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INFECTIOUS DISEASES AS AN EMERGENCY AT AN EAR-NOSE-THROAT PEDIATRIC DIVISION

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SUMMARY – Infectious diseases are the leading cause of emergency hospital admission for children treated at ENT department. The aim of this retrospective study was to investigate the rate of emergency admission for particular infectious diseases, bacterial etiology and treatment modalities, especially surgical. The study included 83 emergency patients admitted to the Pediatric Division of ENT Department, Sestre milosrdnice University Hospital, Zagreb, over the period from January 1999 through May 2001. In the majority of cases, the pathology was due to upper respiratory tract infections. Otitis media, peritonsillary abscess and acute sinusitis were most common diagnoses. The most frequently isolated pathogenic bacteria were *Streptococcus pneumoniae, Haemophilus influenzae* and *Staphylococcus aureus.* All patients were treated with antibiotics and nearly all of them by surgery.

Key words: *Respiratory tract infections, complications; Emergencies; Child; Infant*

Introduction

The main cause of emergency hospitalization at pediatric ear-nose-throat (ENT) division are infectious diseases. Other causes of emergency admission, such as foreign bodies of the aerodigestive tracts, make a minor portion in comparison to infectious diseases. The children with infectious diseases often have severe general symptoms, and propagation of infection from ENT region into the neighboring structures may be fatal. It is therefore necessary to treat them meticulously and to provide them with prompt medicamentous therapy. Nevertheless, this topic has still been quite poorly explored in clinical studies.

The treatment of diseases is either medical or surgical, however, in most cases combination therapy is required. A great number of patients are admitted for acute inflammation of the head and neck region, mostly for upper respiratory tract infections but also for infections such as soft tissue abscess, whereas a minor proportion of patients are admitted for exacerbation of chronic infectious disease such as chronic seromucinous otitis media, chronic otitis media and chronic rhinosinusitis.

Despite a great number of newly developed antibiotics and improvement in the efficacy of existing agents, medicamentous therapy failure is still a common phenomenon. Many children were admitted after and because of ineffective antibiotic therapy[1,2].

The aim of this retrospective study was to assess the rate of different infectious diseases, microbiological etiology of the diseases, and treatment modalities provided at the ENT Department.

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Patients and Methods

This retrospective study was carried out to identify the infectious diseases that were a major cause for emergency admission to the Pediatric Division of ENT Department,

Sestre milosrdnice University Hospital, Zagreb. The study included 83 patients admitted for emergency to the Department over the period from January 1999 through March 2001. The cases required emergency admission for some severe acute or exacerbated chronic infectious disease. In all patients, microbiological swab was obtained from the inflamed region such as nasopharynx, oropharynx, ear, inflammatory regions, and/or abscesses. The swabs were obtained immediately upon admission or intraoperatively.

Patients with subglottic laryngitis were excluded from the study due to inadequate data on the etiology, although the origin of the disease may have been infection-related.

The prevalence of particular diagnoses, distribution of isolated bacteria, choice of antibiotic drug, and type of surgical treatment were analyzed.

Results

In the total of 83 patients enrolled in the study, there were 40 male and 43 female patients, mean age 4 years and 10 months (58 months). The youngest patient was 5 months, and the oldest 14 years and 10 months (178 months) old (Table 1). Surgical treatment was used in 79 (95%) patients.

Table 1.

Mean age (months)	Male n	Male %	Female n	Female %	Total n
58.2	40	48	43	52	83

Otitis media was the most common diagnosis, found in 44 (54%) patients, i.e., acute otitis media in 34 (42%), exacerbated chronic seromucinous otitis media in nine (11%) patients, and mastoiditis resulting from acute otitis media in one (1%) child. Sinusitis was detected in nine (11%) subjects: maxillary sinusitis in six (7%) patients, one of them bilateral, ethmoiditis in two (2%), and sphenoiditis in 1 (1%) child. Tonsillopharyngitis was detected in four (3%), peritonsillar abscess in seven (9%), inflamed cervical cysts or fistulas in five (4%), and lymphadenitis coli in five (4%) subjects. All other diagnoses, such as ear furuncle, nasal septal abscess, facial soft tissue abscess, parapharyngeal abscess, epiglottitis and parotid gland abscess were diagnosed in one or two patients each.

The most frequently isolated organisms were *Streptococcus pneumoniae* (29 swabs), *Haemophilus influenzae* (19 swabs), *Staphylococcus aureus* (12 swabs), saprophytes (ll swabs) and *Moraxella* (10 swabs). In spite of the great number of swabs, 18 were sterile (Tables 3 and 4).

