

ADULT RESPIRATORY TRACT INFECTIONS AND THEIR TREATMENT WITH ANTIBIOTICS IN LITHUANIAN PRIMARY HEALTH CARE

Asta Palekauskaitė¹, Rolanda Valintėlienė¹, Aušra Beržanskytė^{1, 2}

¹*Institute of Hygiene*

²*Vilnius University Faculty of Medicine*

Summary

Objective. The purpose of this study was to describe antibiotic prescribing for adult patients with respiratory tract infections (RTIs) in Lithuanian primary health care.

Methods. The retrospective study was carried out in 7 randomly selected outpatient clinics. Medical records in each clinic were selected by cluster method – not less than 210 medical records were picked from 30 randomly selected places (7 medical records as cluster sample). In total 1767 patients' medical records were analyzed. Study population was adults who referred family doctors in year 2004.

Results. RTIs were the most common and accounted 84.1% (959) of all diagnosed infections. Prevalence of RTIs was 54.3%. Upper respiratory tract infections (URTIs) were more prevalent (66.0%, 633) than lower respiratory tract infections (LRTIs) (34.0%, 326). In total 62.6% RTIs were treated with antibiotics, LRTIs more frequent (89.0%) than URTIs (56.4%). 90.6% of pneumonia, 88.1% of pharyngitis, 83.5% of acute bronchitis were treated with antibiotics. Broad spectrum penicillins were prescribed most frequently (59.5%), followed macrolides (12.1%) and tetracyclines (11.4%). Phenoxymethylpenicillin was prescribed only 4 times (0.6%). Only 3 microbiological tests had been done (0.3% from all RTI). No one strepA test was performed.

Conclusion. Antibiotics to treat adult RTIs in Lithuanian primary health care are prescribed unjustified and too often. The most frequently prescribed are broad spectrum antibiotics. Such use of antibiotics may contribute to the increase of antibiotic resistance.

Keywords: antibiotic, respiratory tract infection, primary care.

BACKGROUND

Antibiotics are often overused to treat RTIs in primary care setting and various studies showed that big proportion of RTIs is treated with antibiotics in primary care empirical [1, 2, 3, 4]. Some concerns about overuse of antibiotics are that it leads to unnecessary costs and the potential of adverse effects for the individual taking the antibiotic. But even more important is the adverse effect on public health because excessive use of antibiotics has led to the development of antibiotic resistant bacteria [5]. In UK 80% of all antibiotic usage occurs in primary care and over 50% of this is for URTIs [3]. In Norway more than 90% of prescriptions are prescribed in primary care and more than 60% of them – for RTIs [6]. This is also

relevant for the Netherlands with the lowest antibiotic consumption in the Europe. The problem is particularly important for countries such as the UK with a consumption twice, or Belgium with a consumption nearly three times, that of the Netherlands [7].

There are good examples how carefully designed mass educational campaigns could improve antibiotic use nationally and should be considered in countries with high antibiotic use [8, 9]. Antibiotic use and antimicrobial resistance in France are among the highest in Europe. In 2002 the long term national campaign “Keep antibiotics working” was started. The campaign was focused on antibiotic prescribing for upper and lower RTIs and included an educational campaign for health care workers, the promotion of rapid tests for diagnosis of streptococcal infections, public information campaign. Between 2002 and 2007 it was observed an overall 26.5% reduction of antibiotic prescriptions in France [8, 9].

In the end of the 20th century number of studies in Lithuania have demonstrated some overuse of antibiotics

Correspondence to Asta Palekauskaitė,
Institute of Hygiene,
Didžioji 22, LT-01128 Vilnius, Lithuania.
E-mail: asta@hi.lt

in primary care as well as in hospitals [10-14]. Following initiatives in different countries and recommendations the development of national program to combat antimicrobial resistance has been initiated. For prioritization of activities recent data on antimicrobial use in different settings were essential. The retrospective study was carried out to evaluate the antibiotic prescribing manners in outpatient settings in Lithuania. This article presents the part of the data of this study revealing the treatment of adult RTIs.

