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ORIGINAL ARTICLE

Diagnostic Efficacy of Nanopore Sequencing Using Clinical Specimens for Nontuberculous Mycobacterial Pulmonary Disease

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SUMMARY

Background: **This study aimed to evaluate the diagnostic efficacy of nanopore sequencing using clinical specimens for the rapid diagnosis of nontuberculous mycobacterial pulmonary disease (NTM-PD) and to provide a new detection tool for the early diagnosis of NTM-PD.**

Methods: **Information regarding patients with suspected *Mycobacterium* infection with lung disease was retrospectively analyzed to determine the sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and area under the curve (AUC) for nanopore sequencing compared with those for NTM culture.**

Results: **Overall, 871 patients were enrolled in the study. By using NTM culture as the reference standard for diagnosing NTM-PD, the sensitivity, specificity, PPV, NPV, and AUC were found to be 93.3% (95% CI: 86.1% - 97.5%), 97.2% (95% CI: 95.8% - 98.2%), 78.5% (95% CI: 69.5% - 85.9%), 99.2% (95% CI: 98.4% - 99.7%), and 0.95 (95% CI: 0.94 - 0.97) for nanopore sequencing, respectively. The overall accuracy of diagnosing NTM-PD was excellent for nanopore sequencing.**

Conclusions: **Nanopore sequencing analysis of clinical specimens offers high diagnostic accuracy for detecting NTM-PD. Furthermore, this approach can be used as the priority diagnostic tool for detecting NTM-PD.**

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Supplementary Data

Table S1. Diagnostic efficacy of acid-fast bacilli smear for the diagnosis of nontuberculous mycobacterial pulmonary disease.

Test	Sample		NTM culture		Sensitivity (%, 95% CI)	Specificity (%, 95% CI)	PPV (%, 95% CI)	NPV (%, 95% CI)	AUC (95% CI)
			+	-					
AFB smear	All	+	38	183	41.8 (31.5 - 52.6)	76.6 (73.4 - 79.5)	17.2 (12.5 - 22.8)	91.9 (89.5 - 93.8)	0.59 (0.56 - 0.62)
		-	52	598					
	Sputum	+	8	37	88.9 (51.8 - 99.7)	98.9 (59.8 - 69.9)	17.8 (8.0 - 32.1)	98.2 (90.5 - 100.0)	0.74 (0.65 - 0.83)
		-	1	55					
	BALF	+	30	146	37.0 (26.6 - 48.5)	78.8 (75.6 - 81.8)	17.1 (11.8 - 23.4)	91.4 (88.9 - 93.5)	0.58 (0.54 - 0.61) *
		-	51	543					

Comparison between sputum and BALF, * p = 0.0045.
AFB acid-fast bacilli, NTM nontuberculous mycobacterial, AFB acid-fast bacilli, PPV positive predictive value, NPV negative predictive value, AUC area under the curve, BALF bronchoalveolar lavage fluid.