Table 2. Distribution of diagnoses

	n	%
Acute otitis media	34	42
Chronic seromucinous otitis media	9	11
Acute mastoiditis	1	1
Furuncle of meatus	2	2
Acute sinusitis	9	11
Abscess of the nasal septum	1	1
Epiglottitis	1	1
Acute tonsillopharyngitis	4	5
Peritonsillar abscess	7	9
Parapharyngeal abscess	2	2
Abscess of the face	2	2
Abscess of the parotid gland	1	1
Lymhadenitis of the neck	5	6
Inflamed cysts of the neck	5	6

Table 3. Isolated microorganisms

	n
Haemophilus influenzae	19
Streptococcus pneumoniae	29
Sterile	16
Staphylococcus aureus	10
Saprophyte	11
Pseudomonas aeruginosa	3
Moraxella	10
Peptostreptococcus	4
Klebsiella	3
Physiological flora	1
Streptococcus pyogenes	2
Proteus	2
Coagulase negative staphylococcus	2
Candida	1
Escherichia coli	2
Propionibacterium	3
Gram-negaitve bacilli	1
Fusobacterium	1

As regards medicamentous therapy, all patients were treated with antibiotics. Several of them were treated with a combination of two antibiotics. The combination of penicillin and garamycin was most commonly used. Antibiotics were given to older children who had started this

Table 4. Distribution of isolated microrganisms according to sampling site (n)

Microorganism	ear	nf	of	sinus	cyst	a.f.	m	s.a.	a.p.	p.a.	pa.a.
Haemophilus influenzae	5	14									
Streptococcus pneumoniae	14	15									
Sterile	6	3		3	2	1				1	
Staphylococcus aureus	5	4		1							
Saprophyte		11									
Pseudomonas aeruginosa	3										
Moraxella		10									
Peptostreptococcus				1			1	1	1		
Klebsiella	3										1
Physiological flora										1	
Streptococcus pyogenes	1		1								
Proteus	2										
Coagulase negative staphylococcus				2							
Candida										1	
Escherichia coli	2										
Propionibacterium				1						2	
Gram-negative bacilli	1										
Fusobacterium							1				

nf=nasophaynx; of=oropharynx; a.f.=abscess of the face; m=mastoiditis; s.a.=septal abscess; a.p.=parotid abscess; p.a.=peritonsillar abscess; pa.a.=parapharyngeal abscess

therapy before their emergency admission.Three patients were treated for inflamed cyst or lymph nodes of the neck, and one for facial soft tissue abscess. Amoxicillin/clavulanate was most commonly used in the treatment of our patients.

Surgically treated patients underwent one of the following procedures: myringotomy with ventilation tube implantation (n=39; 47%); tympanoplasty (n=1; 2%), incision and drainage (n=15; 18%), and sinus surgery (n=9; 13%). In 14 patients, myringotomy with ventilation tube implantation was performed bilaterally. One patient underwent bilateral sinusoscopy (Table 5).

Table 5. Surgical procedures

	n	%
Myringotomy ventilation tube	4	6
Myringotomy with implantation	39	47
Tympanoplasty	1	2
Ethmoidectomy (internal) (FESS)	1	2
Sinusoscopy	6	7
Sphenoidectomy	1	2
Ethmoidectomy (external)	1	2
Incision and drainage	15	18
Extirpation of cyst	5	7
Expirpation of lymphnodes	5	7

Discussion

Although infectious diseases have an important role in ENT pathology, and a huge number of patients are treated in ENT departments for head and neck infections, the number of clinical studies dealing with this matter is still deficient.

Infection as a primary cause of admission was recorded in 15% to 17 % of patients admitted to pediatrics, ENT and general surgery[3]. A significantly greater percentage of these cases are expected to be admitted to ENT pediatric division and as emergency admission. This presumption is based on the fact that infectious diseases are more common in children than in adults. On the other hand, non-infectious diseases such as tumors and goiters are rarely found in this population.

The distribution of diagnoses in children under 10 years of age, who were treated at the ENT Pediatric Di-

vision, showed that tonsillitis and upper respiratory tract infection occurred in as many as 37% of all patients observed[4]. Infection of the upper respiratory tract was found to underlie 82% of the diagnoses in this group of patients. The remaining diagnoses included inflammation of congenital anomalies of the neck, ENT region soft tissue abscess, and lymphadenitis of the neck, which also may occasionally be due to infection of the upper respiratory tract.

All admitted children were referred by a general practitioner, pediatrician and/or otolaryngologist. As we are a tertiary referral center for treatment of ENT diseases, the children were referred to our Department primarily for surgery, although the treatment they received here commonly included a combination of medicamentous therapy and surgery. Medicamentous therapy alone was used in children with severe tonsillopharyngitis and in one child with epiglottitis.

The study showed more than a half (54%) of hospitalized children to have the diagnosis of otitis media. Since upper respiratory tract infection is the most common disease in children[5], and otitis media is part of this infection, this type of complication should be expected not only in case of mastoiditis.

