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Evaluation of Homocysteine Status and its Correlation with Disease Severity in Individuals with Sick Cell Anaemia in Steady State

Évaluation de l'État de l'Homocystéine et de sa Corrélation Avec la Gravité de la Maladie chez les Personnes Atteintes d'Anémie Drépanocytaire en État Stable

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ABSTRACT

INTRODUCTION: Sick cell anaemia (SCA) is a genetic disorder associated with chronic inflammation and a hypercoagulable state. This study evaluated the serum homocysteine level and its correlation with disease severity and body mass index (BMI) among individuals with SCA in a steady state.

METHODS: A cross-sectional study was carried out and the serum level of homocysteine was analysed using the ELISA method. Disease severity and BMI were also calculated. Data generated were analyzed using SPSS software, version 21.

RESULTS: Ninety subjects participated in this study and were made up of 30 homozygous sickle cell (HbSS, SCA) subjects, 30 individuals with sickle cell trait (HbAS), and 30 individuals with normal adult haemoglobin (HbAA) with a mean age of 27.3 ± 6.4 years, 26.0 ± 6.0 years, and 27.2 ± 6.6 years respectively. The mean serum level of homocysteine among HbSS was 26.2 ± 11.8 $\mu\text{mol/l}$ which was significantly higher than 17.9 ± 8.0 $\mu\text{mol/l}$ and 18.9 ± 7.9 $\mu\text{mol/l}$ among HbAA or HbAS respectively ($p < 0.05$). Mean BMI of 21.9 ± 2.8 kg/m^2 among HbSS was significantly lower than those of HbAS (23.7 ± 2.5 kg/m^2) and HbAA (24.7 ± 2.4 kg/m^2) ($p < 0.05$). There was a positive correlation between homocysteine level and disease severity in patients with HbSS, though not significant ($r = 0.168$; $p > 0.05$). There was a significant negative correlation between homocysteine level and BMI ($r = -0.0258$; $p = 0.021$); and between disease severity and BMI ($r = -0.400$; $p = 0.028$).

CONCLUSION: Individuals with HbSS have significantly higher mean serum homocysteine level and lower BMI compared to HbAS and HbAA. There was a positive correlation between homocysteine level and disease severity, though not significant but a strong negative correlation between homocysteine levels and BMI, and between disease severity and BMI among HbSS participants. A similar study should be carried out on a wide scale to determine the actual relationship between homocysteine level and disease severity in SCA and whether patients will benefit from routine administration of vitamin B12, vitamin B6, and folic acid. **WAJM 2023; 40(4): 382–388.**

Keywords: Disease Severity, Homocysteine, Sick cell Anaemia.

RÉSUMÉ

INTRODUCTION: La drépanocytose est une maladie génétique associée à une inflammation chronique et à un état d'hypercoagulabilité. Cette étude a évalué le taux d'homocystéine sérique et sa corrélation avec la gravité de la maladie et l'indice de masse corporelle (IMC) chez les personnes atteintes d'anémie drépanocytaire à l'état stable. **MÉTHODES:** Une étude transversale a été réalisée et le taux sérique d'homocystéine a été analysé à l'aide de la méthode ELISA. La gravité de la maladie et l'IMC ont également été calculés. Les données générées ont été analysées à l'aide du logiciel SPSS, version 21.

RÉSULTATS: Quarante-vingt-dix sujets ont participé à cette étude, dont 30 drépanocytaires homozygotes (HbSS, SCA), 30 drépanocytaires de trait (HbAS) et 30 personnes ayant une hémoglobine adulte normale (HbAA), âgés en moyenne de $27,3 \pm 6,4$ ans, $26,0 \pm 6,0$ ans et $27,2 \pm 6,6$ ans, respectivement. Le taux sérique moyen d'homocystéine chez les HbSS était de $26,2 \pm 11,8$ $\mu\text{mol/l}$, ce qui était significativement plus élevé que $17,9 \pm 8,0$ $\mu\text{mol/l}$ et $18,9 \pm 7,9$ $\mu\text{mol/l}$ chez les HbAA ou HbAS respectivement ($p < 0,05$). L'IMC moyen de $21,9 \pm 2,8$ kg/m^2 chez les HbSS était significativement inférieur à celui des HbAS ($23,7 \pm 2,5$ kg/m^2) et des HbAA ($24,7 \pm 2,4$ kg/m^2) ($p < 0,05$). Il y avait une corrélation positive entre le niveau d'homocystéine et la sévérité de la maladie chez les patients HbSS, bien que non significative ($r = 0.168$; $p > 0.05$). Il existe une corrélation négative significative entre le taux d'homocystéine et l'IMC ($r = -0.0258$; $p = 0.021$); et entre la gravité de la maladie et l'IMC ($r = -0.400$; $p = 0.028$).

CONCLUSION: Les personnes atteintes de HbSS ont un taux moyen d'homocystéine sérique significativement plus élevé et un IMC plus faible que les personnes atteintes de HbAS et de HbAA. Il existe une corrélation positive entre le taux d'homocystéine et la gravité de la maladie, une corrélation négative non significative mais forte entre le taux d'homocystéine et l'IMC, et entre la gravité de la maladie et l'IMC chez les participants HbSS. Une étude similaire devrait être menée à grande échelle pour déterminer la relation réelle entre le taux d'homocystéine et la gravité de la maladie dans le SCA et pour savoir si les patients bénéficieront de l'administration systématique de vitamine B12, de vitamine B6 et d'acide folique. **WAJM 2023; 40(4): 382–388.**

Mots clés: Gravité de la maladie, homocystéine, anémie drépanocytaire.