METHODS

The retrospective prevalence study was carried out. Study population was adults (persons older than 18 years) who visited outpatient clinics in year 2004. Stepwise – nest selection was performed. First, 7 outpatient clinics were randomly selected of which 4 were polyclinics and 3 private family medicine centers. Medical records in each clinic were selected by cluster method – not less than 210 medical records were picked from 30 randomly selected places (7 medical records as cluster sample). In total 1767 patients' medical records were analyzed.

Sample size was defined with expected prevalence – 25%, desired precision – 5, design effect – 3, confidence interval – 95%. Data about patient (age, sex), infection, antimicrobial treatment were collected from medical records for analysis. Only 2004 years' data were registered. Respiratory tract infections (RTI) were grouped into upper (rhinitis, acute viral RTIs, pharyngitis, otitis, laryngitis, sinusitis, tonsillitis – URTI) and lower (tracheitis, acute bronchitis, exacerbation of chronic bronchitis, pneumonia – LRTI). Medications were classified according to the Anatomical - Therapeutic - Chemical (ATC) classification system. Antimicrobial treatment was analyzed by the type of RTIs (URTIs and LRTIs), sex and age group (18-30, 31-40, 41-50, 51-65, >65 years).

The chi square (χ^2) statistical test or Fisher's method (when $n < 5$) were used comparing categorical variable. A p value of < 0.05 was considered significant. Data were managed and analyzed using Epi Data, SPSS version 11.0.

RESULTS

Characteristics of patients

Females composed 62.7% (1108) of all studied patients.

Similar distribution was in all age groups. Mean age of patients was 43.7 years. Females (mean age 44.7 years) were older than males (mean age 42.0 years) ($p=0.003$) (Table 1).

Table 1. Characteristics of study population

Age group	Male	Female	Total	
	n (%)	n (%)	(n)	%
18-30	236 (39.7)	359 (60.3)	595	33.7
31-40	115 (40.8)	167 (59.2)	282	16.0
41-50	109 (38.5)	174 (61.5)	283	16.0
51-65	114 (38.0)	186 (62.0)	300	17.0
>65	85 (27.7)	222 (72.3)	307	17.3
Total	659 (37.3)	1108 (62.7)	1767	100.0
Mean age	42.0*	44.7*	43.7	
SD	18.1	19.3	18.9	
Minimal age	18	18	18	
Maximal age	95	92	95	

* $p=0.003$ (difference between male and female mean age)

Prevalence and structure of respiratory tract infections

RTIs composed the biggest part (84.1%) of all diagnosed infections. 707 (40.0% from all 1767 patients) patients had at least one RTIs during one year. In total 959 RTIs were registered giving the RTIs prevalence – 54.3% (95% CI, 52.0-56.6%). The highest prevalence of RTIs was among younger adults: 46.4% (445) in 18-30 age group and 19.6% (188) in 31-40 age group (Fig. 1).

