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### Diagnostic Accuracy of a Clinical Scoring Scheme in Childhood Heart Failure

*Précision Diagnostique d'un Schéma de Notation Clinique de l'Insuffisance Cardiaque chez l'Enfant*

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#### ABSTRACT

**BACKGROUND:** Heart failure remains a major health problem. But its early diagnosis remains a significant challenge especially among the Paediatric population. A standardized highly sensitive and specific clinical basis of diagnosis requiring no sophisticated equipment readily elicitable at the patients beside at presentation is required.

**OBJECTIVE:** The study set out to determine the accuracy of a clinical scoring scheme for the diagnosis of heart failure in infants in Ibadan, Nigeria, using B-type natriuretic peptide (BNP) as gold standard.

**METHODOLOGY:** Forty-five consecutive infants admitted into the Paediatric wards of the University College Hospital and the Adeoyo Maternity Teaching Hospital in Ibadan, Nigeria were evaluated with the Ibadan Childhood Heart Failure Index (ICHFI) and those with clinical score of  $\geq 3$  were recruited. Their plasma BNP levels and those of 45 age-matched controls were also measured.

**RESULTS:** There was a strong positive correlation (0.920) between the ICHFI scores and plasma BNP values ( $r_s = 0.920$ ,  $P = 0.000$ ). At a cut-off score of 2, the ICHFI has a sensitivity of 97.6%, specificity of 89.8%, a positive predictive value of 88.9% and a negative predictive value of 97.8%. The receiver operating characteristic curve plotted had an AUC of 0.978 at the 95% CI, 0.951–1.000;  $P < 0.001$ .

**CONCLUSION:** The ICHFI was found to be an accurate tool for the diagnosis of heart failure in infants and it is therefore recommended for use in primary care and resource challenged settings for the rapid diagnosis, grading of the severity of heart failure and monitoring of treatment. *WAJM 2021; 38(1): 67–74.*

**Keywords:** Diagnostic accuracy, infants, heart failure, clinical scoring scheme.

#### RÉSUMÉ

**CONTEXTE:** L'insuffisance cardiaque reste un problème de santé majeur. Mais son diagnostic précoce reste un défi important, surtout parmi la population pédiatrique. Il est nécessaire de disposer d'une base clinique standardisée de diagnostic très sensible et spécifique, ne nécessitant aucun équipement sophistiqué et facilement accessible aux patients, à côté de la présentation.

**OBJECTIF:** L'étude visait à déterminer la précision d'un schéma de notation clinique pour le diagnostic de l'insuffisance cardiaque chez les nourrissons à Ibadan, au Nigeria, en utilisant le peptide natriurétique de type B (BNP) comme étalon-or.

**MÉTHODOLOGIE:** Quarante-cinq nourrissons consécutifs admis dans les services pédiatriques de l'University College Hospital et de l'Adeoyo Maternity Teaching Hospital à Ibadan, au Nigeria, ont été évalués à l'aide de l'indice d'insuffisance cardiaque chez l'enfant d'Ibadan (ICHFI) et ceux dont le score clinique était  $> 3$  ont été recrutés. Leurs taux de BNP plasmatique et ceux des 45 témoins appariés à l'âge ont également été mesurés.

**RÉSULTATS:** Il y a eu une forte corrélation positive (0,920) entre les scores de l'ICHFI et les valeurs de BNP plasmatique ( $r_s = 0,920$ ,  $P = 0,000$ ). Avec un score limite de 2, l'ICHFI a une sensibilité de 97,6 %, une spécificité de 89,8 %, une valeur prédictive positive de 88,9 % et une valeur prédictive négative de 97,8 %. La courbe caractéristique de fonctionnement du récepteur tracée avait une SSC de 0,978 à l'IC de 95 %, 0,951–1,000 ;  $P < 0,001$ .

**CONCLUSION:** L'ICHFI s'est révélé être un outil précis pour le diagnostic de l'insuffisance cardiaque chez les nourrissons et il est donc recommandé de l'utiliser dans les établissements de soins primaires et les établissements disposant de ressources limitées pour le diagnostic rapide, l'évaluation de la gravité de l'insuffisance cardiaque et la surveillance du traitement. *WAJM 2021; 38(1): 67–74.*

**Mots clés:** Précision du diagnostic, nourrissons, insuffisance cardiaque, schéma de notation clinique.

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Abbreviations: BNP, B-type natriuretic peptide; ICHFI, Ibadan Childhood Heart Failure Index