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A clinical risk score to detect COVID-19 in suspected patients



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Purpose: We proposed to develop and internally validate a clinical risk score for detecting coronavirus disease 2019 (COVID-19) in suspected patients during a local outbreak, using commonly measured clinical variables.

Methods: Medical records were extracted for a retrospective cohort of 336 suspected patients admitted to Baodi hospital during a local outbreak between Jan 27 to Feb 23, 2020. A total of 56 patients were diagnosed with COVID-19. Multivariate logistic regression models were applied to develop the risk-scoring model. Model performance was evaluated by calibration and discrimination. Sensitivity, specificity, positive and negative predictive values were calculated at different cutoff points of the risk score.

Results: Age, close contact with confirmed/suspected cases, visit to Baodi Shopping Mall, temperature, leukocyte count, radiological findings of pneu-

monia and bilateral involvement were included in the final model, with excellent calibration (χ^2 for Hosmer-Lemeshow test = 5.591, $p=0.693$) and discrimination (the area under the receiver operating characteristic curve (AUC) = 0.894, 95%CI: 0.849-0.939). At the cutoff point of 3.45, 100% of COVID-19 patients were diagnosed with a specificity of 27.1%. With use of this cutoff point, 76.5% of patients needed to undergo the nucleic acid testing, without any cases being missed. While a cutoff point of 4.40 ruled out 45.8% of patients from testing, with missing 5.6% of the cases.

Conclusion: COVID-19 cases in local outbreaks may be identified using the developed risk score based on routinely collected clinical factors, with excellent predictive performance. Further external validations in new outbreaks are warranted before use in clinical practice.

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