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Antimicrobial resistance patterns in Neisseria gonorrhoeae isolates from men having sex with men – results from the first prospective cohort in Poland

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Background

The rate of gonorrhea is much higher in men having sex with men (MSM) than ingeneral population [1-2]. Neisseria gonorrhoeae (NG) has developed resistance to nearly all antibiotics used for its treatment [1]. Little up-to-date data is available regarding antimicrobial resistance of NG isolates among MSM in Poland. The aim of this study was to evaluate the susceptibility of NG isolates in this key population.

Methods

200 MSM living with HIV or using HIV pre-exposure prophylaxis (PrEP) from Wroclaw All Saints' outpatient clinic were included between 10.2022 and 4.2024 – full patient characteristic see Table 1. Inclusion criteria were age over 18 years, identifying as MSM, presenting with symptoms suggesting NG infection or PCR smears positive for NG, having sexual partner with positive PCR results and/or symptoms or having multiple sexual partners in the last three months. We investigated antimicrobial susceptibility of NG isolates to six antimicrobials: ceftriaxone, cefixime, azithromycin, ciprofloxacin, tetracycline and benzylpenicillin. Minimum inhibitory concentrations (MICs; mg/l) were determined using Etest on gonococcal isolates. Patients filled out an online behavioral questionnaire before the swabs collection.

Results

200 high-risk MSM were included in the study. 67 living with HIV and 133 HIV-negative using PrEP. The rate of NG infection was 23% (46 isolates/200 patients) with positive cultures from urethral (25), oropharyngeal (12) and rectal (9) sites.

We were able to obtain resistance profiles for 43 isolates – see Table 2 and Figure 1. All NG isolates were susceptible to cefixime and ceftriaxone. Susceptibility to azithromycin was found in 69.7% (30/43) of the NG isolates and resistance in 30.3 (13/43). Susceptibility to tetracycline was found in 51% (22/43) and resistance in 49 (21/43) of the isolates.

PrEP users were younger, had more sexual partners (more often foreign; p=0.022) and had more oral sexual contacts. Condom use both during oral and anal sexual contacts did not differ between the two groups (p=0.757 and 0.875 accordingly).

PrEP use or living with HIV, doxyPEP use, engaging in chemsex, previous STIs, sex with Polish citizens exclusively or also with foreigners as well as place of living did not corelate with NG diagnosis nor resistance profile. Having sex also with women (p=0.0389) and more oral contacts (p=0.0472) were the only factors corelating with NG positive cultures.

