OPINION

Pain management in pediatric patients with sickle cell anemia

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ABSTRACT

Opioids, intravenous fluids, regional anaesthesia, ketamine infusions, and Non-steroidal Anti-inflammatory Drugs (NSAIDs) are frequently used by paediatric Sickle Cell Disease (SCD) children to treat pain during an acute vaso-occlusive episode. Acupuncture has long been researched as a successful means of pain treatment, despite the fact that the use of it in paediatric patients with SCD during an acute vaso-occlusive pain episode is notably understudied. The usefulness of acupuncture as a pain relief method for young SCD patients who are suffering from acute pain is reviewed in this article based on recent research.

Key Words: *Acupuncture; Pediatric pain; Acute vaso-occlusive episode; Integrative pain medicine*

INTRODUCTION

Treatment options for paediatric Sickle Cell Disease (SCD) patients experiencing an acute vaso-occlusive episode are limited to opioids, intravenous fluids, adjunct ketamine infusions, regional anaesthesia, and Nonsteroidal Anti-Inflammatory Drugs (NSAIDs). A coherent theory of acupuncture's effect in Western medicine has not yet been recognised, despite the fact that it has been investigated for pain management for a very long time.

Furthermore, acupuncture for the management of acute pain episodes in paediatric patients with SCD is a medical field that is remarkably understudied.

Sickle cell disease

Only opioids, intravenous fluids, adjunct ketamine infusions, regional anaesthesia, and Nonsteroidal Anti-Inflammatory Medications (NSAIDs) are available as treatments for juvenile Sickle Cell Disease (SCD) patients undergoing an acute vaso-occlusive crisis. Although acupuncture has been studied for pain management for a very long time, a coherent theory of its effects in Western medicine has not yet been recognised. A branch of medicine that is strikingly understudied is acupuncture According to estimates for combined adult and paediatric statistics, 176,000 persons in the US pass away each year from problems connected to SCD.Patients with SCD have a life expectancy that is 2-3 decades lower than the general population, despite the fact that mortality rates have significantly decreased over time. Risks of infection, acute chest syndrome, stroke, splenic sequestration, acute anaemia, nephropathy, acute renal failure, retinal damage, cholecystitis, priapism, and avascular necrosis are among the comorbidities for paediatric SCD patients. Pain, which can manifest as acute intermittent pain, chronic daily pain, or acute on chronic pain, is the most prevalent symptom of SCD starting in infancy. Depending on the type of pain being experienced, children's standard-of-care pharmacological pain therapy involves IV fluids, immediate-release or sustained-release opioids, NSAIDs, adjunct ketamine infusions, and regional anaesthesia.

Constipation, pruritis, urinary retention, and nausea are just a few of the serious side effects that patients may experience from these treatments. Many of these side effects may necessitate the use of additional medications or increase the chance that patients will eventually develop altered pain processing, such as central sensitization.

Acupuncture

According to the medical literature in the Huang di Neijing (The Yellow Emperor's Classic of Medicine), which date back to 100 B.C. in China, acupuncture is a method of medicine that is practised all over the world. To achieve a therapeutic effect during acupuncture, thin, firm, disposable stainless-steel needles are placed into certain body locations.

With reference to specific body spots and routes, Eastern Medicine philosophy sees acupuncture as the movement of energy (qi) and blood. These ideas are embodied in the fundamental theories of Yin/Yang, Five Elements, and Zang Fu Organ Theory . Acupuncture develops a diagnosis and a plan of treatment using observational data from the appearance of the patient's tongue and the sensation of their pulse in addition to patient questioning.

Western medicine has not yet been able to pinpoint a single, all-encompassing mechanism of action for acupuncture's ability to reduce pain. Acupuncture may alter human biochemistry, the neurological system, the circulatory system, the immunological system, and fascial networks, according to research. It may also have local and distal effects. According to SCD pathophysiology, acupuncture may reduce SCD pain through four different mechanisms: vasodilation, endothelial dysfunction regulation, anti-inflammatory actions, and endogenous opioid release .Unfortunately, there are currently no

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research showing that acupuncture can reduce haemoglobin S polymerization. According to studies, acupuncture can boost local concentrations of nitrate + nitrite end products as well as trustworthy indicators of nitrous oxide metabolism and production at acupuncture points, which results in local vasodilation and enhancements in blood flow. Although not specifically demonstrated in SCD, acupuncture has also been shown to improve endothelial dysfunction in other clinical conditions, such as hypertension. The anti-inflammatory benefits of acupuncture through peripheral nerve modulation as a potential treatment for organ failure in sepsis were the focus of decades of research, both in human and animal models. In mouse and human models, acupuncture and electroacupuncture have similar effects on the downregulation of pro-inflammatory cellular signals such tumour necrosis factor-alpha, interleukin-1, and interleukin-6. Last but not least, acupuncture's analgesic mechanism of action involves first stimulating a muscle's afferent A-delta and C fibre signalling, which causes a local release of endogenous opioids (such as dynorphin and enkephalins) through the spinal cord to the midbrain Later, midbrain synapses cause efferent signals to be sent back onto the spinal cord by serotonin, dopamine, and norepinephrine in order to block and suppress pain transmission signals. Although intriguing and conceivable, none of these theories have been specifically validated in patients with sickle cell disease, so they remain heuristic at this time. Retrospective chart reviews or studies on the acceptability of acupuncture are the main types of studies now being done on the cli-

-nical efficacy or effectiveness of acupuncture for pain caused by SCD in children. They lack the methodological rigour required to evaluate the advantages of acupuncture The American Society of Haematology (ASH) published guidelines for the management of acute and chronic pain in the adult and paediatric patient populations in 2020, concluding that there was insufficient evidence to recommend the use of acupuncture for the treatment of acute and/or chronic pain in paediatric patients with SCD.

DISCUSSION

Paediatric SCD patients frequently experience pain, which is subjective and complex. Pain can be difficult for a physician to treat, especially when opioids and other drugs don't work. The NIH and AAP both support the possible use of acupuncture for the treatment of specific pain problems in both adults and children. Acupuncture has been examined for its complex physiology of pain control. A multidisciplinary strategy that incorporates acupuncture can offer prospective therapy alternatives for pain that is challenging to control in addition to the standard-of-care management of acute sickle cell pain episodes in the inpatient and outpatient context. When performed by a skilled and board-certified acupuncturist, acupuncture is still a safe therapy with few side effects. Acupuncture is still an individualised therapeutic option that may assist paediatric SCD patients feel less pain.