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Pain Management for Patients Suffering from Sickle Cell Disease (SCD); Overview

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Abstract: **SCD is a quadrumvirate of pain syndromes, anemia and its sequelae, organ failure, including infection, and comorbid conditions. Pain, however, is the insignia of SCD and controls its medical image throughout the life of the patients. The purpose of our study is to examine the complications of pain in SCD and the management of pain throughout this disease, also we aimed to evaluate the different approaches of pain management through different guidelines. We have performed overview study through review the literature in pain assessment among patients with SCD, and that's through electronic search within different databases; MIDLINE, CINAHL, and EMBASE, for all articles discussing this topic up to November 2016, we limited our search to those studies written in the English language, describe treatment of humans, and contain original data. Management of SCD continues to be mainly palliative in nature, including encouraging, symptomatic, and preventive methods to therapy. There are 3 significant of sickle cell pain: severe, persistent, and neuropathic pain. The severe painful episode is the insignia of the disease and the most common reason for hospitalization. Its management requires making use of pharmacologic and nonpharmacologic techniques. Pain management need to follow particular concepts that include an assessment stage, treatment stage, reassessment phase, and modification phase.**

Keywords: **MIDLINE, CINAHL, and EMBASE, SCD.**

1. INTRODUCTION

Sickle cell disease (SCD) is an acquired disorder of hemoglobin structure that has no recognized remedy in adult patients [(1)]. Treatment has actually been accomplished in picked children with sickle cell anemia utilizing allogeneic bone marrow transplantation [(2)] or cord blood transplantation [(3)]. SCD is a quadrumvirate of pain syndromes, anemia and its sequelae, organ failure, including infection, and comorbid conditions. Pain, however, is the insignia of SCD and controls its medical image throughout the life of the patients **(Figure1)** [(4)]. In 2006 the 59th World Health Assembly adopted a resolution that highlighted the requirement for higher international attention to SCD [(5)]. It is approximated that more than 200 000 babies are born with the disease each year in Africa alone.2 An extra 60 000 to 100 000 infants are thought to be born with the condition each year outside of Africa [(6)]. Patients with the disease experience a decline in life expectancy [(7)] in addition to considerable morbidity [(8)]. Patients with SCD have both persistent and episodic pain and lowered lifestyle [(9)]. While agonizing crisis is the most typical reason for emergency department use, other deadly issues include acute chest syndrome and stroke (10). Pain may precipitate or be itself precipitated by the other 3 components of the quadrumvirate. Management of sickle cell pain should be within the framework of the disease as a whole and not in seclusion. SCD is unlike other pain syndromes where the provider can make decisions on treatment based exclusively on the pain and its associated behavior [(4)].

Pain and its management pose significant public health obstacles around the world [(11)]. The management of pain in sickle cell disease (SCD) has actually never ever been viewed with a straightforward technique by lots of practicing hematologists, pain specialists, or generalists, especially for the adult patient [(12)]. Greater understanding of a disease whose pathogenesis is related to increased mortality and complex quality-of-life issues and of the lethality of pain itself has made the care of patients with sickle related pain more urgent and more difficult [(13,14)].

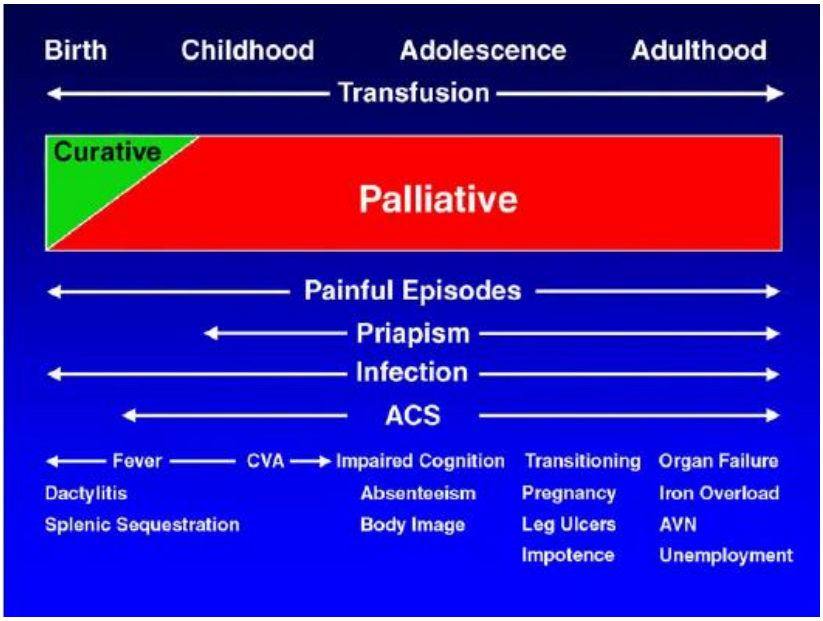

Figure1: Sequence of complications of sickle cell anemia from birth through adult life. Cure is possible in selected children. The mainstay of management in most patients is palliative, with pain management being most important. ACS, acute chest syndrome; AVN, avascular necrosis; CVA, cerebrovascular accident [(4)]

OBJECTIVES:

The purpose of our study is to examine the complications of pain in SCD and the management of pain throughout this disease, also we aimed to evaluate the different approaches of pain management through different guidelines.