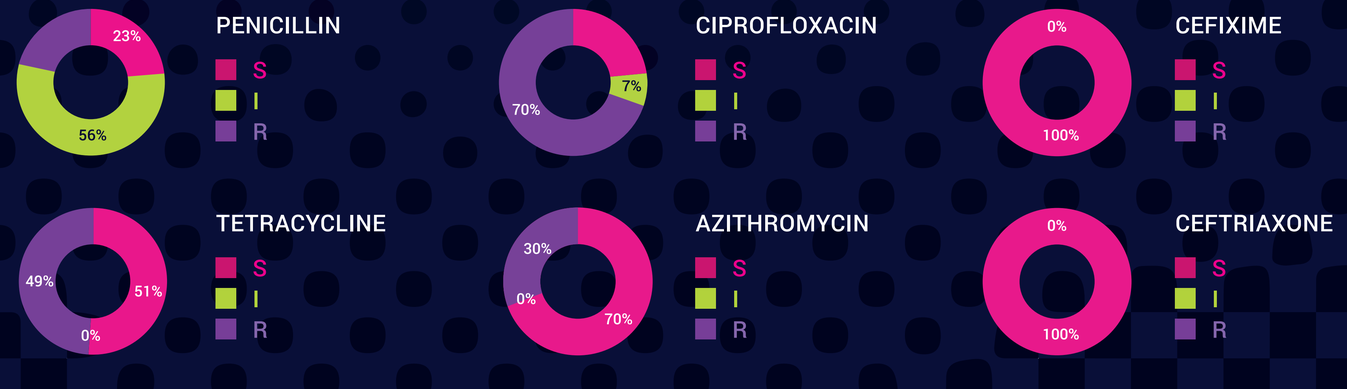
Tab. 1. Patients characteristics

	PrEP	PLWH	p
Number of patients ∑=200; n [%]	134 [67]	66 [33]	NA
Age [years], median [IQR]	34 [28-39]	36 [32-42]	0.0104
Exclusively MSM ∑=188; n [%]	128 [68.1]	60 [31.9]	0.196
Bisexual patients ∑=12; n [%]	6 [50]	6 [50]	0.196
Polish partners only ∑=123; n [%]	75 [61]	48 [39]	0.022
Sex with foreigners ∑=77; n [%]	59 [76.6]	18 [23.4]	0.022
History of STIs ∑=166; n [%]	109 [65.7]	57 [34.3]	0.505
DoxyPEP use ∑=39; n [%]	19 [48.7]	20 [51.3]	0.0194
Engaging in chemsex ∑=86; n [%]	55 [64]	31 [36]	0.426
No of sexual partners in the last 3 months, median, [IQR]	5 [2-10]	4.5 [2-8]	0.0136
No of oral sexual contacts in the last month, median, [IQR]	5 [2-10]	3 [2-6]	0.0222
No of anal sexual contacts in the last month, median, [IQR]	3 [2-7]	3 [1-5]	0.0749
Symptomatic infections ∑=101; n [%]	72 [71.3]	29 [28.7]	0.147
Positive NG cultures ∑=46 (two patients had cultures positive from two sites); n [%]	31 [67.4]	15 [32.6]	0.801

Tab. 2. Antimicrobial susceptibility of NG isolates

	PENICILIN	CEFIXIME	CEFTRIAXONE	CIPROFLOXACIN	TETRACYCLINE	AZITHROMYCIN
	isolates; n [%]	isolates; n [%]	isolates; n [%]	isolates; n [%]	isolates; n [%]	isolates; n [%]
S – susceptible	10 [23.3]	43 [100]	43 [100]	10 [23.3]	22 [51.2]	30 [69.8]
I - Intermediate	24 [55.8]	0	0	3 [7]	0	0
R - resistant	9 [20.9]	0	0	30 [69.8]	21 [48.8]	13 [30.2]
Total	43 [100]	43 [100]	43 [100]	43 [100]	43 [100]	43 [100]

Figure 1. Antimicrobial susceptibility of NG isolates (pie charts) - S-sensitive, I-intermediate, R-resistant



Discussion

Our data show that resistance profiles follow European trends [2]. Azithromycin resistance of 30.8% has been higher than European reports [1-4] which might be the result of increasing resistance, more prevalent resistance among MSM who use azithromycin more commonly or regional difference. There is scarcity of such reports for our region and almost no longitudinal monitoring even among mostly impacted populations.

Oral exposures have been left out in educational campaigns as they are less risky for HIV transmission. However, for other STIs (syphilis, gonorrhoea, chlamydiosis, etc.) oral sexual contacts, kissing and using saliva as lubricant can lead to transmission and harm reduction strategies are often not followed.

PrEP users being younger, having slightly more sexual partners and more oral contacts are all factors that corelate with increased risk of STI transmission [5-6]. This group requires additional prevention strategies that include easy access to free testing and treatment as younger patients are more resource-limited. Similarly, doxyPEP more commonly utilized by PLWH might reflect their better access to medical care than PrEP users.

Conclusions

All isolates remain susceptible to cephalosporins. Increasing azithromycin resistance is especially concerning for future treatment options, especially if ceftriaxone/cefixime resistance starts to develop. Resistance to azithromycin in 30% of isolates should prompt changes in the combined treatment guidelines for NG. Easy testing for populations at risk is needed including monitoring of resistance patterns, their dynamics and spread, especially taking into account prevalent oral contacts and almost no condom use in both groups. Systemic approach to STIs and PrEP are needed in Poland. DoxyPEP partial efficacy for NG might decrease soon as rapid increase in doxycycline resistance in this group of patients is highly probable.

Limitations

Relatively small group size, limited senstivity of bacterial cultures and lack of universal PCR verification might all have impacted the conclusions for factors related to NG infection. Bacterial resistance profiles are representative for MSM from the clinic's vicinity and might not be representative for the whole of Poland and other populations.

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