

The risk of upper respiratory tract bacterial infections among HIV-positive patients is high for young MSM with detectable HIV RNA

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Background

- The risk and characteristics of upper respiratory tract (URT) bacterial infections (URT-BI) among HIV (+) patients is understudied.
- We analyzed factors associated with its occurrence and the spectrum of pathogens among patients routinely followed at the HIV Out-Patient Clinic in Warsaw.

Methods

- All symptomatic HIV (+) patients with available URT swab culture were included into analyses.
- Patients were followed from the day of registration in the clinic until first positive URT swab culture or last clinical visit.
- Cox proportional hazard models were used to identify factors associated with positive URT swabs culture (those with $p < 0.1$ in univariate included into multivariable).

Results

- In total 474 patients were included into the analyses, 166 with positive URT swab.
- In general 416 (87.8%) man, 342 (72.1%) infected through MSM contact, 253 (53.4%) on antiretroviral therapy.
- Median follow-up time was 3.4 (1.3-5.7) years, age 35.2 (30.6-42.6) years and CD4+ count 528 (400-685) cells/ μ l.
- The most common pathogens were *S. aureus* (40.4%) and *S. pyogenes* (13.9%) (Table 1).
- Patients with URT-BI were more likely to be MSM (68.5% vs 78.9%; $p < 0.016$), have detectable viral load (20.9% vs 12.0%; $p < 0.0001$) and CD4+ cell count < 500 cells/ μ l (55.2% vs 39.0%; $p = 0.003$) (Table 2).
- In multivariate survival analyses detectable viral load (HR 3.13; 95%CI: 2.34-4.19) and MSM (1.63; 1.09-2.42) were increasing, but older age (0.63; 0.58-0.69, per 5 years older) and higher CD4+ count (0.90; 0.85-0.95, per 100 cells/ μ l) decreasing the risk of URT-BI (Table 2).

Conclusions

- URT BI are common among HIV (+) positive patients with high CD4+ count.
- Similarly to general population most common pathogens are *S. aureus* and *S. pyogenes*.
- Risk factors identified in multivariate survival analysis indicate that younger MSM patients with detectable HIV viral load are at highest risk.
- In clinical practice this group of patients requires special attention.

Table 1. Pathogens identified in upper respiratory tract swab cultures.

Identified pathogen	N	%
Total number	474	100
2 types of bacteria	10	6
3 types of bacteria	1	0,6
Citrobacter spp	1	0,6
Enterobacter aerogenes	1	0,6
Enterobacter cloace	2	1,2
Enterococcus agglomerens	1	0,6
Escherichia coli	2	1,2
Haemophilus influenzae	11	6,6
Haemophilus parainfluenzae	5	3,6
Klebsiella pneumoniae	10	6
Moraxella catarrhalis	1	0,6
Proteus mirabilis	1	0,6
Serratia marscescens	1	0,6
Streptococcus group C, F, G	15	9,02
Staphylococcus aureus	67	40,4
Staphylococcus epidermidis	1	0,6
Staphylococcus haemolyticus	1	0,6
Streptococcus agalactiae	1	0,6
Streptococcus pneumoniae	9	5,4
Streptococcus pyogenes	23	13,9
Streptococcus viridans	1	0,6

Table 2. Univariate and multivariate logistic regression models for positive upper respiratory tract swab culture.

Variable	Univariate		Multivariate*		
	HR (95% CI)	P value	HR (95% CI)	P value	
Age in years (per 5 years)	0.90 (0.88-0.92)	<0.0001	0.91 (0.89-0.93)	<0.0001	
Last CD4+ cells/ μ l (per 100)	0.99 (0.98-0.99)	<0.0001	0.99 (0.99-1.00)	0.0005	
Last CD8+ cells/ μ l (per 100)	1.00 (1.00-1.00)	<0.0001	1.00 (1.00-1.00)	0.12	
HIV RNA >50 copies/ml	6.36 (4.64-8.73)	<0.0001	3.13 (2.34-4.19)	<0.0001	
Route of inf. heterosexual	MSM	2.10 (1.28-3.45)	0.003	1.63 (1.09-2.42)	0.01
	IDU	1.76 (0.85-3.66)	0.12	0.90 (0.57-1.43)	0.66
	Unknown	3.23 (1.20-8.72)	0.02	2.27 (0.99-5.20)	0.005
Male gender	1.83 (1.03-3.22)	0.03	-	-	
On antiretroviral treatment	0.90 (0.66-1.22)	0,50	-	-	

* Adjusted for all variables significant ($p < 0.1$) in univariable analyses

Figure 1. Probability of a positive culture result according to Kaplan Meier with stratification relative to the route of infection (Log-Rank $p = 0.0137$)

