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Review Article

Pentazocine Injection Among Patients with Sickle Cell Disease: A Systematic Review

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Abstract

The misuse of pentazocine injections by sickle cell disease (SCD) patients was investigated in this systematic review. The mixed agonist-antagonist opioid pentazocine is frequently used to treat the pain of vaso-occlusive crises in areas with limited resources, but it is increasingly linked to serious injection-site problems and patient dependence. Results show that long-term, unmonitored pentazocine use causes osteomyelitis, calcific myofibrosis, contractures, fibrosis, and abscess formation. Psychologically, as a result of poor pain treatment and management, patients resort to self-medication procedures, which brings about depression, anxiety, and stigma. Poor opioid monitoring systems and very weak pharmaceutical restrictions make injectable formulations widely available without a proper prescription, which further promotes the abuse and misuse of the drug. Comprehensive clinical recommendations, patient education, and stricter medication control procedures are required to decrease the rising incidence of pentazocine-related problems in sickle cell populations.

1. Introduction

Sickle cell disease (SCD), which is also known as sickle cell anemia, is a group of inherited disorders that affect the major protein in the red blood cells that carries oxygen called haemoglobin [1]. A point mutation in the gene encoding hemoglobin component β (HBB) is the hallmark of a series of common hereditary genetic illnesses collectively referred to as sickle cell disease [2]. According to the World Health Organization [3], an estimated 7.74 million people worldwide were living with sickle-cell disease, with 515 000 new births, mostly in Sub-Saharan Africa, which accounts for roughly 80% of all cases. When fetal hemoglobin (HbF) falls to the adult level by five to six months of age, sickle cell disease (SCD), a multi-organ, multi-system condition, manifests both acute and chronic outcomes [4]. The gene frequency varies in European populations and is highest in West African nations, where 1 in 4 to 3 (25–30%) people are carriers, compared to 1/400 African Americans [5]. Recurrent vaso-occlusive crises (VOCs), which cause abrupt, intense pain and often necessitate parenteral opioid analgesia, are a hallmark of sickle cell disease [6].

Pentazocine mainly operates as a weak antagonist or partial agonist of the mu opioid receptor (MOR) and an agonist of the kappa opioid receptor (KOR). Pentazocine activates KORs, especially in the spinal cord, to produce its main analgesic effect [7]. Compared to complete mu-agonists, this action relieves pain with less respiratory depression and less potential for addiction. At MORs, pentazocine has mild antagonist or partial agonist action. Patients who are physically reliant on full mu-agonists such as morphine may have withdrawal symptoms as a result of this antagonism [8]. Over recent decades, multiple clinical reports have raised concerns about pentazocine misuse among patients with SCD and associated with local and systemic complications [9].

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Particularly in Nigeria, West Africa, the abuse of pentazocine which is also referred to as "pentaholism" is a major public health challenge in the region [10]. Some of the identified causes and contributing factors include easy access, healthcare worker involvement, inadequate pain management and psychosocial factors [11].

This systematic review summarizes the current information on pentazocine injection in SCD patients, with a focus on use patterns, harms (local and systemic), misuse factors, and clinical and policy implications.

2. Methodology

2.1. Search Strategy

A structured research was conducted in this review across secondary data sources from PubMed/PMC, ScienceDirect, Google Scholar and selected journal publishers such as Wiley, Elsevier and other related published articles. The terms used in the search include "pentazocine", "pentazocine injection", "sickle cell disease", "sickle cell", "pentazocine misuse", "SCD", "vaso-occlusive" and "injection complications". Reference lists of retrieved articles and relevant reviews were hand-searched for additional reports. Search results included case reports, case series, cross-sectional studies and narrative reviews.

2.2. Inclusion and Exclusion Criteria

As shown in Table 1, the review applied the following inclusion and exclusion criteria during its screening process to ensure the quality and relevance of the materials.

Studies and reports that described parenteral pentazocine use, pentazocine misuse, dependence, or injection-related complications among people with sickle cell disease were included. All reviewed materials were published in English language while the rest were removed for lack of enough information. All animal studies, and reports not mentioning pentazocine use and misuse in relation to SCD patients were all excluded see also Figure 1.

Table 1: Inclusion / Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Peer-reviewed journal articles, researches and cross-sectional studies.	Articles not focused on pentazocine use, misuse and injection complications on SCD patients.
Studies addressing pentazocine use, misuse, dependence and injection-related complications among SCD patients.	Studies with surface information on pentazocine use, misuse, dependence and injection-related complications among SCD patients.
Publications between 2011 and 2025	Articles published before 2011 without substantial relevance.
Publications in English Language	Publications that are not in English Language.

