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**Otorhinolaryngology emergency department hospitalizations
in a secondary medical center**

Ургентна стања у оториноларингологији
у секундарној здравственој установи

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Ургентна стања у оториноларингологији у секундарној здравственој установи

SUMMARY

Introduction/Objective Overall number of emergency department visits, including otorhinolaryngology, has increased. Due to population growth, industry and traffic expansion, workload of the otorhinolaryngology emergency department is steadily on the rise.

The objective of this study was to determine most common indications for emergency hospitalization in otorhinolaryngology department in secondary medical center. Also, we examined course of diagnostics and treatment upon admittance, outcome of hospitalization and possible referral to tertiary medical center.

Methods Retrospective study included patients who were urgently hospitalized on the Department of otorhinolaryngology and maxillofacial surgery in Đorđe Joanović General Hospital in Zrenjanin in a two-year period. The data were obtained by processing patients' medical charts.

Results The study included 428 patients who were urgently hospitalized on the Department of otorhinolaryngology of the secondary medical center in two-year period. 245 (57.2%) were male and were 183 (42.8%) female, with average age of 48.5 years. Patients were most frequently hospitalized because of tonsillopharyngitis and its' complications, followed by head and neck trauma. Most of the patients were treated conservatively with medication therapy (72%), and 28% underwent surgical or other invasive intervention. 27 (6.3%) patients were referred to tertiary medical center, which was correlated significantly with number of comorbidities and consultative exams.

Conclusion Otorhinolaryngology inflammatory/infectious diseases are the most frequent indication for urgent hospital admission in secondary medical center. Most of the patients were treated conservatively. Referral to tertiary medical center was significantly correlated to number of comorbidities and consultative exams.

Keywords: otorhinolaryngology; emergency hospitalizations; secondary medical center

САЖЕТАК

Увод/циљ Свакодневно се у лекарској пракси сусрећемо са хитним стањима из области оториноларингологије. Са порастом броја инфекција респираторног тракта и њихових компликација, као и повреда у саобраћају и индустрији, ургентна стања у оториноларингологији постају све чешћа на секундарном нивоу здравствене заштите.

Циљ рада је био испитати структуру и даљи третман свих хитних пријема обављених у поменутом периоду испитивања у односу на пол, старост, пријемну дијагнозу, обављену интервенцију и третман, упућивање у установу терцијарног ранга, коморбидитете, обављену допунску дијагностику и консултативне прегледе из осталих специјалистичких области.

Метод Ретроспективна студија је обухватила све пацијенте који су као хитни случајеви хоспитализовани на Одељењу за оториноларингологију и максилотофацијалну хирургију Опште болнице Зрењанин у двогодишњем временском периоду. Подаци су добијени анализом медицинских историја пацијената, и адекватном статистичком обрадом.

Резултати Студија је обухватила 245 (57.2%) пацијената мушког пола и 183 (42.8%) женског пола просечне старости 48.5 година. Најчешће пријемна дијагноза је била тонзилофарингитис и његове компликације, потом траума главе и врата. У 72% случајева спроведена је медикаментозна терапија, док је у 28% спроведена хирушка интервенција. У установе терцијарног нивоа упућено је 27 (6.3%) пацијената, што је највише зависило од броја коморбидитета и спровених консултативних прегледа.

Закључак Инфекције и инфламације су најчешће индикације за хитну хоспитализацију у оториноларингологији на секундарном нивоу здравствене заштите. Већина пацијената је лечено конзервативно, а упућивање у терцијарну здравствену установу је значајно зависило до броја коморбидитета, броја консултативних прегледа и дужине хоспитализације.

Кључне речи: хитни пријем; оториноларингологија; секундарни здравствена установа

INTRODUCTION

Overall number of emergency department visits, including otorhinolaryngology, has increased [1]. Due to population growth, industry and traffic expansion, workload of the otorhinolaryngology emergency department is steadily on the rise. Facial, orofacial, and cervical trauma and various infections with complications are most frequent causes for emergency hospitalization [2, 3]. Most of otorhinolaryngology emergency cases are not life threatening, but certain number of patients require hospitalization for further assessment and treatment. During hospitalization, fast and precise diagnosis of these disorders is important in order to preserve functioning organs and in some cases life of the patient.

