Malaria and hypertension-a new hypothesis in clinical medicine

Research from University College Cork, Ireland and New York University School of Medicine, USA has shown a credible link to the high rate of hypertension, stroke, and myocardial infarction amongst Africans and Afro-Americans, and a genetic defence mechanism to protect against malaria.

Across the world, black people display a rate of hypertension, stroke, and myocardial infarction that is significantly higher than other ethnic groups. The study, which has been published in Circulation Research, sought to understand a possible alternative cause for hypertension on populations that have been under the selective pressure of malaria. The research links the well-known fact that angiotensin II, a hormone that is involved in the regulation of the plasma sodium concentration and arterial blood pressure, is a major driver of hypertension, with the finding that polymorphisms in genes that result in higher levels of angiotensin II are associated with protection against severe malaria. The article proposes that the higher incidence for hypertension in populations of African and South Asian origin is the protection against severe malaria provided by elevated levels of angiotensin II. This hypothesis now allows the authors to suggest superior treatment plans to combat hypertension in patients with malaria.

Dr. Ana Rodriguez, Associate Professor in New York University School of Medicine, one of the two senior authors of the article, comments that “The research allows us to argue that the hypothesis that Elevated levels of Angiotensin II, a peptide hormone that causes vasoconstriction and a subsequent increase in blood pressure, may confer protection against malaria morbidity and/or mortality. By providing this alternative explanation for hypertension in malaria endemic areas, we can now create a response in how we treat patients who present with increased hypertension, by choosing the most adequate anti-hypertensive medication in areas with the risk of contracting malaria.”

But the importance of the research paper is much broader as the proposed mechanism of protection against severe malaria also points to new and unique pharmacological strategies for the treatment of severe malaria. The significance of this discovery is commented upon by Professor Thomas Walther, senior author of this article, and Chair in Pharmacology and Head of University College Cork’s Department Pharmacology & Therapeutics “Although it is known for decades that Africans and Afro-Americans are more likely to develop hypertension or suffer a stroke or myocardial infarction, the causes for such phenomenon are still unexplained. Our work provides a consistent explanation as to why this is the case, although it requires further investigation to prove our hypothesis.”

Furthermore, the causative cascade of such selection pressure provides not only a likely explanation for the increased prevalence in hypertension observed in populations of African and

South Asian origin in areas with exposure to malaria but also to black people outside such areas. Dr Barry H. Greenberg, Director Advanced Heart Failure Treatment Program and Professor of Medicine from the Sulpizio Cardiovascular Center UC San Diego comments that “The concept that chronic exposure to malaria over generations might have offered a selective survival advantage to individuals with higher Angiotensin II levels (at the cost of an increase in hypertension and its consequences) is a fascinating one and could help explain the excess of hypertension, stroke and myocardial infarction seen in the African American population in the U.S. The consequences of hypertension in the African American population is considerable. Hypertension is by the most important population-attributable risk factor for heart failure and this is particularly true in the African American population. Once heart failure develops in African American patients, it is associated with a 1.8 fold increase in mortality in males and a 2.4 fold excess in mortality in women. Insights about the role of the angiotensin in the pathogenesis of hypertension are extremely important particularly as they relate to potential therapies for this condition.”

Thomas Walther
Department of Microbiology, New York University School of Medicine (J.G.-D., A.R.)
Department of Pharmacology and Therapeutics, School of Medicine and School of Pharmacy, University College Cork (UCC), Ireland

Publication

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