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Conceptual progress in the management of sickle cell pain from individualized trial and error approach to a specific pharmacologic precision medicine

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Sickle cell disease (SCD) is an inherited disorder that affects 100, 000 African Americans and about 100 million individuals globally. Upon deoxygenation, the sickle hemoglobin polymerizes and initiates a series of events leading to vascular occlusion, tissue hypoxia, pain and progressive organ damage. Recurrent acute painful episodes are the hallmark of SCD that require treatment in the emergency department and/or hospital with relatively large doses of opioids. Up to the 1960s, SCD was primarily a disease of children. In the 1970s, survival increased and transfer to adult care increased progressively. Soon adult programs were overwhelmed with a large number of patients with frequent utilization of medical facilities, heavy consumption of opioids and suboptimal insurance coverage. As a result, patients with SCD were accused of drug-seeking behavior and addiction. Consequently, pain was under treated and, at best, was on the basis of trial and error for each patient. As the controversy about the treatment of sickle cell pain was brewing, the advent of precision medicine came to the rescue. Pharmacodynamically, opioids function as ligands that bind to and activate specific helical receptors in the central nervous system. If an opioid does not activate receptors, its analgesic effect would be absent. Pharmacokinetically, each drug is metabolized into specific active or inactive metabolites depending on the presence of genetically determined enzymes. The net effect of an opioid depends on the specific receptors and enzymes in each patient. This explains why different patients responded differently to an opioid. Pain management should be precision medicine-dependent.

Biography

Samir K Ballas received his MD with distinction from the American University of Beirut-Lebanon in 1967. He completed his training in Hematology at Thomas Jefferson University in Philadelphia, Pennsylvania. He is board certified in Internal Medicine, Hematology, Blood Banking, Pain Medicine and Pain Management. He is currently Emeritus Professor of Medicine and Pediatrics at Thomas Jefferson University and honorary Staff Member of Hemorio, the Hematology Institute in Rio de Janeiro, Brazil. He has authored or co-authored over 800 articles, book chapters and abstracts. He also published two editions of a book on sickle cell pain in 1998 and 2014 respectively.

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