabdomiosarcoma |
|-----------------------|----------------------|------------------|
| Cases                 | 676                  | 3                |
| Percentage %          | 99.5                 | 0.5              |

Graph 6: Distribution by histological type.

**Tumor localization at the moment of diagnosis:** From the above data we see that tumor in glottis region is in 49.5% of cases, in supraglottic region 36.4% of cases, in subglottic region 1.6% and in transglottic region in 5.6% of cases. In the data postcriocoid carcinoma is included in hypopharyngeal inferior carcinoma and marginal tumors are included in supraglottic carcinomas. According to the data presented by the National Institute of Carcinogenic Diseases in USA, 56.1% of cases with laryngeal cancer are in the glottic region, 32.7% in the supraglottic region and 1.4% in the subglottic Table 7, Graph 7.

**Risk factors**

**Tobacco:** According to international data, the percentage of smokers is 85–95%. Our data are in line with those of literature. According to Talamini, 90% of the cases affected by laryngeal cancer are smokers Table 8, Graph 8 [12–17].

**Alcohol:** The major risk factors for SCC of the larynx are long-term tobacco exposure and alcohol abuse and have been long – established [18,19]. According to a European study and presented by Talamini, 58% of cases suffering from laryngeal cancer consume alcohol and 75% of cases are both tobacco and alcohol consumers. For alcohol consumption these data are not consistent with our study [10,12,17] Table 9, Graph 9.

**Other risk factors:** These data match Muscat, Wynder, or Zheng’s studies that show that there is a connection between laryngeal cancer and various occupational professions related to the textile industry, chemical industries dealing with wood processing [11,20]. A small proportion of carcinomas appears to be related to transcriptionally active human papillomavirus infection, prognostic significance of this is not known at these sites [21]. In our 679 cases we don’t have data that are connected with HPV as a cause of laryngeal cancer Table 10, Graph 10.

**Clinical findings**

The most commonly occurring sign in our patients is dysphonia (79.8%) followed by dysphagia (42.5%), dyspnea (25.4%), stridor (1.62%) and rarest infestation is fetor, present only in 1 patient. Meanwhile, according to study data Done by Corle Bu Teaching Hospital Accra dysphonia was found in 75.5% of patients with dysphagia at 29%, dyspnea at 20%, stridor in 10.4 and neck mass at 7.8% Table 11, Graph 11 [22–24].

**Staging. The extent of the tumor at the time of diagnosis**

Staging criteria in Table 12, data collected of cancer staging uses the most recent UICC TNM staging (currently 8th version), which reflects the AJCC cancer staging for all criteria except for T3/T4a subglottic carcinomas. In the AJCC system, T3 carcinomas include those limited to larynx with vocal cord fixation and/or invasion of paraglottic space and/or inner cortex of the thyroid cartilage. Normal (T1) or impaired (T2) vocal cord mobility and vocal cord fixation (T3) may only be determined clinically.

From the above data we see that in most cases of our cases, the laryngeal cancer is diagnosed in advanced stages III / IV. This proves a low level of early diagnosis of the disease, but also a silent tumor, which it might be diagnosed only when it is spread sufficiently. Perhaps these data point to our Albanian-Balkan character as careless of the disease. According to Jeffrey S.Moyer and Gregory T.Wolf, the third–fourth infiltration is 40% – 50%, so no great compatibility with our study because of the two factors mentioned above Tables 12,13, Graph 12[25,26].
Treatment

**Surgery:** Table 13, Graph 13.

**Surgery and its types:** From our data we see that patients who undergo surgery are 38.09%. From the above data we see that the type of surgery most commonly used is laryngectomy that in most cases is associated with selective lymph node dissection. In this study stripping and mass excision are included in surgery type Cordectomy, which means that we have excised the tumor in stage IIa when the tumor is localized in one vocal fold. The surgery undergo is microlaryngoscopy and excision of the mass with Kleinsasser laryngeal scissors. Meanwhile no patient has undergone salvage surgery Table 14, Graph 14.