2. METHODOLOGY

We have performed overview study through review the literature in pain assessment among patients with SCD, and that's through electronic search within different databases; MIDLINE, CINAHL, and EMBASE, for all articles discussing this topic up to November 2016, we limited our search to those studies written in the English language, describe treatment of humans, and contain original data. We did not exclude any article based on publication date, so any article appearing in the literature through the date of our search was potentially eligible. we used following terms in our search strategy; Pain assessment, Sickle cell disease, SCD, analgesia, Sickle cell anemia.

3. RESULTS AND DISCUSSION

Clinical picture:

The medical picture of sickle cell pain is protean. Sickle cell pain has distinct functions. Pathophysiologically, it is nociceptive (ie, secondary to tissue damage). It might be severe or persistent, somatic or visceral, unilateral or bilateral, localized or diffuse and mild, moderate or extreme [(15)]. Normally, acute agonizing episodes impact long bones and joints, with the low back being the most frequently reported site of pain [(16)]. Other areas of the body, consisting of the scalp, face, jaw, hips, and abdomen, might be included. A severe acute sickle cell unpleasant episode has actually been defined as one that needs treatment in a medical facility with parenteral opioids for 4 or more hours [(17,18)]. The event of three or more such crises shows that the afflicted patient has serious SCD. The words frequently utilized to describe sickle pain consist of "throbbing," "sharp," "dull," "stab-bing," and "shooting," in decreasing order of frequency [(16)]. (**Table 1**) lists the significant kinds of pain syndromes in patients with SCD. These are divided into those secondary to the disease itself, those related to therapy, and those that are because of comorbid conditions [(19)].

Table1: Classification of painful episodes in sickle cell disease [(19)]

Pain Secondary to the Disease Itself
Acute pain syndromes
Recurrent acute painful episodes (crises) Acute chest syndrome
Hepatic crisis Priapism

Calculus cholecystitis Hand-foot syndrome[a] Splenic sequestration[a]
Chronic pain syndromes
• With objective signs
Aseptic (avascular) necrosis Arthropathies
Leg ulcers
Chronic osteomyelitis
• Without objective signs Intractable chronic pain
Neuropathic pain
Pain Secondary to Therapy Withdrawal
Loose prosthesis (hip or shoulder) Postoperative pain
Pain Due to Comorbid Conditions Trauma
Arthritis (septic, degenerative, rheumatoid, collagen disease) Peptic ulcer disease
Other conditions
[a] *Occurs in infants and children.*

Management plans:

Pain is the hallmark of SCD, and the acute sickle cell painful episode (painful crisis) is the most common cause of more than 90% of hospital admissions among adult patients who have SCD [(15)]. Effective management of sickle cell pain is complex and entails thorough understanding of the issues that are associated with the treatment of pain of an incurable disease on a chronic basis [(15,20)]. Major prerequisites for an effective and rational management of sickle cell pain pertain to the patient, the pathophysiology of the disease, the pharmacology of analgesics, and the attitude of the health care provider. A patient is a unique human entity. The more a provider knows the patient, the more effective pain management becomes [(21)]. Knowledge of the patient should not be limited to age, sex, precise diagnosis, complications, and previous pain management methods. It should also take into consideration the biopsychosocial fabric of the patients, lives, including their level of education, employment status, occupation, family structure, source of income, ethnicity, housing conditions, fears, religion, beliefs, habits, hobbies, and perception of the severity and prognosis of their disease. This approach allows the physician to individualize pain management and avoid unfounded generalizations about patients and their consumption of opioid analgesics. Such generalizations, for instance, may result in over sedation of a patient naïve to opioids or in under treatment of a patient too tolerant of them [(21)].

