A meta-analysis to evaluate the effectiveness of real-time PCR for diagnosing novel coronavirus infections

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ABSTRACT. Novel coronavirus (nCoV) belongs to the Coronaviridae family, which includes the virus that causes SARS, or severe acute respiratory syndrome. However, infection source, transmission route, and host of nCoV have not yet been thoroughly characterized. In some cases, nCoV presented a limited person-to-person transmission. Therefore, early diagnosis of nCoV may be of importance for reducing the spread of disease in public. Methods for nCoV diagnosis involve smear dyeing inspection, culture identification, and real-time PCR detection, all of which are proved highly effective. Here, we performed a meta-analysis to evaluate the effectiveness of real-time PCR for diagnosing nCoV infection. Fifteen articles conformed to the inclusion and exclusion criteria for further meta-analysis on the basis of a wide range of publications searched from databases involving PubMed, EMBASE, Web of Science, Medline, ISI. We analyzed the stability and publication bias as well as examined the heterogeneity inspection of real-time PCR detection in contrast to smear staining and culture identification. The fixed-effect model was adopted in our meta-analysis. Our result demonstrated that the combination of real-time PCR and

smear diagnostics yielded an odds ratio (OR) = 1.91, 95% confidence interval (CI) = 1.51-2.41, Z = 5.43, P < 0.05, while the combination of real-time PCR and culture identification yielded OR = 2.44, 95%CI = 1.77-3.37, Z = 5.41, P < 0.05. Therefore, we propose real-time PCR as an efficient method that offers an auxiliary support for future nCoV diagnosis.

Key words: Real-time PCR; Coronavirus; Meta-analysis