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Cephalosporin-Resistant *Neisseria gonorrhoeae* Clone, China

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Cephalosporin-resistant *Neisseria gonorrhoeae* is a major public health concern. *N. gonorrhoeae* of multiantigen sequence type G1407 and multilocus sequence type 1901 is an internationally spreading cephalosporin-resistant clone. We detected 4 cases of infection with this clone in China and analyzed resistance determinants by using *N. gonorrhoeae* sequence typing for antimicrobial resistance.

Gonorrhea, the second most prevalent sexually transmitted infection (STI) globally, remains a major public health concern in China. From 2015 to 2016, the reported cases of gonorrhea in China increased by 14.7% (100,245 to 115,024) (1). The extended-spectrum cephalosporin ceftriaxone has been recommended as monotherapy to treat gonorrhea in China since 2007 (2), but resistance to this drug emerged almost at the same time (3). Presently, the transmission of internationally spread cephalosporin-resistant clones in China has become a threat to effectively controlling gonorrhea (4). Strains with *N. gonorrhoeae* multiantigen sequence type (NG-MAST) G1407 and multilocus sequence type (MLST) 1901 have been successful clones associated with cephalosporin resistance and have caused clinical treatment failures in France and Spain (5,6); these strains have also become the predominant clones in the United Kingdom (7) and Japan (8) and among US men who have sex with men (9). Here we report 4 cephalosporin-resistant NG-MAST G1407/MLST 1901 clones identified out of 2,038 isolates collected through China's Gonococcal Resistance Surveillance Program during 2015–2016.

Demographic and clinical information for the 4 case-patients are summarized in online Technical Appendix Table 1 (<https://wwwnc.cdc.gov/EID/article/24/4/17-1817-Techapp1.xlsx>). All case-patients were adult men; gonococcal isolates were obtained from urethral swab samples. The 4 men had obvious urethral discharge and were diagnosed with acute urethritis. Gram staining and culture of the urethral swabs were positive for gonococcal infection. One of the 4 patients self-reported being a man who has sex with men. One of the infections, occurring in Zhejiang Province, was treated with a single-dose regimen of spectinomycin (4 g); the other 3 infections, occurring in the municipality of Chongqing, were treated with a 2-dose regimen of ceftriaxone (1 g) administered over 2 days. Test-of-cure follow-ups were not performed.

All strains were transferred to the reference laboratory at the National Center for Sexually Transmitted Disease Control, Chinese Center for Disease Control and Prevention. Gram staining, a rapid oxidase reaction test, and a carbohydrate utilization test confirmed the identification of *N. gonorrhoeae*. We determined antimicrobial susceptibility to ceftriaxone (CRO), cefixime (CFM), spectinomycin (SPT), azithromycin (AZM), ciprofloxacin (CIP), and

Table. MICs of antimicrobial drugs for *Neisseria gonorrhoeae* isolates from 4 case-patients with cephalosporin-resistant NG-MAST G1407/MLST 1901 infections identified through the national Gonococcal Resistance Surveillance Program, China, 2015–2016*

Case-patient no.	MIC, mg/L						
	CRO	CFM	CIP	PEN	SPT	AZM	PPNG
1	0.5/R	0.5/R	8/R	16/R	16/S	1/S	No
2	0.5/R	1/R	32/R	16/R	32/S	0.5/S	No
3	0.5/R	0.5/R	32/R	16/R	32/S	1/S	No
4	0.25/R	0.5/R	32/R	16/R	64/S	1/S	No

*AZM, azithromycin; CFM, cefixime; CIP, ciprofloxacin; CRO, ceftriaxone; MLST, multilocus sequence type; NG-MAST, *N. gonorrhoeae* multiantigen sequence type; PEN, penicillin; PPNG, penicillinase-producing *N. gonorrhoeae*; R, resistant; S, susceptible; SPT, spectinomycin.

penicillin (PEN) by using the agar dilution method. We detected β -lactamase (penicillinase)-producing *N. gonorrhoeae* isolates by using a nitrocefin solution filter paper test. These strains were resistant to CRO, CFM, PEN, and CIP but susceptible to AZM and SPT based on susceptibility and resistance breakpoints from the European Committee on Antimicrobial Susceptibility Testing (http://www.eucast.org/clinical_breakpoints) (Table). MICs of ceftriaxone ranged from 0.25 to 0.50 mg/L, and MICs of cefixime ranged from 0.5 to 1.0 mg/L.

