NILAI DIAGNOSTIK POLA *BREATHPRINT* / *VOLATILE ORGANIC COMPOUND* (VOC) GENOSE C-19 SEBAGAI ALAT SKRINING PADA PASIEN ANAK DENGAN COVID-19

Dicki Iman Ginanjar*, Amalia Setyati**, Dian K Nurputra***

*Mahasiswa Magister Ilmu Kedokteran Klinis, Fakultas Kedokteran, Kesehatan Masyarakat, dan Keperawatan, Universitas Gadjah Mada, Yogyakarta, Indonesia
** Departemen Ilmu Kesehatan Anak, Universitas Gadjah Mada, Yogyakarta, Indonesia
*** Departemen Ilmu Kesehatan Anak, Universitas Gadjah Mada, Yogyakarta, Indonesia

INTISARI

Latar belakang. Selama masa pandemi COVID-19 di Indonesia, anak-anak menjadi kelompok rentan dengan angka kematian tertinggi di dunia. Namun, pemeriksaan RT-PCR dengan *swab* oronasopharing yang invasive membuat deteksi awal dan pemeriksaan dalam jumlah banyak sulit dilakukan pada pasien anak. Alat skrining alternatif yang memanfaatkan *biomarker* pengganti diperlukan.
Tujuan. Mengetahui performa pemeriksaan GeNose C-19 dalam menggambarkan pola VOC dan nilai diagnostik sebagai alat skrining pada anak dengan COVID-19.
Metode. Dilakukan studi potong lintang dengan subjek anak usia 5 -18 tahun yang dicurigai COVID-19 berdasarkan gejala dan riwayat kontak erat dengan kasus terkonfirmasi, yang diambil secara *consecutive sampling* sejak Maret 2021 sampai Maret 2022. Sampel napas diambil dan dilakukan pemeriksaan RT-PCR dengan swab oronasopharing untuk konfirmasi diagnosis COVID-19. Data dianalisis untuk mendapatkan sensitivitas, spesifisitas, nilai duga positif dan negatif, serta rasio kemungkinan positif dan negatif.
Hasil. Sebanyak 55 sampel diikutsertakan dan dianalisis pada penelitian ini. Sebagian besar asimptomatik (32 dari 55). Dua puluh delapan anak anak terkonfirmasi positif COVID-19 dan 27 negatif oleh RT-PCR. Dari 28 anak yang terkonfirmasi positif COVID-19, pemeriksaan GeNose C-19 menunjukkan 24 anak positif, sedangkan dari 27 anak yang negatif COVID-19, Genose C-19 menunjukkan 24 anak negatif. Sensitifitas dan spesifisitas pemeriksaan Genose C-19 terhadap pemeriksaan RT-PCR sebesar 85,71% dan 88,89%. Rasio kemungkinan penelitian ini sebesar 7,71 (<10). *Pretest probability* dan *posttest probability* penelitian ini yaitu 50,91% dan 88,89%. Analisis kromatografi gas menunjukkan peningkatan proporsi etil-butanoat, yang dilaporkan menjadi salah satu *biomarker* VOC COVID-19.
Kesimpulan. Analisis hembusan napas VOC oleh GeNose C-19 berpotensi untuk data digunakan sebagai alat skrining yang cepat dan non-invasif untuk anak-anak yang diduga COVID-19.

Kata kunci: *Electronic nose,* GeNose C-19, COVID-19, anak

DIAGNOSTIC TEST BREATH DERIVED VOLATILE ORGANIC COMPOUND (VOC) PERFORMED BY ELECTRONIC NOSE (GENOSE C-19) AS POTENTIAL SCREENING TOOL FOR CHILDREN WITH SUSPECTED COVID-19

Dicki Iman Ginanjar*, Amalia Setyati**, Dian K Nurputra***

*Student of Master Program in Clinical Medicine, School of Medicine, Public Health and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia
** Pediatric Department, Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia
*** Pediatric Department, Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia

ABSTRACT

Background. During COVID-19 pandemic in Indonesia, children become the vulnerable group where the mortality considered to be highest in world. Yet, invasiveness of RT-PCR examination on nasopharyngeal *swab* made harder to perform fast and massive screening. Alternative screening tool utilizing surrogate *biomarker* is necessary.
Objectives. To evaluate the ability of GeNose C-19 to depict breath-derived-VOC pattern in children with COVID-19 and clarify its potency as screening tool.
Metode. This cross-sectional diagnostic test study used consecutive sampling from March 2021 to March 2022. Individuals, suspected of having COVID-19 based on symptoms and history of close contact with confirmed cases, which came to designated health facilities were enrolled. Breath-samples were taken and then confirmed for their RT-PCR examination using naso-oropharyngeal *swab* samples. Data were analyzed to obtain sensitivity, specificity, positive and negative predictive values, and positive and negative likelihood ratios.
Results. Fifty five children age 5-18 years old were enrolled in this study. Most of them are asymptomatic (32 out of 55). Twenty eight patients were confirmed as positive COVID-19 and 27 were negative by RT-PCR. Among 28 positive patients, GeNose C-19 examination showed 24 positive breath-print. While from 27 negative COVID-19, it showed 24 negative breath-print, suggesting performance of 85,71% in sensitivity and 88,89% in specificity. The probability ratio for this study was 7,71 (<10). The pretest probability and posttest probability of this study are 50,91% and 88,89%.
Gas chromatography analysis showed the increase proportion of ethyl-butanoate, which was reported to be one of VOC *biomarker*s of COVID-19.
Conclusions. Breath-derived VOC analysis by GeNose C-19 may play potential role as fast and non-invasive screening tools for children with suspected COVID-19.

Key word: Electronic nose, GeNose, COVID-19, children