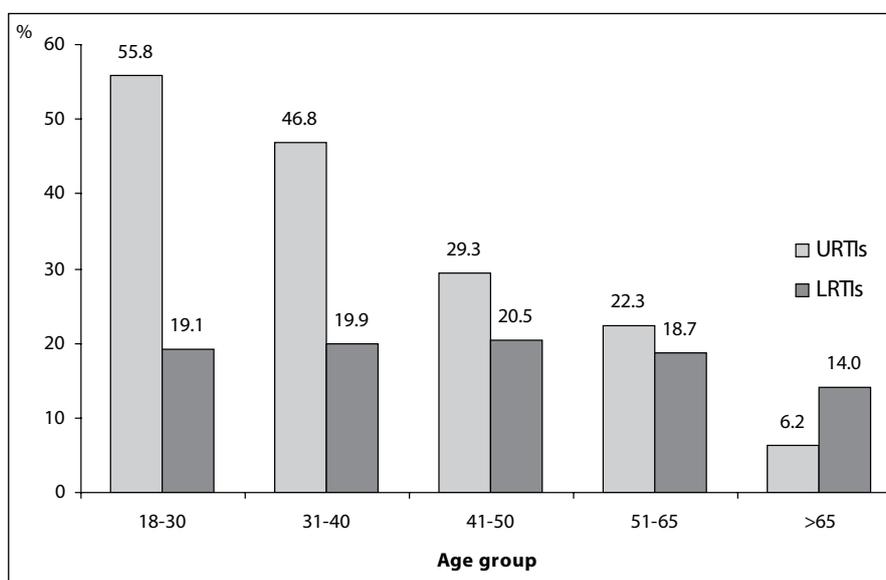


Fig. 1. Prevalence of URTIs and LRTIs in different age groups

More than a half of all RTIs (66.0%) were URTIs and 34.0% – LRTIs. Distribution of RTIs among males and females was quite similar (without statistical differences). Comparing distribution of RTIs in different age groups URTIs were more common than LRTIs in all age groups, except age group over 65 years old, where LRTIs were more common (69.4%) than URTIs (30.6%) ($p < 0.001$). The most common diagnoses were acute viral respiratory tract infection (41.5%), pharyngitis (28.9%) among URTIs and acute bronchitis (52.1%) among LRTIs (Fig. 2).

Only 3 microbiological tests had been done (0.3% from all RTIs). No one strepA test was performed.

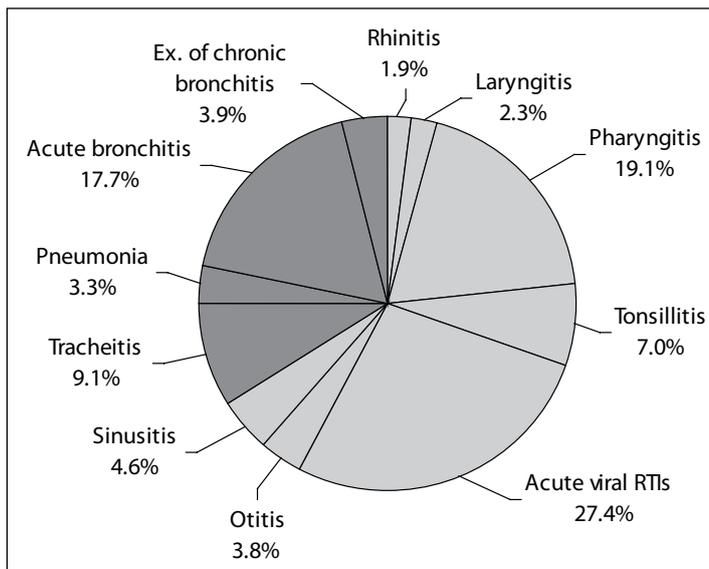


Fig. 2. Structure of respiratory tract infections

Antibiotic prescription rates

In total 33.3% (589, 95% CI, 31.1-35.6%) patients with any infection were treated with antibiotics and 723 antibiotics were prescribed (prevalence – 40.9%, 95% CI, 38.7-43.2%).

82.4% of all antibiotics were prescribed for RTIs. Overall 62.6% (600 out of 959) RTIs were treated with antibiotics: LRTIs more frequently (89.0%) than URTIs (56.4%) ($p < 0.001$).

Most frequent pneumonia (90.6%), tonsillitis (88.1%), acute bronchitis (83.5%) were treated with antibiotics. Antimicrobials were prescribed in 41.8% cases of acute viral RTI, 55.7% of pharyngitis (Fig. 3).

In general differences of antibiotic prescription rates among males and females for all RTIs were not statistical significant ($p = 0.087$). Though antibiotics for treatment of URTIs were prescribed more frequently for females (56.0%) than males (47.7%) ($p = 0.042$).

In different age groups antibiotics were prescribed from 57.0% to 64.3% patients with RTIs. In all age groups LRTIs were more frequent treated with antibiotics than URTIs (Table 2).

STRUCTURE OF ANTIBIOTICS

Broad spectrum penicillins (59.5%), macrolides (12.1%), tetracyclines (11.4%) were prescribed most frequently for RTIs. Phoxymethylpenicillin was prescribed only 4 times (0.6%). The structure of prescribed antibiotics between males and females as well as age groups was similar.

Spectrum of antibiotics for URTIs and LRTIs was quite similar - broad spectrum penicillins were mostly prescribed (Fig. 4).

