

IN VITRO SUSCEPTIBILITY OF LOCAL *NEISSERIA GONORRHOEAE* ISOLATES TO ERTAPENEM

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BACKGROUND

- Over the last two decades *N gonorrhoeae* (NG) has developed resistance to every class of recommended antibiotics, including the final class of cephalosporins
- Loss of first line therapies for this organism has left limited options for treatment
- Alternative therapies for NG are desperately needed
- The New Orleans STD clinic is a CDC Gonorrhea Isolates Surveillance Program (GISP) collection site
- Ertapenem (ERT) has been considered as a potential option for the treatment of NG as a single intramuscular injection
- Five previous studies have investigated the susceptibility of NG to ERT. The most notable one performed in the UK showed that as ceftriaxone minimum inhibitory concentrations (MICs) rose, MICs to ERT fell
- The MIC ranges for ERT in these studies were 0.002 µg/L to 0.5 µg/L
- The purpose of this study was to determine the in vitro sensitivity of NG to ERT from local isolates

METHODS

The E-test method was utilized for susceptibility testing on confirmed NG isolates previously identified by NAAT and culture

- A total of 151 isolates from 2014 were thawed and prepared for E-testing using the following steps:
 - Inoculation and incubation of Thayer-Martin plates at 35°C in 5% carbon dioxide for 24 hours
 - Confirmation of purity by sub-culture on to non-selective chocolate agar plates and re-incubated
 - Suspension of culture diluted to a McFarland standard of 0.5 (108 CFU/mL) in Mueller Hinton (MH) Broth and plated onto MH plates

METHODS continued

- Antibiotic E-test strips for ertapenem, ceftriaxone, azithromycin, and gentamicin were placed onto the inoculated chocolate MH plates (Image 1)
- Quality Control strains of *Haemophilus influenzae*, *Escherichia coli* and NG were also prepared in the same manner
- The MICs for each isolate were recorded and compared to CLSI values

RESULTS

	Azithromycin	Gentamicin	Ceftriaxone	Ertapenem
MIC range	0.023 to 32	1.5 to 6	<0.002 to 0.09	0.002 to 0.19
MIC for 90% of isolates	<1	<5	<0.006	<0.008
<i>N. gonorrhoeae</i>	<1	0.32 to 8	0.004 - 0.015	--
<i>H. influenzae</i>	≤4	--	≤2	--
<i>E. coli</i>	--	0.5	0.03 - 0.12	--

Minimum Inhibitory Concentrations

- Of the 181 isolates, 30 were eliminated due to contamination or failure of the controls
- Of the remaining 151 isolates Ertapenem MICs ranged from < 0.02 to 0.19, and 146 had MICs of less than 0.12 which is in the susceptible range
- Gentamicin exhibited MICs ranging from 0.25 to 6. Most isolates had an MIC of 4 which is within the susceptible range
- Results for azithromycin were poor with most isolates having an MIC of greater than 0.12
- No isolates resistant to ceftriaxone were identified

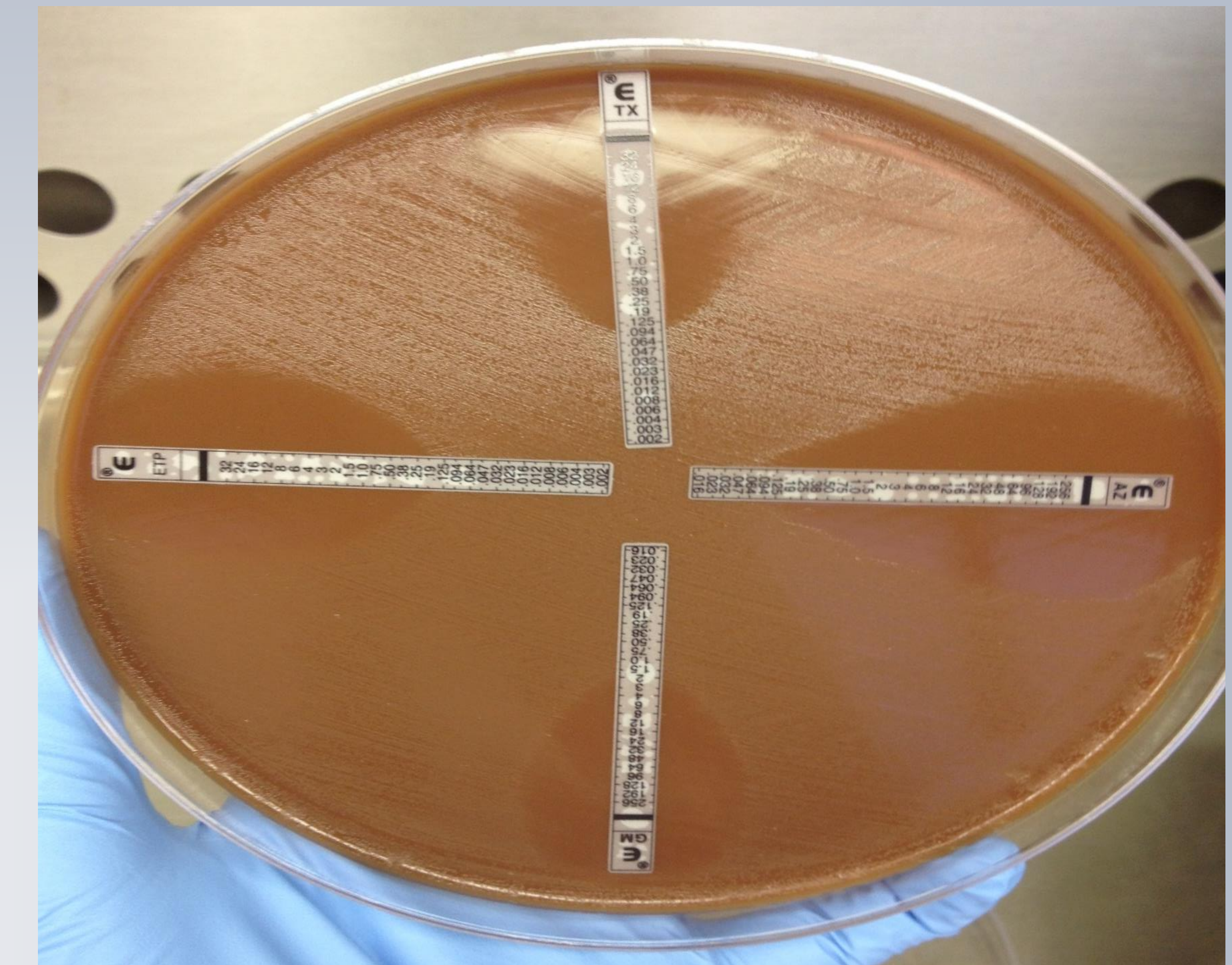


Image 1: E-testing on Mueller Hinton agar comparing four antibiotics

CONCLUSIONS

- Ertapenem had excellent MICs against NG isolates collected in New Orleans.
- Two isolates with increased ertapenem MICs also had increased ceftriaxone MICs. This correlation has not been previously reported.
- Our findings support the 2015 CDC STD Treatment Guidelines recommendation against the use of azithromycin as a single agent for NG.
- Ertapenem *in vitro* susceptibility results were very encouraging for its use as a potential option for the treatment of gonococcal infection.