2.3. Key Findings

Tissue Injuries

Pentazocine injections are known to cause several local tissue damage because of the acidic nature of the drug, which precipitates in the neutral tissues of the body, as well as complications from repeated, unsterile self-administration in an environment with poor regulatory control. Repeated intramuscular injection of pentazocine can cause fibrosis, contractures, and in severe cases, calcific myofibrosis [12]. Furthermore, self-injection with non-sterile injections increases the risk of osteomyelitis, abscesses, and subsequent bacterial infections [13]. These issues surpass its medical nature, frequently tending towards long-term social and psychological implications, such as diminished quality of life, stigma and disability.

Pentazocine Injection for Pain Relief in Sickle Cell Disease

The extensive use of pentazocine injections for the treatment of SCD pain is a reflection of both the pressing demand for effective analgesic and the shortcomings of the healthcare system, majorly in resource-limited areas. SCD crises come with acute/chronic and excruciating pain which most times require rapid opioid intervention forcing clinicians and patients to rely on pentazocine injections as readily available alternative [14]. This is as a result of poor pain management frameworks or consistent access to morphine and other opioids. Pentazocine is known to offer temporary relief, but its mixed agonist-antagonist pharmacological profile makes it less suitable for long-term management because it leads to tolerance and dependence [15].

Emotional Distress

Psychologically, the use and misuse of pentazocine injection among SCD patients is linked to chronic pain and emotional distress. Depression and anxiety become likely because of the frequent hospital stays and repeated vaso-occlusive episodes [16]. When pain treatment is insufficient or takes too long, patients may resort to self-medication, viewing pentazocine as a way to physically and psychologically escape. Withdrawal symptoms and drug cravings are signs of dependence, which develops over time [17]. This tendency is made worse by co-occurring mental health conditions since untreated sadness and despair reduce motivation to seek medical care.