DISCUSSION

Respiratory tract infections are among most common infections worldwide nevertheless their treatment

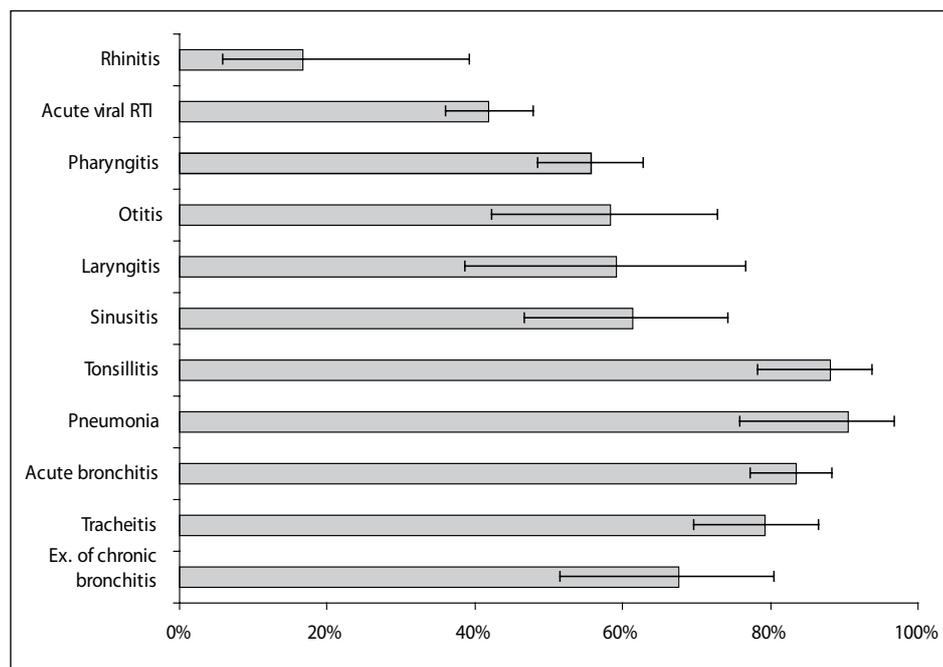


Fig. 3. Prevalence of antibiotic prescription for different RTIs

Table 2. Proportion of infections treated with antibiotics in different age and sex groups

	Proportion of infections treated with antibiotics		
	URTIs % (n)	LRTIs % (n)	All RTIs % (n)
Age groups			
18-30	57.2 (190)	84.9 (96)	64.3 (286)
31-40	54.5 (72)	82.1 (46)	62.8 (118)
41-50	48.2 (40)	81.0 (47)	61.7 (87)
51-65	40.3 (27)	76.8 (43)	57.0 (70)
>65	31.6 (6)	76.7 (33)	63.0 (39)
Sex			
Male	47.7% (112)	82.5 (94)	36.4 (206)
Female	56.0% (223)	80.7 (171)	63.6 (394)
Total	53.0 (335)	81.3 (265)	62.6 (600)

is still under discussions. Almost 10% of the worldwide burden of morbidity and mortality relates to RTIs and three – quarters of all antibiotic are consumed for RTIs [15]. Consequently the optimization of RTI treatment is one of the major topics when antimicrobial resistance issues and rational use of antimicrobials is discussed.

Results of our study confirmed that RTIs are very common complaint among patients consulting their primary care physicians. The highest prevalence of