Some disorders require referral to tertiary medical center due to complexity of the disorder, lack of qualified personnel with surgical expertise or medical equipment in secondary medical centers. Despite a rising need for emergency surgery services globally, there is wide variability in the human and physical resources available. In addition, the number of surgeons, anesthetists and operating theatres varies significantly by national income [4]. Inappropriate referrals result in inefficient use of resources and financial burden, not to mention of delaying diagnosis and potentially endangering the patient. A careful assessment in deciding should a certain emergency disorder can be managed in secondary medical center must be made.

The objective of this study was to determine most common indications for emergency hospitalization in otorhinolaryngology department in secondary medical center. Also, we examined course of diagnostics and treatment upon admittance, outcome of hospitalization and possible referral to tertiary medical center.

METHODS

Retrospective study included all patients who were urgently hospitalized on the Department of otorhinolaryngology and maxillofacial surgery in Đorđe Joanović General Hospital in Zrenjanin, from January 1st 2017 to December 31st 2018. This study was approved by the Institutional Ethical Committee (01-273/71/2019). Patients were first examined on otorhinolaryngology emergency department, and then hospitalized according to their disorder. The data were obtained by processing medical charts of the patients. We

analyzed demographic data (age, gender), diagnosis upon admittance, comorbidities, conducted diagnostic procedures and consultative exams, conducted treatment and invasive or surgical procedures, duration of the hospitalization and further referrals to tertiary medical center. Patients older than 16 years were considered adults.

Descriptive statistics were calculated for demographic characteristics and other followed parameters and presented as frequencies and proportions. For statistical analysis χ^2 test, univariate and multivariate logistic regression methods were used. All test variables with statistical significance of $p < 0.05$ in the univariate model were included in the multivariate model. Statistical significance was considered at $p < 0.05$. Statistical analysis was performed using the IBM® SPSS® Statistics v20 (Statistical Package for Social Sciences, SPSS Inc, Chicago, Illinois).

RESULTS

This retrospective study included 428 patients who were urgently hospitalized on the Department of otorhinolaryngology and maxillofacial surgery in Đorđe Joanović General Hospital in Zrenjanin in two-year period; 245 (57.2%) were male and were 183 (42.8%) female, with average age of 48.5 years (± 21.8). Patients with the age from 40 to 70 years were significantly more frequently admitted to the department (χ^2 test, $p < 0.05$). Most of the patients had one, two or more comorbidities (222 patients, 51.9%). Considering additional diagnostics conducted during hospitalization, 51.9% had one or more consultative examinations, 25.2% underwent radiography imaging, 16.6% ultrasound imaging and 11.2% CT imaging. Twenty-seven patients (6.3%) were referred to tertiary medical center for further treatment (Table 1). Average duration of hospitalization was 5.6 (± 4.5) days.

Children and adults were most frequently hospitalized because of tonsillopharyngitis and its' complications (in 18.7% of cases). In children, foreign bodies of digestive system were also frequent indication for hospitalization, followed by otogenic and sinusogenic complications (Table 2). Other frequent reasons for urgent hospitalization in adults were epistaxis, angioedema, head and neck trauma and head and neck phlegmon or abscess formation (Table 3).

Considering comorbidities, most of the patients were treated of cardiovascular diseases (41.4%), followed by diabetes (10.5%), and pulmonal diseases (7.2%) (Figure 2).

Most of the patients were treated conservatively with medication therapy (72%), and 28% underwent surgical or other invasive intervention. Abscess or hematoma incision and drainage was most frequently done, as well as anterior nasal packing (in 7.7%). Directoscopy or esophagoscopy because of foreign body extraction was conducted in 6.1% (Table 4).

According to the results of univariate logistic regression analysis (Table 6) referral to tertiary medical center was significantly related to duration of hospitalization, number of comorbidities and number of consultative exams ($p < 0.05$). Multivariate logistic regression indicated that none of the factors significantly correlated with referral to tertiary medical center ($p > 0.05$) (Table 6).

DISCUSSION

Otorhinolaryngology emergencies visits are frequent in emergency units, but the number of patients requiring hospitalization is small. There are few published studies describing the structure of otorhinolaryngology emergency hospitalizations [2, 5, 6].

Most common disease responsible for hospital admittance was tonsillopharyngitis and complications. This does not differ from data obtained from other studies. Multiple secondary medical centers with otorhinolaryngology department are localized in cities that don't have otorhinolaryngology service on the primary care level. Any application of intravenous therapy is conducted through hospital stay. Lack of resources and logistics leads to attending to patients who would otherwise be treated by their general practitioner. About 25% to 40% of the medical practice of general practitioner consists of ear, nose, and throat diseases [3]. This data supports the fact that hospital health services are frequently used instead primary care centers. Better training and education of general practitioners would allow secondary level healthcare facilities to be more available and effective for more complex cases [8, 9]. On the other hand, in children, admittance was done only in cases where surgical intervention was planned. Children who underwent conservative antibiotic treatment were admitted to the pediatric department.

