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Drug susceptibility of non-tuberculous mycobacteria in East London: a four year retrospective review

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Background: Non-tuberculous mycobacteria (NTM) may cause a variety of pulmonary, systemic and more localised infections, particularly in immunocompromised patients. Barts Health NHS Trust (BHNT) in East London provides secondary hospital care to a population of 2.5 million people, as well as tertiary haematology, oncology, cardiothoracic and transplant services. The Infection Services at BHNT work closely with colleagues at the Public Health England (PHE) National Mycobacterial Service South (NMRS-S) to identify potentially pathogenic NTM and undertake appropriate drug susceptibility testing. In this retrospective study we reviewed the NTM resistance patterns from the BHNT population.

Material/methods: All samples positive for NTM species between 01/01/2011 and 31/07/15 were identified from the BHNT microbiology laboratory information management system (LIMS). The data for these isolates were manually reviewed and tabulated; susceptibility testing results were subsequently retrieved from the NMRS-S LIMS and combined with the BHNT data.

Results: In total, 196 isolates underwent susceptibility testing; 62 isolates of *M. abscessus*, 80 isolates of *M. avium/intracellulare* and 26 isolates of *M. kansasii*. Small numbers of other species made up the remainder of the isolates tested.

M. avium/intracellulare isolates underwent only clarithromycin susceptibility testing – 1 *M. avium* isolate was found to be resistant, with the remainder susceptible.

M. kansasii isolates underwent testing against the first line agents rifampicin, isoniazid and ethambutol - all isolates tested were susceptible to all three drugs.

M. abscessus isolates were tested against a panel of up to 10 agents. Isolates were more likely to be resistant than susceptible to most agents; exceptions were amikacin and cefoxitin, where the majority of isolates tested as intermediate. Results are tabulated below:

Drug susceptibilities of <i>Mycobacterium abscessus</i> isolates			
Drug	Number (%)		
	Susceptible	Intermediate	Resistant
Amikacin	18 (29.5)	28 (45.9)	15 (24.5)
Ciprofloxacin	0 (0)	7 (12.3)	55 (88.7)
Clarithromycin	12 (19.4)	4 (6.4)	46 (74.2)
Co-trimoxazole	1 (1.7)	0 (0)	60 (98.3)
Doxycycline	0 (0)	0 (0)	60 (100)
Cefoxitin	2 (3.4)	40 (67.8)	17 (28.8)
Linezolid	9 (14.5)	6 (9.7)	47 (75.8)
Minocycline	0 (0)	3 (6.2)	45 (93.8)
Moxifloxacin	0 (0)	3 (5)	57 (95)
Tobramycin	0 (0)	4 (6.5)	58 (93.5)

Conclusions: Within this cohort, *M. avium*, *M. intracellulare* and *M. kansasii* were susceptible to first line agents in >99% of cases, suggesting that routine drug susceptibility testing may not be necessary for these species. Resistance in *M. abscessus* isolates was much more common; for drugs where resistance was universal or near universal, such as fluoroquinolones, tetracyclines, tobramycin and co-trimoxazole, the benefits of susceptibility testing may be minimal. For drugs with more variable susceptible results, testing may yield benefits; however, data linking in vitro susceptibility testing with clinical outcomes are lacking. Prospective studies are required to correlate drug susceptibility with patient management and outcomes.