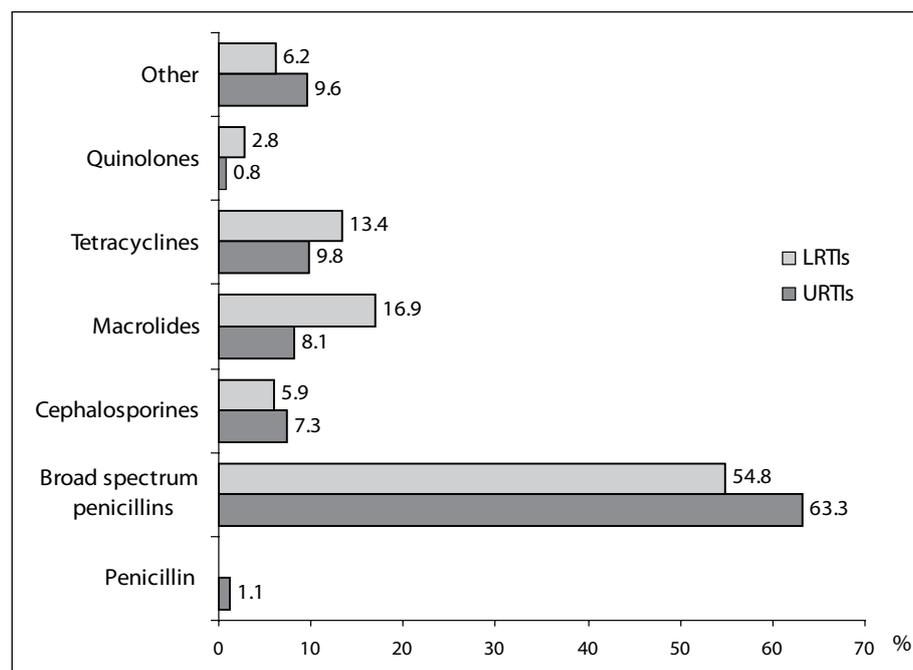
RTIs was determined among young adults. It could be explained by the fact that they are mainly working people and need sick – leaves so it might be they are addressing to family doctors with mild symptoms.

Our study showed that more than a half of RTIs (62.6%) were treated with antibiotic. It's quite high rate comparing with other countries. In Netherlands 34% of consultations for URTIs and in 30% of consultations for LRTIs an antibiotic is prescribed and about half of these prescriptions are estimated to be unnecessary [2]. Our study showed higher antibiotic prescription rates: most of LRTIs (89.0%) and more than half of URTIs (56.4%) were treated with antibiotics. Antibiotic prescribing in Netherlands is under control comparing with other countries. In Lithuania it could be bigger proportion of unnecessary prescriptions because microbiological tests or rapid diagnostic tests aren't performed to confirm bacterial infection.

As it was mentioned, most of RTIs are self limiting and although predominantly viral in origin. But antibiotics are prescribed widely. Sometimes physicians are confirmed that antimicrobial treatment helps to shorten disease or to avoid complications [16, 17]. But studies showed that antibiotics don't shorten the duration of RTIs they just can shorten term of symptoms for one day or few hours [2, 16].

The particular attention should be concentrate on treatment of acute viral RTIs. It is evident but commonly ignored that antibiotics are inefficient for viral infections and neither destroy viruses, nor hasten

convalescence nor lower risk of complications. This study showed that 41.8% of acute viral RTIs were treated with antibiotics and this not significantly differed from situation 12 years ago [11]. The similar situation is in some countries with higher antimicrobial resistance. In France 50% of viral RTIs are treated with antibiotics, in Great Britain – 52%, in United States – 51% [20-22]. One study in USA showed that antibiotics were prescribed to adults in 73% sore throat cases, while it's known from different sources that only 5-10% of them are caused by bacteria [18, 23, 24].

**Fig. 4.** Structure of prescribed antibiotics for the treatment of URTIs and LRTIs

It's more likely that antibiotics in this situation are prescribed not for treatment of diagnosed infection but to avoid complications. Unfortunately use of antibiotics for non – bacterial or self – limiting bacterial infections cause adverse reactions and stimulates development of antimicrobial resistance. Wide spread resistant to antibiotics bacterium such as *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Moraxella catarrhalis* become global public health problem [25, 26].

Correct diagnosis of bacterial infection is the key element reducing unnecessary antibiotic prescribing. In Lithuanian primary care settings microbiological tests are still used very rarely – only 0.3% of RTIs were tested in our study. Rapid antigen testing is supplanting microbiological culturing whenever it's available and this is a case with streptococcal pharyngitis. Antigen testing for group A streptococci is commonly used in Scandinavian countries and it may also add to the reduction of antimicrobial use. In a group of patients in whom a rapid streptococcal test was performed, 66.1% were prescribed an antibiotic compared with 83% of the group where no test was performed [27]. In Burgundy free delivery of rapid diagnostic tests to practitioners to diagnose pharyngitis was associated with a dramatic antibiotic prescription decrease to 41% [28]. Our study showed that no one strepA test was performed while 55.7% of pharyngitis were treated with antibiotics. These tests are not covered by health insurance and not promoted in Lithuania that's why they are not popular.

