

L. Gray, M. Wootton, L. Davies, M. Perry, P. Brookes, R. A. Howe

Introduction

Neisseria gonorrhoeae (NG), the etiological agent of gonorrhoea, causes an estimated 62 million new cases a year. It is the second most common sexually transmitted infection (STI) in men and women aged 15-24 years old. Diagnostic detection of NG has been problematic due to similar taxonomy in the *Neisseria* genus. A number of methods are available; biochemical (API), monoclonal antibody (Phadebact), and more recently Nucleic Acid Amplification Test (NAAT). Matrix Assisted Laser Desorption/Ionisation-Time of Flight (MALDI-ToF) mass spectroscopy is becoming increasingly used in the diagnostic laboratory. This study aims to determine if MALDI-ToF can accurately distinguish NG from 3 commonly misidentified species.

Table 1: Sensitivity, specificity, positive predictive value, negative predictive value

	Sens	Spec	PPV	NPV
Phadebact	100%	91.2%	97%	100%
MALDI-ToF (stringent)	30.2%	93.9%	100%	33%
MALDI-ToF (Relaxed)	98.9%	100%	97.9%	94.3%

Methods

96 NG isolates were recovered from genital and eye samples of patients attending GPs or genitourinary clinic over a 6 month period. All NG isolates were identified using Phadebact monoclonal NG kits and MALDI-ToF (Bruker Daltronics Biotyper 3.0), confirming ID using NAAT. A control strain *N. gonorrhoeae* NCTC 12700 was also tested. Further non NG isolates; 13 *Neisseria meningitidis* (NM), 18 *Moraxella catarrhalis* (MC) and 2 *Kingella dentrificans* (KD) were analysed with MALDI-ToF. Both stringent (genus & species of top 3 are the same with ≥ 1.7 score) and relaxed (genus & species of top 1 with ≥ 1.7 score) MALDI-ToF acceptance criteria (AC) were used.

Table 2: Percentage of NG, NM, MC & KD correctly identified by MALDI-ToF

	Number	Relaxed	Stringent	Incorrect ID
NG	96	98.9%	30.2%	<i>N. meningitidis</i>
NM	13	100%	100%	N/A
MC	18	100%	100%	N/A
KD	2	100%	0%	<i>Streptomyces violaceoruber</i> / <i>N. meningitidis</i>

Results

All 96 *N. gonorrhoeae* tested positive by the Phadebact monoclonal kit, however the 2 *K. dentrificans* also tested positive. Sensitivity, specificity, PPV and NPV for these kits are shown in Table 1. Using the relaxed MALDI-ToF criteria 95/96 (98.9%) were correctly identified as NG compared with 29/96 (30.2%) using the stringent criteria. In all cases if an incorrect ID, NM was the species listed (Table 2, Fig 1).

Of the 13 NM and 18 MC all were correctly ID'd using the stringent criteria. Of the 2 KD, both were correctly ID'd using the relaxed but not the stringent criteria. Sensitivity and specificity for ID of NG using stringent and relaxed criteria are 30.2% & 93.9% and 98.9% & 100% respectively.

Conclusions

MALDI-ToF can be used for *Neisseria gonorrhoeae* identification using the relaxed criteria. Species of three genera, NM, MC and KD were distinguishable from NG when using the relaxed criteria.

Fig 1: Numbers of correct NG ID in top 3 MALDI-ToF IDs when using the stringent criteria

