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TABLE OF CONTENTS

GENERAL INFORMATION	1C
INFORMATION FOR AUTHORS	1F
EDITORIAL NOTES – Newborn Screening for Sickle Cell Disease – G. E. Erhabor.....	237
World Hearing Day – Impaired Hearing and Noise Culture	238
– T.S. Ibekwe, S.O. Ayodele, Y.B. Amusa, G. E. Erhabor	
ORIGINAL ARTICLES	
A Clinico-Pathological Study of Vulvo-Vaginal Disease at a Nigerian Tertiary Health Facility	241
I. Emmanuel, P. O. Akpa, D. Yakubu, E. N. Yakubu, B. S. Otene, B. C. Dallang, B. K. Adedeji, B. W. Audu, T. N. Fadok, C. Amaike, A. N. Manasseh, B. M. Mandong	
Abnormalities of Kidney Function in Acute Malarial and non-Malarial Infections	247
O. Efuntoye, S. Ajayi, Y. Raji, B. L. Salako, A. Arije, S. Kadiri	
Accuracy of Whole Blood Cardiac Troponin I in the Diagnosis of Childhood Heart Failure at the University College Hospital, Ibadan	254
A. Hamza, S. I. Omokhodion	
Clients’ Perception of Maternal, Newborn and Child Health Services received before and during the COVID-19 Outbreak in Nigeria’s Epicenter	262
M. Balogun, T. Olubodun, O. Ubani, V. Yesufu, A. Sekoni, F. Ogunsola	
Decisional Conflict amongst Women Undergoing Caesarean Section in Health Facilities in Ibadan, Nigeria	269
A. I. Anih, O. O. Ogunbode, A. O. Okedare	
Evaluation of Primary School Health Environment in Ido/Osi Local Government Area, Ekiti State, Nigeria	277
E. O. Adeyemi, O. S. Olatunya, O. B. Bolaji, O. A. Lawal, W. A. Ajetunmobi, A. O. Adaje, C. E. Onyema, P. N. Omefe, O. Fayemi, S. O. Ajigbotosho, J. C. Okolugbo	
Socioeconomic Parameters and Well Being of Sickle Cell Anaemic Patients in Southwestern Nigeria	284
T. A. Obembe, O. O. Akinyemi, O. A. Adeyanju, T. Ilori, I. E. Okunade	
Effect of COVID-19 Pandemic on Utilization of Paediatric Health Services at the Federal Medical Centre, Asaba, Nigeria..	292
B. U. Ezeonwu, C. O. Okike, K. A. Adeniran, E. E. Omoyibo, E. Onyeka-Okite, H. I. Opara, U. C. Ajanwenyi Joseph, O. M. Uwadia, A. A. Okolo	
Acceptability of Newborn Screening for Sickle Cell Disease among Post-Partum Mothers in Abakaliki, South East Nigeria...	298
O. C. Nnachi, A. A. Umeokonkwo, H. C. Okoye, A. N. Ekwe, C. O. Akpa, A. E. Okoye	
Effect of Frequency of Antenatal Care Contacts on Maternal and Fetal Outcome in Low-Risk Pregnancies at Federal Teaching Hospital Gombe, Nigeria	305
A. B. Rabiu, A. U. El-Nafaty, B. Bako, M. D. Yahaya	
Missed Opportunity for Routine Childhood Vaccination in Urban and Rural Areas of Edo State, Nigeria: A Comparative Study	312
V. O. Omuemu, E. O. Ogboghodo, J. Erhunmwunsee	
Pattern of Abdominal Trauma and Treatment Outcome in a Nigerian Tertiary Hospital	321
E. Ray-Offor, V. Enebeli, S. E. B. Ibeanusi	
Vision-Related Quality of Life after Cataract Surgery in West Africa	329
I. Signes-Soler, J. Javaloy, R. Montés-Micó, G. Muñoz, R. Montalbán, A. Hernández, C. Albarrán-Diego	
Barriers and Facilitators of Isoniazid Preventive Therapy Implementation among People Living with HIV in Nigeria: A Scoping Review of the Literature	336
V. A. Adepoju, A. Adelekan, O. E. Adepoju, O. I. Onyeczue, W. Imoyera, A. Nkeiruka, A. B. Olofinbiyi	
Tape Rule Measurement of Foot Length as Proxy for Vernier Digital Calliper in Estimating Gestational Age among Nigerian Neonates	345
O. Kuponiyi, T. Ogunlesi, A. Adekanmbi, O. Akodu, M. Olowonyo	
INDEX TO VOLUME 40, NO. 3, 2023	
Author Index	351
Subject Index	352