In Serbia, otorhinolaryngologist also attends to cases of maxillofacial trauma in the emergency department, as the presence of the attending maxillofacial surgeon after working hours is extremely rare, except in tertiary university centers. This directly influences the number of admitted and referred patients, and makes head and neck trauma the second most common diagnosis in hospitalized patients.

One of the prominent data was that CT diagnostics was done only in 11.2% of admitted patients. According to literature data, that CT use in the emergency department increased in the last few decades from 60 to 80% depending on the patients' age, gender, race and diagnosis [10]. CT can identify patients who can benefit from hospital admission, and aid in determining appropriate disposition and risk assessment. This may be particularly relevant to patients who require major procedures and those with complex clinical presentations (elderly, patients with multiple chronic comorbidities) [11]. One of the main reasons for low percentages of CT use in our patients is poor organization and cooperation with the radiology department, as well not firmly implemented diagnostics and treatment protocols.

Surgical or other invasive interventions were done in 28% of the cases. Most frequent intervention was abscess incision and drainage. This was also noted as the most frequent ENT surgical emergency in population-based estimates of global burden [4]. The data was supported with other studies results [2, 3, 5, 12].

Some authors estimate that less than 10% of emergency otorhinolaryngology cases require middle and high complexity resources in tertiary medical centers [3, 13]. Most common reason for referrals were advanced head and neck malignancies, with cardiovascular and pulmonal complications. Rhinosinusitis and otitis complications were referred when surgical treatment was needed. The lack of equipment and/or experienced surgeons who could treat those patients was also the main reason for referral of trauma patients in need of surgical reduction of facial fractures. Complex patients with advanced neck phlegmons requiring further surgical treatment and postoperative intensive care were also transferred to tertiary medical centers. Further dissemination of the infection such as mediastinitis and sepsis require extensive, which cannot be fully provided in secondary medical center.

In our study, number of comorbidities, duration of hospitalization and number of consultative exams was proven to be significantly correlated to patients' referral to the tertiary medical center. More than half of the patients had comorbidities (51.9%),

cardiovascular diseases and diabetes being the most frequent ones. One or more comorbidities were detected in 21.5% of the patients. Chronic diseases like COPD, asthma, cancer, chronic heart failure, liver disease significantly more frequent in patients who visit emergency department [14]. There are reports suggesting that infection or trauma could worsen chronic illnesses such as chronic heart disease and chronic obstructive pulmonary disease. These patients were at greater risk of developing infectious complications and be discharged to hospital care settings [15, 16, 17]. Complications of oropharyngeal infections and neck phlegmons were frequent indications for hospitalization and surgical treatment in our study. Head and neck phlegmon are accompanied by endogenous intoxication that leads to homeostasis disturbance and vital organs disorder. In those patients, concomitant pathologies such as cardiovascular insufficiency, diabetes, hepatic and kidney disease significantly influenced the course of the infection and the progression of the disease [18]. Frequent comorbidities in patients result in multidisciplinary approach to patient's treatment and higher hospitalization rate. Frequency of physician consultations for emergency department patients varies between 20% and 40% [19, 20]. In our study that number of patients who underwent one or more consultative exam was 247 (57.7%) and was significantly higher comparing to literature data. Complex patients require more consultative examinations and diagnostic procedures, especially if surgical treatment is considered. Higher number of consultative exams was significantly correlated with referrals to tertiary medical center.

Limitations of the study are those that data were obtained retrospectively from only one secondary medical center. Multi-centric studies are required to obtain data from other secondary medical centers. The need for precise diagnostic and treatment protocols and their implementation is apparent, in order to define required diagnostics, possible treatment options and terms of referrals to tertiary centers.

CONCLUSION

The data from this study concluded that otorhinolaryngology inflammatory/infectious diseases are the most frequent indication for urgent hospital admission in secondary medical center. Most of the patients were treated conservatively. Referral to tertiary medical center was significantly correlated to number of comorbidities and consultative exams. Further

research is needed to address any needs and possible areas of improvement in emergency services in secondary medical centers and patterns in treatment and referrals to tertiary medical centers.