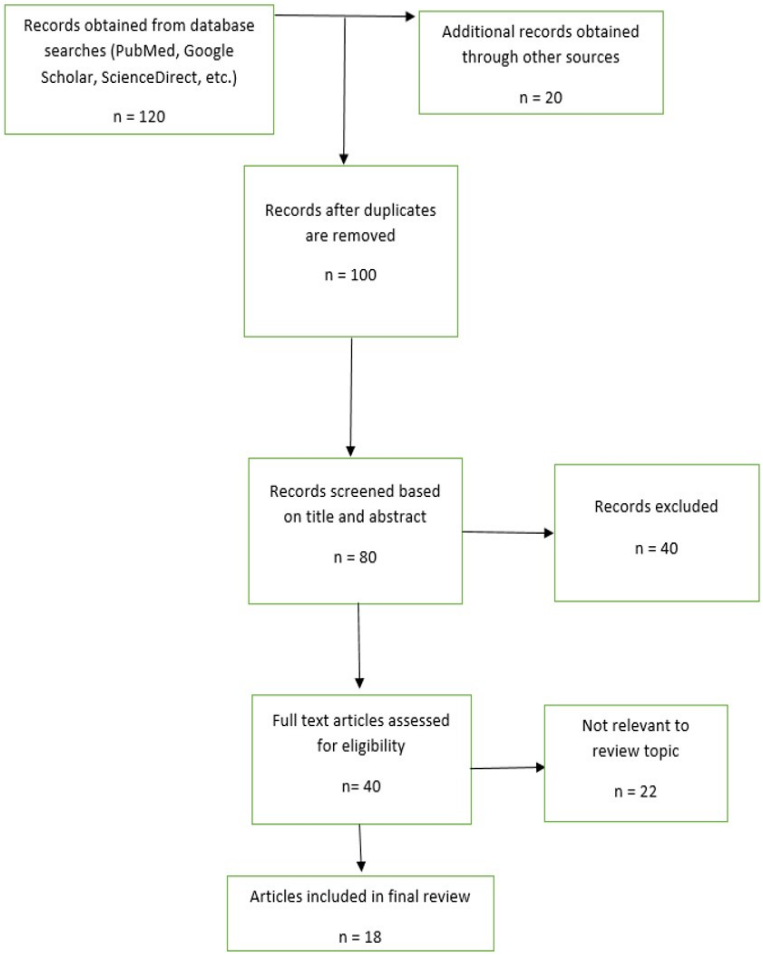

Figure 1: PRISMA Flow Diagram

Weak Pharmaceutical Regulations and Framework

The misuse of Pentazocine reveals the consequences of poor pharmaceutical regulations and poor opioid framework. Pentazocine is easily purchased without prescription in many Sub-Saharan African nations, because many pharmacies lack monitoring systems for controlled substances [9]. This regulatory loophole aids the over-the-counter purchase and non-medical usage of injectable formulations of pentazocine. Furthermore, inexperienced medical professionals could underestimate the drug's risk for dependence and keep prescribing it without careful monitoring.

Healthcare Stigma

The medical community's stigmatization of SCD sufferers exacerbates the situation. According to [18], some clinicians regard patients who present with persistent pain as "drug-seekers," which may result in under-treatment or delays in pain relief. This worry motivates patients to administer unsupervised pentazocine injections at home and discourages them from seeking medical assistance. As a result, this stigma elevates an analgesic issue to a social one, further marginalizing SCD patients.

3. Summary of Findings

This systematic review reveals that pentazocine injection misuse among patients with sickle cell disease is a growing psychosocial and medical challenge, especially in resource-limited and low-income settings. Evidence from clinical studies and case reports show that while pentazocine is prescribed for acute vaso-occlusive crises due to its accessibility and availability, its unsupervised use leads to drug dependence and complications [9, 14].

Tissue fibrosis, contractures, abscess formation, calcific myofibrosis and osteomyelitis are resultant implications of repeated intramuscular injections, due to its irritant nature and poor injection hygiene [13]. The misuse of pentazocine also contributes to emotional distress for SCD patients resulting from consistent hospital stays and frequent crises. These patients tend to experience depression, anxiety and stigma regularly [16]. A recurrent finding is the role of weak pharmaceutical regulations over controlled substances which facilitates misuse. Pharmacies lack monitoring systems and some make the purchase of pentazocine easy without prescription [9].

Overall, the analysis shows that pentazocine abuse in sickle cell disease (SCD) is caused by a combination of biological, psychosocial, and structural factors, such as poor opioid stewardship, insufficient pain management frameworks, and a lack of mental health assistance. Comprehensive clinical and policy treatments aimed at prevention, education, and regulatory control are necessary to address these problems.

4. Conclusion

Pentazocine injection remains both a necessary analgesic and a potential source of harm for patients with SCD. While its availability provides temporary pain relief during crises, its long term use creates dependence especially when unsupervised and can lead to tissue necrosis. The findings of the review highlights that pentazocine misuse is not only an individual problem but reflects broader irregularities in healthcare systems, inadequate pain management protocols, weak regulation and inefficient support for patients with SCD.

Effective solutions require a multifaceted approach which includes strengthening opioid policies, improving access to safer pain management alternatives, pharmaceutical regulation and training of healthcare professionals to identify and manage dependence on time. De-stigmatization of SCD patients through awareness and empathy-based care can also reduce self-medication practices. In order to protect vulnerable groups and advance long-term, compassionate pain care, reducing pentazocine misuse among SCD patients ultimately requires integrated clinical, governmental, and community-level approaches.

Article Information

Disclaimer (Artificial Intelligence): The author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.), and text-to-image generators have been used during writing or editing of manuscripts.

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References

[1] Lung National Heart and Blood Institute. Sickle Cell Disease - What Is Sickle Cell Disease?, 2024. URL https://www.nhlbi.nih.gov/health/sickle-cell-disease.

[2] C. K. Tebbi. Sickle Cell Disease, a Review. *Hemato*, 3(2):341–366, 2022. doi: https://doi:10.3390/hemato3020024.

[3] World Health Organisation. Sickle-cell disease, 2025. URL https://www.who.int/news-room/fact-sheets/detail/sickle-cell-disease.

[4] S. K. Ballas, M. R. Kesen, M. F. Goldberg, G. A. Lutty, C. Dampier, I. Osunkwo, W. C. Wang, C. Hoppe, W. Hagar, D. S. Darbari, and P. Malik. Beyond the Definitions of the Phenotypic Complications of Sickle Cell Disease: An Update on Management. *The Scientific World Journal*, 2012:1–55, 2012. doi: https://doi.org/10.1100/2012/949535.