Accuracy of Whole Blood Cardiac Troponin I in the Diagnosis of Childhood Heart Failure at the University College Hospital, Ibadan

Précision de la Troponine I Cardiaque du Sang Total Dans le Diagnostic de l'Insuffisance Cardiaque de l'Enfant à l'Hôpital du Collège Universitaire, Ibadan

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ABSTRACT

OBJECTIVE: To determine the accuracy of cardiac troponin I (cTnI), a marker of myocardial cell injury or necrosis, in correctly identifying heart failure in children.

PATIENTS, MATERIALS, AND METHODS: This was a cross-sectional study in which 45 children aged 12 years or below admitted into the paediatric wards of the University College Hospital, Ibadan, who, on evaluation with the Ibadan Childhood Heart Failure Index (ICHFI) had a score of ≥ 3 , were consecutively recruited. Forty-five age- and sex-matched apparently healthy children with ICHFI score of <3 were similarly evaluated as controls. Demographic, clinical data and cTnI values were documented. Statistical analysis was done using IBM SPSS version 23.

RESULTS: There was a strong positive correlation (0.592) between the whole blood cTnI values and ICHFI scores ($r_s = 0.592$, $P = 0.000$). At a cut-off value of 0.07ng/ml, the whole blood cTnI had a sensitivity of 26.7%, specificity of 97.8%, a positive predictive value of 92.8% and a negative predictive value of 57.1%. The receiver operating characteristic curve plotted had an AUC of 0.800 at the 95% CI, 0.704 – 0.896; $P < 0.001$.

CONCLUSION: Whole blood cTnI level is elevated in children in heart failure and may predict severity of the condition. Whole blood cTnI was found to be an accurate tool for the exclusion of heart failure in children and is therefore recommended for use in children with suspected heart failure for its rapid diagnosis. **WAJM 2023; 40(3): 254–261.**

Keywords: Cardiac Troponin I, Childhood heart failure, Ibadan.

RÉSUMÉ

OBJECTIF: Déterminer la précision de la troponine cardiaque I (cTnI), un marqueur de lésion ou de nécrose des cellules myocardiques, dans l'identification correcte de l'insuffisance cardiaque chez les enfants.

PATIENTS, MATÉRIEL ET MÉTHODE: Il s'agit d'une étude transversale dans laquelle 45 enfants âgés de 12 ans ou moins admis dans les services pédiatriques de University College Hospital, Ibadan, qui, après évaluation avec Ibadan Childhood Heart Failure Index (ICHFI), avaient un score ≥ 3 , ont été recrutés consécutivement. Quarante-cinq enfants apparemment sains, appariés selon l'âge et le sexe, avec un score ICHFI de <3 ont été évalués de la même manière en tant que témoins. Les données démographiques, cliniques et les valeurs de cTnI ont été documentées. L'analyse statistique a été réalisée à l'aide d'IBM SPSS version 23.

RÉSULTATS: Il existe une forte corrélation positive (0,592) entre les valeurs de cTnI dans le sang total et les scores ICHFI ($r_s = 0,592$, $P = 0,000$). À une valeur seuil de 0,07 ng/ml, le cTnI du sang total avait une sensibilité de 26,7 %, une spécificité de 97,8 %, une valeur prédictive positive de 92,8 % et une valeur prédictive négative de 57,1 %. La courbe caractéristique du récepteur tracée avait une AUC de 0,800 à l'IC de 95 %, 0,704 - 0,896 ; $P < 0,001$.

CONCLUSION: Le taux de cTnI dans le sang total est élevé chez les enfants souffrant d'insuffisance cardiaque et peut prédire la gravité de la maladie. Le taux de cTnI dans le sang total s'est avéré être un outil précis pour l'exclusion de l'insuffisance cardiaque chez les enfants et il est donc recommandé de l'utiliser chez les enfants suspectés d'insuffisance cardiaque pour un diagnostic rapide de l'insuffisance cardiaque. **WAJM 2023; 40(3): 254–261.**

Mots clés: Troponine cardiaque I, Insuffisance cardiaque chez l'Enfant, Ibadan.

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