**Surgery/Radiotherapy/Chemotherapy:**

Of all the data we have for treatment, we see that patients who undergo surgery are 38.09%, while according to Marion and Cartei states that surgery was applied in 55% of patients. Also radiotherapy according to literature is used in more than 70% of patients and in our study is used at 95%.

**Surgery as a single treatment/ radiotherapy as a single treatment:** As we see from the data only 9% of the patients underwent surgery as a single treatment otherwise 91% of them underwent radiotherapy as a single treatment. 233 of them underwent total laryngectomy. Those who underwent Cordectomy, Vertical Hemilaryngectomy and Horizontal Supraglottic laryngectomy, it was the only treatment without radiotherapy after surgery Table 16, Graph 16.

**Radiotherapy only/Radiochemiotherapy:** There are 47 patients who have been treated with chemotherapy. Chemotherapy is used in 4.4% of cases versus 10% of literature Table 17, Graph 17 [24,27,28].

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**Table 7: Tumor localization.**

| Localization       | Supraglottic | Glottic | Subglottic | Hypopharyngeal superior | Hypopharyngeal inferior | Transglottic |
|--------------------|--------------|---------|------------|--------------------------|--------------------------|--------------|
| Cases              | 247          | 336     | 11         | 3                        | 44                       | 38           |
| Percentage %       | 36.4         | 49.5    | 1.6        | 0.4                      | 6.5                      | 5.6          |

**Graph 7: Tumor localization.**

**Table 8: Smoking.**

| Smoking  | Yes | No |
|----------|-----|----|
| Cases    | 630 | 49 |
| %        | 92.8% | 7.2% |

**Graph 8: Smoking.**

**Table 9: Alcohol consumption.**

| Alcohol consumers | Yes | No | Alcohol and Tobacco |
|-------------------|-----|----|---------------------|
| Cases             | 86  | 494| 99                  |
| %                 | 12.6| 72.7| 14.6               |

**Graph 9: Alcohol consumption.**

**Table 10: Other risk factors.**

| Other risk factors | Textile Industry | Chemical Industry | HPV | Genetic predisposition | GERD |
|--------------------|------------------|-------------------|-----|------------------------|------|
| Cases              | 2                | 23                | 0   | 5                      | 1    |
| %                  | 0.29             | 3.3               | 0   | 0.7                    | 0.14 |

**Graph 10: Other risk factors.**

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Discussions

Tobacco and alcohol

The importance of smoking exposure in the appearance of laryngeal cancer is a clear case for our study. Also, for alcohol exposure it can be said that there is a clear link. While the relationship between the two factors is commonly our study is not to produce any. The result of the simple fact because it requires more in-depth research [13,14,16,17].

Professions exposed as a result of work in the wood industry, rubber, textile or mineral industries

As in the literature and in our study there are several cases of laryngeal cancer that have worked in these industries. But despite these we can’t judge for the consequent cause connection.

Table 11: Signs and symptoms.

| Signs and symptoms | Cases | %    |
|--------------------|-------|------|
| Dysphonia          | 542   | 79.8 |
| Dysphagia          | 289   | 42.5 |
| Dyspnea            | 173   | 25.4 |
| Odynophagia        | 139   | 20.4 |
| Otolgia            | 26    | 3.8  |
| Stridor            | 11    | 1.62 |
| Neck mass          | 13    | 1.91 |
| Fetor              | 1     | 0.16 |

Table 12: Staging for laryngeal cancer.

| Stage | In Situ | I | II | III | IV |
|-------|---------|---|----|-----|----|
| Cases | 2       | 134| 58 | 319 | 166|
| %     | 3       | 19.7| 8.5| 47.0| 24.4|

Table 13: Patients undergoing surgery or not.

| Surgery | Yes | No |
|---------|-----|----|
| Cases   | 256 | 423|
| %       | 38.09| 62.2|

Table 14: Surgery and its types.

| Types                      | Total Laryngectomy | Vertical Hemilaryngectomy | Corpectomy | Epiglottectomy or Horizontal Supraglottic Laryngectomy |
|----------------------------|--------------------|---------------------------|------------|--------------------------------------------------------|
| Cases                      | 233                | 17                        | 20         | 3                                                      |

Genetic

There are some cases that people diagnosed with laryngeal cancer have had close affiliation with this type of cancer, but despite that we are unable to say if there is a real cause connection [20,29].