Conflict of interest: None to declare.

Paper accepted

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Table 1. Characteristics of the patients included in the study

Sex, n (%)	
Male	245 (57.2)
Female	183 (42.8)
Number of comorbidities, n (%)	
None	206 (48.1)
One	130 (30.4)
Two	74 (17.3)
Three or more	18 (4.2)
Additional diagnostics, n (%)	
Consultative examination	247 (57.7)
Radiography imaging	108 (25.2)
Ultrasound imaging	71 (16.6)
CT imaging	48 (11.2)
Number of consultative exams, n (%)	
None	181 (30.6)
One	141 (23.8)
Two	64 (10.8)
Three or more	42 (7.1)
Treatment, n (%)	
Medication treatment	308 (72)
Surgical treatment/intervention	120 (28)
Referral to tertiary medical center, n (%)	
Yes	27 (6.3)
No	401 (93.7)

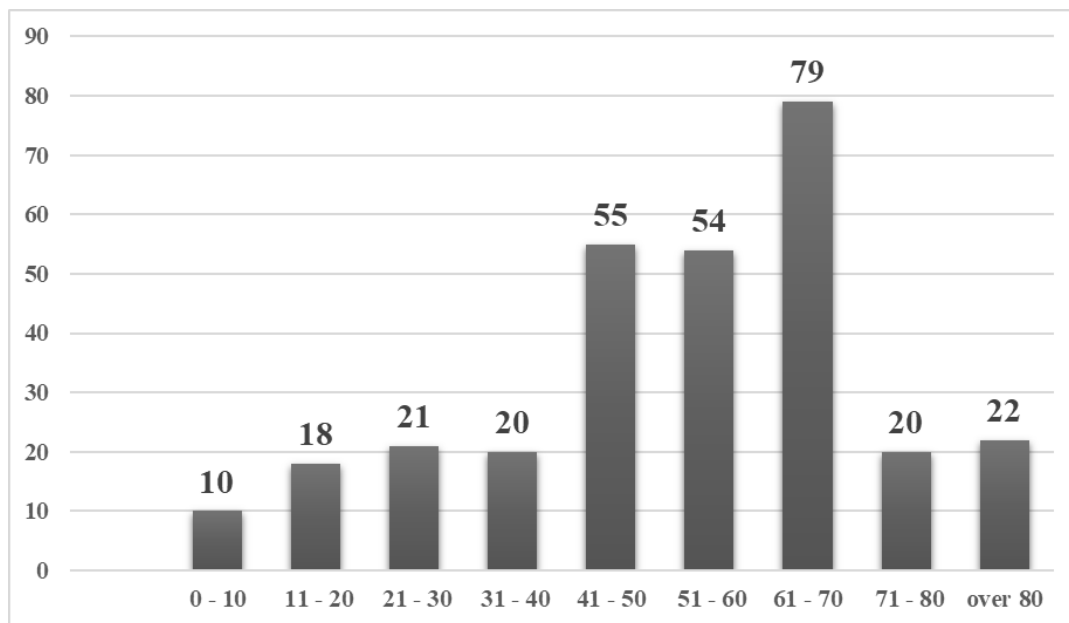


Figure 1. Age groups of patients included in the study

Table 2. Indications for hospitalization in patients ≤ 16 years old

Indication for hospitalization	n (%)
Tonsillopharyngitis and complications	9 (2.1)
Digestive tract foreign body	7 (1.6)
Acute suppurative rhinosinusitis without/with complications	5 (1.2)
Head and neck trauma	4 (0.9)
Acute suppurative otitis media without/with complications	4 (0.9)
Head and neck abscess	2 (0.5)
Bleeding after tonsillectomy	2 (0.5)
Allergic reaction to insect bite/medication	1 (0.2)
Total	34 (7.9)

Paper accepted

Table 3. Indications for hospitalization in patients >16 years old

Indication for hospitalization	n (%)
Tonsillopharyngitis and complications	71 (16.6)
Epistaxis	36 (8.4)
Angioedema	36 (8.4)
Head and neck trauma	35 (8.2)
Head and neck abscess/phlegmon	34 (7.9)
Digestive tract foreign body	25 (5.8)
Allergic reaction to insect bite/medication	22 (5.1)
Acute suppurative otitis media without/with complications	21 (4.9)
Perichondritis	17 (4)
Acute suppurative rhinosinusitis without/with complications	16 (3.7)
Malignant head and neck tumors	16 (3.7)
Stridor	13 (3)
Acute laryngitis /laryngotracheitis	11 (2.6)
Dysphagia/aphagia	9 (2.1)
Acute epiglottitis	7 (1.6)
Vertigo	5 (1.2)
Sialoadenitis	5 (1.2)
Neck lymphadenitis	4 (0.9)
Acute idiopathic sensorineural hearing loss	3(0.7)
Bleeding after tonsillectomy	2 (0.5)
Chemical ingestion	2 (0.5)
Respiratory tract foreign body	1 (0.2)
Other	3 (0.7)
Total	394 (92.1)

