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Do high-risk patients with acute lower respiratory tract infection benefit from treatment with amoxicillin?

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Background: Antibiotics are of limited benefit for patients with uncomplicated lower respiratory tract infections (LRTIs) (Lancet Infect Dis 2013;13:123-9) as well as sub-groups at higher risk of an adverse course (Br J Gen Pract 2014;64:e75-e80). We aimed to estimate the benefit of antibiotic treatment for acute LRTI among patient subgroups with confirmed bacterial infection, confirmed viral infection,

elevated C-reactive protein (CRP), elevated procalcitonin (PCT), and elevated blood urea nitrogen (BUN)

Material/methods: In total, 2061 adults with LRTI were recruited between 2007 and 2010 and given either amoxicillin treatment or placebo. Etiology and levels of PCT, CRP and BUN were determined. We fitted a Cox model for the duration of symptoms (allowing for censoring), a linear regression model for the symptom severity and a logistic regression model for deterioration of the illness. The interaction between a particular subgroup (e.g. patients with confirmed bacterial LRTI) and treatment (e.g. amoxicillin) is used to assess the difference in effectiveness in the subgroups.

Results: Only those patients from whom both a viral (rhinovirus, influenza, coronavirus, respiratory syncytial virus, human metapneumovirus, parainfluenza virus, adenovirus, polyomavirus or bocavirus) and a bacterial (*Streptococcus pneumoniae*, *Haemophilus influenzae*, *Mycoplasma pneumoniae*, *Chlamydia pneumoniae*, *Bordetella pertussis* or *Legionella pneumoniae*) pathogen were isolated, experienced an increased benefit of antibiotics (Table 1). For all other subgroups no benefit of antibiotics was seen. No benefit of antibiotics was found for the duration of symptoms or the symptom severity, both overall and for the different subgroups.

Table 1. Odds of illness deterioration in amoxicillin versus placebo group (95% confidence interval), p-values and number needed to treat (NNT) according to subgroup

Subgroup (%)	Interaction	p-value	Within subgroup	p-value	NNT
Bacterial or viral (62.7)	0.58 (0.36-0.95)	0.029	0.67 (0.50-0.88)	0.005	16.48
Bacterial (20.4)	0.47 (0.27-0.82)	0.007	0.46 (0.29-0.75)	0.002	7.62
Bacterial, not viral (10.8)	0.91 (0.46-1.79)	0.792	0.75 (0.40-1.40)	0.364	19.12
Viral (48.5)	0.66 (0.41-1.04)	0.075	0.64 (0.46-0.90)	0.010	16.24
Viral, not bacterial (38.9)	1.12 (0.69-1.81)	0.639	0.87 (0.59-1.27)	0.464	52.98
Bacterial + viral (9.6)	0.26 (0.11-0.59)	0.001	0.24 (0.11-0.53)	<0.001	4.55
Top 25% PCT [> 0.058](23.3)	0.62 (0.36-1.06)	0.079	0.55 (0.35-0.86)	0.010	10.42
Top 25% Ureum [> 36.7](23.0)	1.15 (0.67-1.99)	0.605	0.88 (0.55-1.41)	0.593	53.01
Top 25% CRP [> 1.5](23.2)	1.03 (0.60-1.75)	0.927	0.80 (0.51-1.27)	0.350	29.88

Conclusions: Antibiotic treatment reduces the odds of illness deterioration in patients from whom both a viral and a bacterial pathogen were isolated. Antibiotic treatment does however not reduce the mean symptom severity nor does it shorten the duration of symptoms.