Perhaps more striking than the overall rate of antibiotic use is the high rate of prescribing broad – spectrum antibiotics and this study confirmed this. There

is an international trend to prescribe newer and more expensive antibiotics, which by rule should be reserved in case of failure of or intolerance to first choice agents [29]. In the Nordic countries consumption of the newer antibiotics, although increasing, is not yet as prevalent as in southern European countries such as Italy or Spain. Lower RTIs as well as upper RTIs are primarily treated with narrow spectrum penicillins in Scandinavian countries. One survey showed that in Spain family doctors prescribed penicillin V very rarely – it accounted only 5.1% of antibiotics prescribed for tonsillitis, whereas in Denmark – 91.7% [30, 31]. Antibiotic prescribing in outpatient settings is highly dependent on reimbursement peculiarities. In Scandinavian countries narrow spectrum antibiotics are clearly favoured and this is not a case in Lithuania.

CONCLUSIONS

1. RTIs composed 84.1% (959) of all diagnosed infections. URTIs were more prevalent (66.0%, 633) than LRTIs (34.0%, 326).
2. 82.4% prescriptions of antibiotics were for RTIs. Overall 62.6% RTIs were treated with antibiotics, LRTIs more frequently (89.0%) than URTIs (56.4%) ($p < 0,001$).
3. The most frequently prescribed antimicrobials for RTIs were broad spectrum penicillins (59.5%), followed by macrolides (12.1%) and tetracyclines (11.4). Phenoxymethylpenicillin was prescribed only 4 times (0.6%).

Received 17 August 2009, accepted 14 September 2009

References

1. Alastair DH, Thomas M, Montgomery A, Wetherell M, Lovering A. The relationship between primary care antibiotic prescribing and bacterial resistance in adults in the community: a controlled observational study using individual patient data. *Journal of Antimicrobial Chemotherapy*. 2005;56:146-153.
2. Akkerman A, Kuyvenhoven M, Wouden J, Verheij T. Prescribing antibiotics for respiratory tract infections by GPs: management and prescriber characteristics. *British Journal of General Practice*. 2005;55(511):114-118.
3. Regional drug and therapeutics centre. Antibiotic prescribing. *Drug Update*. 1999;(7).
4. Hueston WJ, Dickerson L. Antibiotic resistance and the need for rational use of antibiotics. *J Med Liban*. 2001;49(5):246-56.
5. Gill JM, Fleischut P, Haas S, Pellini B, Nash DB. Use of antibiotics for adult upper respiratory tract infections in outpatient settings: a national ambulatory network study. *Family Medicine*. 2006;38(5):349-54.
6. Diekema DJ, Bruggemann AB, Doern GV. Antimicrobial – drug use and changes in resistance in *Streptococcus Pneumoniae*. *Emerging Infectious Diseases*. 2000;5(6):552-556.
7. Coenen S, Van Royen P, Michiels B, Denekens J. Optimizing antibiotic prescribing for acute cough in general practice: a cluster randomized controlled trial. *The Journal of Antimicrobial Chemotherapy*. 2004;54(3):661-672.
8. Sabuncu E, David J, Bernede-Bauduin C, Pepin S, Leroy M, Boelle PY, Watier L, Guilletot D. Significant reduction of antibiotic use in the community after nationwide campaign in France, 2002-2007. *PLoS Med*. 2009;6(6):e1000084.
9. Goossens H, Guilletot D, Ferech M, Schlemmer B, Costers M, Breda M, Baker LJ, Cars O, Davey PG. National campaigns to improve antibiotic use. *European Journal of Clinical Pharmacology*. 2006;62(5):373-379.
10. Valintėlienė R, Kalibatas J. Antimikrobinių vaistų skyrimo optimizavimas bendrosios praktikos gydytojo darbe. *Visuomenės sveikata*. 2003;1(20):9-12.
11. Valintėlienė R, Stefanovič A, Kalibatas J, Žagminas K, Jurkuvėnas V. Antibakterinių vaistų skyrimas viršutinių kvėpavimo takų infekcijoms gydyti Lietuvos poliklinikose. *Visuomenės sveikata*. 2002;2(17):28-32.
12. Mačiulaitis R, Petrikaitė V, Aukštakalnierė A, Janušonis T. Racionalus vaistų vartojimas. *Medicina*. 2006;42(12):999-1005.
13. Jurkuvėnas V, Valintėlienė R, Ašembergienė J, Griškevičienė J. Antibiotikų vartojimas Lietuvos stacionaruose. *Visuomenės sveikata*. 1997;3(3):32-40.
14. Palekauskaitė A, Valintėlienė R. Antibiotikų vartojimas ligoninėse ir tam įtakos turintys veiksniai. *Visuomenės sveikata*. 2008;3(42):63-69.