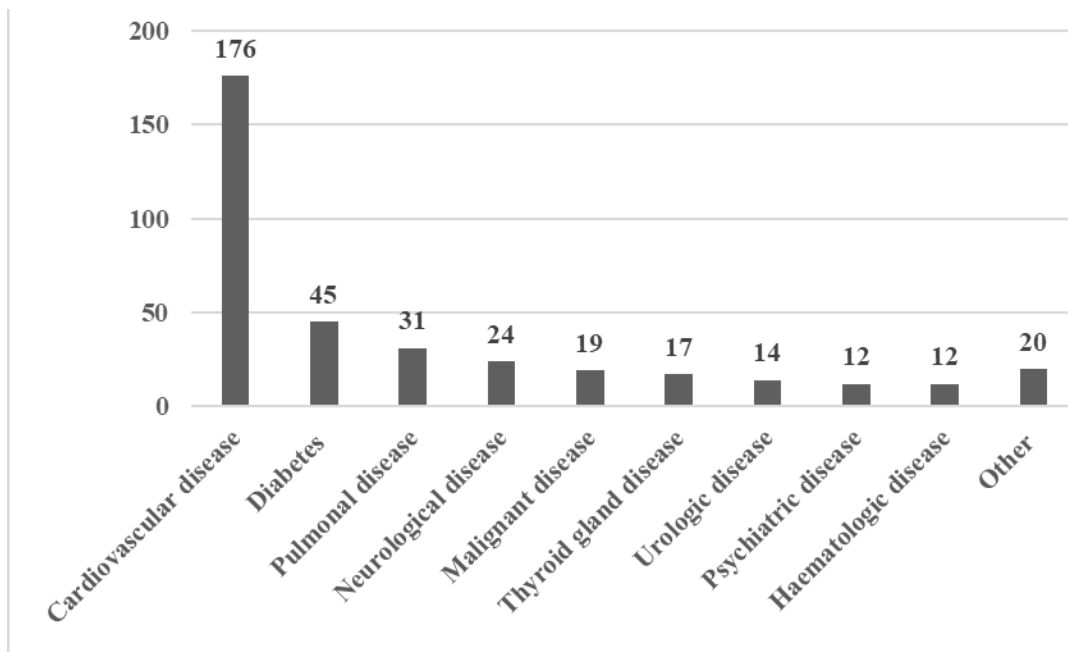


Figure 2. Comorbidities of the patients

Table 4. Surgical and other interventions

Interventions	n (%)
Abscess/hematoma incision and drainage	33 (7.7)
Anterior nasal packing	33 (7.7)
Directoscopy/esophagoscopy with foreign body extraction	26 (6.1)
Tracheotomy	7 (1.6)
Nasal reduction	7 (1.6)
Wound suture	4 (0.9)
Dental extraction	4 (0.9)
Posterior nasal packing	1 (0.2)
Surgical revision of bleeding	1 (0.2)
Other	4 (0.9)

Paper accepted

Table 5. Diagnosis on referral to tertiary medical center

Diagnosis for referral	n (%)
Head and neck malignancy	10 (2.3)
Head and neck trauma	5 (1.2)
Head and neck phlegmon	4 (0.9)
Mastoiditis	3 (0.7)
Failed esophageal foreign body extraction	3 (0.7)
Rhinosinusitis complications	2 (0.5)

Paper accepted

Table 6. Univariate and multivariate logistic regression of factors related to referral to tertiary medical center

Referral	Univariate log regression			Multivariate log regression		
	Exp (B)	95% CI	p	Exp (B)	95% CI	p
Number of comorbidities	1.517	1.007–1.147	< 0.05	1.249	0.968–1.117	0.326
Number of consultative exams	1.673	1.012–2.275	< 0.01	1.040	0.801–1.948	0.282
Duration of hospitalization	1.075	1.163–2.407	< 0.05	1.445	0.962–2.170	0.76