Effective management of acute sickle cell pain in the emergency room and hospital may be achieved by following four major sequential stages: (1) assessment, (2) treatment, including choice of the analgesic, the dose, and the route and method of administration, (3) reassessment to evaluate the effectiveness of the treatment stage and implement changes as needed, and (4) adjustment, including titration of the dose of opioid to achieve adequate pain relief, rescue, tapering, and switching to oral medications, driven by the feedback loops of reassessment. Assessment. Assessment is the cornerstone of effective pain management. It should be conducted before and periodically after the administration of analgesics [(12,15,20,22)]. Because pain is subjective in nature, the patient, s self-report is the most important factor in the hierarchy of pain management. Assessment relies heavily on the patient, s self-report. Other factors in the process of assessment should include the presence or absence of other complications of the disease, such as infection, family members, report, and vital signs, including temperature, blood pressure, pulse, respiratory rate, and pulse oximetry. The patient, s self-report should include multidimensional scales describing intensity, quality, location, distribution, onset, duration, mood, sedation, pain relief, and factors that aggravate or relieve pain [(12,20,22)].

Opioid for SCD pain management:

Opioid agonists are usually used in the management of sickle cell pain, particularly in grownups. They decrease or customize the understanding of pain at the level of the main nervous system. They apply their impact by binding to μ-, κ-, and, to a lower degree, δ-receptors [(23)]. Opioid agonists can be administered by a number of routes (eg, orally, subcutaneously, intramuscularly, intravenously, transdermally) and techniques, consisting of constant intravenous drip, patient-controlled analgesia pump, and intermittent injection. Meperidine, morphine, and hydromorphone are the major opioid analgesics utilized in the treatment of serious pain in the emergency situation department and health center. Controlled-released opioids, such as controlled-release (CR) oxycodone and morphine CR, work in the management of

chronic pain and in mix with short-acting opioids for breakthrough pain. Fentanyl is available in parenteral, transdermal, and transmucosal formulations. Methadone is a true long-acting opioid that can be utilized in mix with short-acting opioids in selected patients [24,25].

The use of meperidine in conjunction with monoamine oxidase inhibitors may trigger a severe unfavorable reaction defined by excitation, hyperpyrexia, convulsions, and death [26]. The coadministration of antipsychotics with meperidine may trigger neuromuscular disorders, consisting of akathisia, dystonia, tardive dyskinesia, and neuroleptic deadly syndrome [27]. Adjuvants consist of antihistamines, benzodiazpines, anticonvulsants, and antidepressants. These are heterogeneous compounds that potentiate the analgesic result of opioids, ameliorate their side effects, and have their own mild analgesic impact. The most frequently used adjuvants in the management of sickle cell pain are listed in (**Table2**). The function of selective serotonin reuptake inhibitors in sickle cell anemia is unclear at present. Adjuvants should be used with care, and patients must be kept an eye on thoroughly when getting them. Adjuvants also have adverse impacts, a few of which precipitate or intensify symptoms of sickle cell anemia [28].

Table2: Adjuvants commonly used in the management of sickle cell pain [28]

Antihistamines
• Hydroxyzine
• Diphenhydramine
Benzodiazepines
• Diazepam
• Alprazolam
Tricyclic Antidepressants
• Amitriptyline
• Nortriptyline
• Doxepin
Anticonvulsants
• Phenytoin
• Carbamazepine
• Gabapentin
• Topiramate
• Clonazepam
Phenothiazines
• Prochlorperazine
• Promethazine

Guidelines for pain management in SCD, established in the United States and the United Kingdom, recommend: (A) prompt initiation of parenteral opioids; (B) use of efficient opioid dosages; (C) repeat opioid doses at regular intervals; and (D) individualization of treatment based on prior opioid reaction histories [20,29,30]. However, prompt and efficient treatment of pain in emergency situation departments is frequently minimal [31,32,33]. Moreover, absence of awareness of available guidelines and continuing ethnic variations in pain treatment in emergency situation department settings additional compromise care [34,35]. Lastly, opioid requirements of adult SCD patients during emergency situation departments go's to are not well defined and elements that can modify treatment decisions, consisting of liver and renal dysfunction (which alter opioid metabolism), chronic long-acting opioid use or drug abuse (which induce both opioid tolerance and hyperalgesia), and the existence of other severe illnesses (which might lead to more timely assessment and healthcare facility admission), have not been thought about [36,37].

4. CONCLUSION

Management of SCD continues to be mainly palliative in nature, including encouraging, symptomatic, and preventive methods to therapy. There are 3 significant of sickle cell pain: severe, persistent, and neuropathic pain. The severe painful episode is the insignia of the disease and the most common reason for hospitalization. Its management requires making use of pharmacologic and nonpharmacologic techniques. Pain management need to follow particular concepts that include an assessment stage, treatment stage, reassessment phase, and modification phase. Chronic sickle cell pain might be because of particular issues of the disease, such as leg ulcers and avascular necrosis; intractable persistent pain may be due to main sensitization. Management of persistent pain should take a multidisciplinary approach.

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