HPV

In our study no case has been discovered that has been affected by HPV, but I believe that there has been 'failure to take this factor seriously' or even because this factor has not been detected as a cause.

Plummer-Vinson

In our study there are several cases with this syndrome but no tangible connection is detected.
Anemia

There are some cases of anemia, but this can be explained by the malnutrition or the lack of vitamins that potentially are the cause of laryngeal cancer [29-64].

Conclusions

Laryngeal cancer occurs with an incidence of 2.27 cases per 10,000 inhabitants and an average of 67.9 new cases per year. Incidence for male is 4.36 per 100,000 inhabitants, for female is 0.19 per 100,000 inhabitants. The incidence is low according to the changes that occurred in Albania in the 1990s, a large part of the Albanians had the opportunity to move abroad and be treated elsewhere. Also many cases can be treated in private hospitals, which further reduce the incidence.

Table 15: Surgery/Radiotherapy before surgery.

| Treatment       | Surgery | Radiotherapy before Surgery |
|-----------------|---------|----------------------------|
| Cases           | 273     | 383                        |

Graph 15: Surgery/Radiotherapy before surgery.

Table 16: Surgery only/ Radiotherapy only.

| Treatment       | Surgery only | Radiotherapy only |
|-----------------|--------------|-------------------|
| Cases           | 40           | 359               |

Graph 16: Surgery only/ Radiotherapy only.

In our study, we find more cases in the city than in the village. In our study 55.5% of the individuals were living in urban zones while 44.5% were living in rural zones. Because of the change of the regime in Albania, an internal migration occurred after the 1990s, many villagers were settled in the city and so we have no accurate result of the percentage of individuals living in the city and those living in the village for the occurrence of laryngeal cancer. Male to female ratio is 95.7%/4.3%.

In the four first decades of life are recorded cases, while the age with the largest number of people affected is more than 66 years old ( 38.3%). In the first 30 years of life, we find no cases. The largest number of people affected is 60-70 years old.

About 92.8% of cases are consumers of tobacco, while 14.6% of cases consume alcohol and tobacco both. It is found a link between tobacco and alcohol and the years of exposure to these two factors. Also there are cases affected by cancer of the larynx that work in mineral industry, wood processing, textiles and industries that have exposure to toxic dust. From this study, 319 of the cases (47%) at the time of diagnosis are in the third stage, 24.4% in the fourth stage, 19.7% in the first stage, 8.5% at the second stage. Dysphonia is the most common clinical finding in most of cases, followed by dysphagia. The most affected region is glottis 336 cases (49.5%) followed by supraglottic region 247 cases (36.4%). In total treatment 40 patients underwent surgery only (cordectomy, Vertical Hemilaryngectomy and Horizontal Supraglottic laryngectomy). The most common treatment modality was radiotherapy as single treatment 359 cases (52.8%). Surgery in total 273 (37.7%) cases; Radiochemotherapy 47 (6.9%) cases.

In addition, we found that there is a link between exposure to wood, dust, or metal working in appearance of the laryngeal cancer. It is a task to detect the quantitative relationship between exposure years and this cancer. Also, the work should be deepened in HPV as a potential causative factor. In Albania
we see laryngeal cancer exclusively in smokers and alcohol abusers. We think that as a very important risk factor except smoking is a traditional Albanian alcoholic drink called "Raki". We conclude from our study that the incidence in women is lower compared to men because smoking is still taboo in Albania. Since primary prevention is not fully feasible then we need to focus more on secondary prevention or early psychology by coordinating activity between family practitioners and those specialists.

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