[5] P. Aguilar Martinez, M. Angastiniotis, A. Eleftheriou, B. Gulbis, M. D. Mañú Pereira, R. Petrova-Benedict, and J.-L. Corrons. Haemoglobinopathies in Europe: health migration policy perspectives. *Orphanet Journal of Rare Diseases*, 9(1):97, 2014. doi: https://doi.org/10.1186/1750-1172-9-97.

[6] K. Takaoka, A. C. Cyril, S. Jinesh, and R. Radhakrishnan. Mechanisms of pain in sickle cell disease. *British Journal of Pain*, 15(2): 204946372092068, 2020. doi: https://doi:10.1177/2049463720920682.

[7] D. Koyyalagunta and S. D. Waldman. *Opioid Analgesics*. Elsevier eBooks, pp. 890–912, 2011. doi: https://doi.org/10.1016/b978-1-4377-0721-2.00122-7.

[8] M. C. Lee and M. Abrahams. Pain and analgesics. *Clinical Pharmacology*, pages 278–294, 2012. https://doi.org/10.1016/b978-0-7020-4084-9.00057-4.

[9] A. Adewoyin, O. Adeyemi, N. Davies, and M. Ojo. Clinical and socio-demographic determinants of pentazocine misuse among patients with sickle cell disease, Benin City, Nigeria: a case-control study. *The Pan African Medical Journal*, 34:88, 2019. doi: https://doi.org/10.11604/pamj.2019.34.88.17257.

[10] U. C. Mba, G. Onyebueke, O. R. Okwesili, I. E. Enyanwuma, G. M. Okorie, S. R. Ohayi, I. C. Ugwu, M. S. Ezeme, and W. O. Okenwa. Tissue necrosis: A burden of pentazocine abuse in South East Nigeria. *Journal of West African College of Surgeons*, 14(2):159–165, 2024. doi: https://doi.org/10.4103/jwas.jwas_90_23.

[11] O. C. Nnachi, C. O. Akpa, F. O. Nwani, and O. O. Edenya. Pentazocine Misuse among Sickle Cell Disease Patients and The Role of Lack of Enforcement of Opioid Dispensing Regulations by Community Pharmacies: A Descriptive Observational Study. *Advances in Public Health*, pages 1–6, 2022. doi: https://doi:10.1155/2022/3877882.

[12] V. Goyal, Jatinder Mohan Chawla, Y. Pal, G. Shukla, S. Singh, and M. Behari. Calcific myofibrosis due to pentazocine abuse: a case report. *Journal of Medical Case Reports*, 2(1), 2008. doi: https://doi.org/10.1186/1752-1947-2-160.

[13] C. Mudrick, J. Isaacs, and J. Frankenhoff. Case Report: Injectable pentazocine abuse leading to necrotizing soft tissue infection and florid osteomyelitis. *Hand (New York, N. Y.)*, 6(4):457–9, 2011. doi: https://doi.org/10.1007/s11552-011-9359-z.

[14] F. Ayeni. Awareness and pattern of pentazocine use in patients with sickle cell disease in two sickle cell clinics in Lagos state, Nigeria. *Nigerian Journal of Pharmacy*, 55(2):83–91, 2021. doi: https://doi.org/10.51412/psnnjp.2021.19.

[15] E. Uche, Bola O. Akinsegun Akinbami, Mulikat Badiru, Suleiman A. Olusola Olowoselu, and B. Augustine. Pentazocine addiction among sickle cell disease patients and perception of its use among health-care workers. *Journal of Applied Hematology*, 10(3):94–94, 2019. doi: https://doi:10.4103/joah.joah_39_19.

[16] S. Adam, C. Flahiff, S. Kamble, M. Telen, S. Reed, and L. De Castro. Depression, Quality of life, and Medical Resource Utilization in Sickle Cell Disease. *Blood Advances*, 1(23):1983–1992, 2017. doi: https://doi.org/10.1182/bloodadvances.2017006940.

[17] Cleveland Clinic. *Substance use disorder (SUD): Symptoms treatment*. Cleveland Clinic, 2024. URL https://my.clevelandclinic.org/health/diseases/16652-drug-addiction-substance-use-disorder-sud.

[18] D. Anderson, K. Lien, C. Agwu, P. S. Ang, and N. Abou Baker. The Bias of Medicine in Sickle Cell Disease. *Journal of General Internal Medicine*, 38, 2023. doi: https://doi.org/10.1007/s11606-023-08392-0.