15. Ball P, Baquero F, Car O, File T, Garau J, Klugman K, Low DE, Rubinstein E, Wise R. Antibiotic therapy of community respiratory tract infections: strategies for optimal outcomes and minimized resistance emergence. *Journal of Antimicrobial Chemotherapy*. 2002;49:31-40.
16. Arrol B, Kenealy T. Antibiotics for the common cold. *Cochrane Database Syst Rev*. 2002;(3):CD000247.
17. McIsaac WJ. Antibiotics for lower respiratory tract infections. Still too frequently prescribed? *Canadian Family Physician*. 2004;50:569-575.
18. Sheller RD, Little P. Rapid streptococcal testing for sore throat and antibiotic resistance. *Clinical microbiology and infection*. 2006;12(9):2-7.
19. Valintėlienė R, Stefanovič A, Kalibatas J, Žagminas K, Jurkuvėnas V. Antibakterinių vaistų skyrimas viršutinių kvėpavimo takų infekcijoms gydyti Lietuvos poliklinikoje. *Visuomenės sveikata*. 2002;2(17):28-32.
20. Sommet A, Sermet C, Boelle PY, Tafflet M, Bernade C, Guillemot D. No significant decrease in antibiotic use from 1992 to 2000 in the French community. *Journal of Antimicrobial Chemotherapy*. 2004;54(2):524-8.
21. Ashworth M, Latinovic R, Charlton J, Cox K, Rowlands G, Gulliford M. Why has antibiotic prescribing for respiratory illness declined in primary care? A longitudinal study using the General Practice Research Database. *Journal of Public Health care*. 2004;26(3):268-74.
22. Steinman MA, Landefeld CS, Gonzales R. Predictors of broad spectrum antibiotic prescribing for acute respiratory tract infections in adult primary care. *The Journal of the American Medical Association*. 2003;289(6):719-25.
23. Matuzevičius A. BPG skiriamo ūminio faringotonzilito gydymo antibiotikais pagrįstumas. *Lietuvos bendrosios praktikos gydytojas*. 2003;11:722-726.
24. Cooper RJ, Hoffman JR, Bartlett JG, Besser RE, Gonzales R, Hickner JM, Sande MA. Principles of appropriate antibiotic use for acute pharyngitis in adults: background. *Ann Intern Med*. 2001;134(6):509-17.
25. Sahn DF, Jones ME, Hickey ML, Diakun DR, Mani SV, Thornsberry C. Resistance surveillance of *Streptococcus pneumoniae*, *Haemophilus influenzae* and *Moraxella catarrhalis* isolated in Asia and Europe, 1997-1998. *Journal of Antimicrobial Chemotherapy*. 2000;45(4):457-66.
26. Morrissey I, Robbins M, Viljoen L, Brown DFJ. Antimicrobial susceptibility of community acquired respiratory tract pathogens in the UK during 2002/3 determined locally and centrally by BSAC methods. *Journal of Antimicrobial Chemotherapy*. 2005;55(2):200-208.
27. Čižman M, Srovin T, Pokorn M, Čad Pečar S, Battelino S. Analysis of the causes and consequences of decreased antibiotic consumption over the last 5 years in Slovenia. *Journal of Antimicrobial Chemotherapy*. 2005;55(5):758-763.
28. Portier H, Grappin M, Chavanet P. New strategies for angina case management in France. *Bulletin de l'Academie nationale de medicine*. 2003;187(6):1107-16.
29. Duijn H, Kuyvenhoven M, Schellevis F, Verheij T. Determinants of prescribing of second – choice antibiotics for upper and lower respiratory tract episodes in Dutch general practice. *Journal of Antimicrobial Chemotherapy*. 2005;56(2):420-422.
30. Vaccheri A, Bjerrum L, Resi D, Bergman U, Montanaro N. Antibiotic prescribing in general practice: striking differences between Italy (Ravenna) and Denmark (Funen). *Journal of Antimicrobial Chemotherapy*. 2002;50:989-997.
31. Llor C, Cots JM, Boada A, Bjerrum L, Gahrn-Hansen B, Munck A, Fores D, Miravittles M. Variability of antibiotic prescribing for respiratory tract infections in two European countries. *Enferm Infecc Microbiol Clin*. 2005;23(10):598-604.