Since the majority of diagnoses were associated with upper respiratory tract infection, the isolated microorganisms corresponded to the findings obtained. *Streptococcus pneumoniae, Haemophilus influenzae* and *Moraxella catarrhalis* were isolated in 58 swabs. In many cases, more than one bacterium were isolated. The most common combination included either *Haemophilus influenzae* and *Streptococcus pneumoniae* or *Haemophilus influenzae* and *Moraxella catarrhalis* isolated from the nasopharynx. These multimicrobial causes are quite expectable and consistent with literature data[6]. Because of the severity of infectious disease and frequent failure of the 'first-line' antibiotic therapy (e.g., penicillin or amoxicillin), we often used so-called 'second-line' antibiotic such as amoxicillin/clavulanate, which was most frequently used of all antibiotics in this group of patients. Klindamycin is another antibiotic very often administered to our patients, as there were a large number of children with verified or suspected sensitivity to penicillin. On the other hand, klindamycin was used in cases of suspected anaerobe infection. In one patient with acute otitis media, we isolated *Streptococcus pneumoniae* resistant to all tested antibiotics except for vancomycin.

Interestingly enough, no beta hemolytic streptococcus was isolated in this group of patients, which may have been due to efficacious therapy for this type of infection delivered by primary health care units[7]. Furthermore, it is interesting to note that many swabs were sterile, even some of those obtained from the pus intraoperatively. This could be explained by the fact that many patients had started their antibiotic therapy prior to admission.

Surgical approach is based on the *ubi pus ibi evacuo* principle. Many of the procedures basically include incision and drainage, e.g., abscess treatment or myringotomy, and implantation of ventilation tubes, which is definitely the most frequent procedure at the Division.

Conclusion

Infectious diseases are the primary cause of emergency admission at the ENT pediatric division. Nearly entire pathology is associated with upper respiratory infection. Otitis media, peritonsillar abscess and acute sinusitis were the most common diagnoses observed. The most frequently isolated bacteria were *Streptococcus pneumoniae, Haemophilus influenzae* and *Staphylococcus aureus*.

All patients were treated with antibiotics, and almost all of them by surgery.

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References

1. GATES GG (ed.). Current Issues in ENT Infectious Disease. Symposium, March 16-17, 1990, Orlando, Florida. Ann Otol Rhinol Laryngol 1992;155 (Suppl 101):4.
2. BAUDOIN T, KALOGJERA L. ORL aspekti infektivnih upala glave i vrata. Knjiga sažetaka Znanstvenostručnog sastanka Hrvatskog društva infektologa, 23.-26. svibnja 2001., Varaždin.
3. MOREILLON P, BROQUET PE, BILLE J, GLOOR E, GLAUSER MP. Prevalence des maladies infectieuses au Centre Hospitalier Universitaire Vaudois. Schweiz Med Wochenschr 1985;115:261-6.
4. CANO FG, CARBALLO MG. Pediatric emergencies attended at a primary care clinic. (II) Epidemiological study. Aten Primaria 2000;26:81-5.
5. CAUWENBERGE Van PB. Childhood diseases of nose and sinus. Curr Opin Otolaryngol Head Neck Surg 1995;3:16-20.

6. FAHEY T, STOCKS N, THOMAS T. Systemic review of the treatment of upper respiratory tract infection. Arch Dis Child 1998;79:225-30.

7. LAN AJ, COLFORD JM. The impact of dosing frequency on the efficacy of 10-day penicillin or amoxicillin therapy for streptococcal tonsillopharyngitis: a meta-analysis. Pediatrics 2000;105:191-8.

Sažetak

ZARAZNE BOLESTI KAO HITNI SLUČAJEVI NA DJEČJEM ODJELU ZA BOLESTI UHA, GRLA I NOSA

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Zarazne su bolesti glavna indikacija za hitan prijam na odjel dječje otorinolaringologije. Unatoč tome, broj kliničkih istraživanja koja se bave tom problematikom vrlo je mali. Cilj je ove retrospektivne studije bio istražiti učestalost pojedinih dijagnoza infektivnih bolesti, bakterijsku etiologiju i načine konzervativnog i poglavito kirurškog liječenja djece koja su hitno zaprimljena na Dječji odjel Klinike za otorinolaringologiju i cervikofacijalnu kirurgiju Kliničke bolnice "Sestre milosrdnice" u razdoblju od siječnja 1999. do svibnja 200l. godine. Većina je bolesnika primljena u hitnoj službi. Gotovo su sve dijagnoze povezane s infektivnim upalama gornjih dišnih putova. Najčešća je dijagnoza bila upala srednjeg uha, peritonzilarni apsces i akutni sinusitis. Najčešće izolirane patogene bakterije iz uzetih obrisaka bile su *Streptococcus pneumoniae*, *Haemophilus influenzae* i *Staphylococcus aureus*. Svi su bolesnici liječeni antibioticima, a gotovo svi i kirurški. Najčešće davani antibiotik bio je amoksicilin s klavulonskom kiselinom. Kirurško se liječenje uglavnom temeljilo na pravilu *ubi pus ibi evacuo*, tako da su najčešći zahvati bile incizije i drenaže, odnosno miringotomija i implantacija ventilacijske cjevčice.

Ključne riječi: *Infekcije dišnog sustava, komplikacije; Hitni slučajevi; Dijete; Dojenče*