We performed NG-MAST and MLST genotyping to identify the sequence types (10). MLST showed all 4 strains to be type 1901, and NG-MAST showed the Zhejiang strain to be sequence type (ST) 10332 and the Chongqing strains to be ST1407. ST10332 has a 2-basepair difference in the *porB* (*porB6067*) gene from that of ST1407 (*porB908*) and belongs to genogroup G1407. We used *N. gonorrhoeae* sequence typing for antimicrobial resistance (NG-STAR) to identify the characteristics of resistance determinants (11). NG-STAR showed 2 of the Chongqing strains to be ST90; the third Chongqing strain was ST194. The strain isolated in Zhejiang was ST507. All 4 strains had type XXXIV mosaic *penA* (*penA* 34.001), –35A Del in the *mtrR* promoter (*mtrR1*), G120K-A121N/D in *PorB* (*PorB8/11*), L421P in *PonA* (*PonA1*), S91F-D95A/G in *GyrA* (*GyrA1/7*), S87R in *ParC* (*ParC3*), and wild-type 23srRNA (23 srRNA0) (online Technical Appendix Table 2).

We conclude that the internationally reported cephalosporin-resistant NG-MAST G1407/MLST 1901 *N. gonorrhoeae* clone has spread into China. Genotyping and resistance determinants analysis showed similarity to the predominant G1407/MLST 1901 clone reported in other regions (7–9), indicating that importation into and transmission within China has occurred. Our findings suggest that increased monitoring of this clone by China's Gonococcal Resistance Surveillance Program will be vital for monitoring trends in antimicrobial resistance.

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***Chlamydia trachomatis* in Cervical Lymph Node of Man with Lymphogranuloma Venereum, Croatia, 2014¹**

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We report an HIV-infected person who was treated for lymphogranuloma venereum cervical lymphadenopathy and proctitis in Croatia in 2014. Infection with a variant L2b genotype of *Chlamydia trachomatis* was detected in a cervical lymph node aspirate. A prolonged course of doxycycline was required to cure the infection.

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Lymphogranuloma venereum (LGV) is a sexually transmitted infection caused by serovars L1, L2, and L3 of the bacterium *Chlamydia trachomatis*. The infection typically causes genital ulcers, proctitis, or femoral/inguinal lymphadenopathy with or without constitutional symptoms. In the past decade, outbreaks of LGV have been reported in North America, Australia, and Europe, mainly as proctitis among HIV-infected men who have sex with men (MSM) (1). We report a patient with pharyngitis, proctitis, and cervical lymphadenitis in whom LGV-specific DNA was detected by real-time reverse transcription PCR (RT-PCR) in a cervical lymph node fine-needle aspirate.

The patient was a 48-year-old, HIV-positive man in Croatia who came to an outpatient HIV clinic in August 2014 with perianal pain for 10 days and bloody rectal discharge with normal stool consistency. He also reported a painful, enlarged cervical lymph node but did not have a sore throat. On the first day of the illness, he had fever, which subsided the next day. He reported having unprotected receptive anal and oral sex with other men while visiting Berlin, Germany, 2 weeks earlier. Clinical examination demonstrated exudate on the right tonsil, a painful and enlarged right cervical lymph node (5 × 2 cm) (online Technical Appendix Figure, <https://wwwnc.cdc.gov/EID/article/24/4/17-1872-Techapp1.pdf>), perianal pain on palpation, and a purulent rectal discharge.

The patient was given a diagnosis of HIV infection in 2002 and had been receiving antiretroviral therapy since July 2002. Plasma viremia had been undetectable since October 2002, and his CD4+ T-cell count before this illness was 2,082 cells/mm³. His clinical history included treatment for neurosyphilis, epilepsy, and diarrhea caused by *Microsporidiae* spp., *Blastocystis hominis*, and *Entamoeba histolytica*.

During examination at the HIV clinic, specimens were obtained from the pharynx, rectum, and urine for culture and a nucleic acid amplification test (NAAT). During fine-needle aspiration of a cervical lymph node, ≈1 mL of pus was removed and analyzed. The lymph node aspirate and a rectal swab specimen were positive for *C. trachomatis* DNA by the *C. trachomatis/Neisseria gonorrhoeae* RT-PCR (Abbott Laboratories, Abbott Park, IL, USA).

Cytologic examination of the fine-needle aspirate of the affected lymph node predominantly showed elements of granulomatous inflammation. An indirect immunofluorescence assay serum test result for *C. trachomatis* antibodies was positive (IgG titer >1:512, IgA titer 1:256). Test results for *N. gonorrhoeae* were negative (culture of the rectal swab and NAAT for urine and rectum). Results of a throat culture for *Streptococcus pyogenes* and routine lymph node aspirate culture for bacteria were also negative. Serum serologic test results were negative for acute infection with *Treponema pallidum*, *Bartonella* spp., and *Toxoplasma gondii*.