Suaugusių žmonių kvėpavimo takų infekcijos ir jų gydymas antibiotikais Lietuvos pirminės sveikatos priežiūros įstaigose

Asta Palekauskaitė¹, Rolanda Valintėlienė¹, Aušra Beržanskytė^{1, 2}

¹Higienos institutas

²Vilniaus universiteto Medicinos fakultetas

Santrauka

Tyrimo tikslas – nustatyti antibiotikų skyrimo ypatumus Lietuvos pirminės sveikatos priežiūros įstaigose gydančių suaugusių žmonių kvėpavimo takų infekcijas.

Tyrimo metodai. Atliktas aprašomasis retrospektyvinis paplitimo tyrimas septyniuose atsitiktinai atrinktos būdu atrinktoje pirminės sveikatos priežiūros įstaigose. Kiekvienoje pirminės sveikatos priežiūros įstaigoje klasteriniu metodu atrinkta ne mažiau kaip po 7 ligonių ambulatorinės kortelės iš 30 atsitiktinai atrinktų vietų (t. y. ne mažiau kaip po 210 ambulatorinių kortelių). Išanalizuotos 1 767 kortelės tų suaugusių ligonių, kurie 2004 m. lankėsi pas gydytoją.

Rezultatai. Dažniausiai nustatytos kvėpavimo takų infekcijos (KTI) – 84,1 proc. (959 atvejai). KTI paplitimas – 54,3 proc. Viršutinių kvėpavimo takų infekcijų (VKTI) diagnozuota daugiau (66,0 proc.; 633) nei apatinių kvėpavimo takų infekcijų (AKTI) (34,0 proc.; 326). Tyrimo metu nustatyta, kad 62,6 proc. visų KTI buvo gydoma antimikrobiniais vaistais. Dažniau antibiotikų skirta gydančių AKTI (89,0 proc.) negu VKTI (56,4 proc.). Dažniausiai antibiotikais gydyti faringitai (88,1 proc.), pneumonijos

(90,6 proc.), ūmūs bronchitai (83,5 proc.). Kvėpavimo takų infekcijoms gydyti dažniausiai buvo skiriama plataus veikimo spektro penicilinų (59,5 proc.), makrolidų (12,1 proc.), tetraciklinų (11,4 proc.). Siauro veikimo spektro penicilino (fenoksimetilpenicilino) skirta tik 0,6 proc. atvejų. Mikrobiologinis tyrimas atliktas tik 3 kartus, t. y. 0,3 proc. nuo visų kvėpavimo takų infekcijų. Neatlikta nė vieno StrepA testo.

Išvados. Antibiotikų Lietuvos pirminės sveikatos priežiūros įstaigose gydančių kvėpavimo takų infekcijas suaugusiems ligoniams skiriama nepagrįstai ir per dažnai. Dažniausiai skiriami plataus veikimo spektro antibiotikai, o toks antibiotikų vartojimas gali turėti įtakos bakterijų atsparumo didėjimui.

*Adresas susirašinėti: Asta Palekauskaitė,
Higienos institutas,
Didžioji g. 22, 01128 Vilnius.
El. p. asta@hi.lt*

Straipsnis gautas 2009-08-17, priimtas 2009-09-14