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Case Report

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The Scars of Syringes: A Case Report on Tramadol Dependence & Injection Site Complications

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HIGHLIGHTS

- Tramadol dependence complications
- Injection ulcers reported
- Dose escalation misuse
- Diabetes increases severity
- Buprenorphine effective therapy

Key Words:
Opioids
Tramadol
Dependence
Ulceration
Diabetes

ABSTRACT

Introduction: Tramadol, a synthetic opioid analgesic, is widely used for moderate to severe pain. Although opioid dependence affects about 2% of the global population, its use in India is reportedly three times higher than the global average. Easy accessibility through over-the-counter sale, online sources, and illicit channels contributes to widespread misuse. Despite their therapeutic value, opioids are associated with significant adverse effects, including dependence, organ damage, and even death. Injection-related complications are rarely reported but can be severe. **Aim & Objective:** This case report aims to highlight a rare but serious complication of tramadol dependence ulceration at injection sites and to emphasize the need for strict monitoring and rational opioid prescribing practices. **Case Presentation:** A 48-year-old male farmer with uncontrolled diabetes and low socioeconomic status developed tramadol dependence after receiving it for chronic pain. He escalated self-administration from 1–2 to 8 ampules daily, also misusing chlorpheniramine maleate tablets to enhance effects. He presented with multiple infected, tender, indurated ulcers on both thighs and legs at injection sites. Laboratory findings showed leukocytosis and hyperglycemia. **Result:** The patient was managed with insulin therapy, appropriate antibiotics, and opioid substitution therapy using buprenorphine–naloxone. Significant clinical improvement and wound healing were observed over a two-month follow-up period. **Conclusion:** This case highlights the risk of opioid dependence and severe injection-related complications. It underscores the need for improved pain management training, early identification of substance misuse, and stricter regulatory control over opioid distribution and monitoring systems to prevent abuse.

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INTRODUCTION

Tramadol is a centrally acting synthetic opioid analgesic that functions primarily as a weak μ-opioid receptor agonist and inhibits the reuptake of serotonin and norepinephrine within monoaminergic pathways. This dual mechanism contributes to its analgesic efficacy in the management of moderate to severe pain. Owing to its initially perceived favourable safety profile, lower risk of respiratory depression compared to stronger opioids, and ease of availability, tramadol gained widespread clinical acceptance, particularly in resource-limited healthcare settings. It is frequently prescribed in both acute and chronic pain conditions and has been considered a relatively safer alternative to conventional opioids. However, this perception has been increasingly challenged by emerging clinical evidence demonstrating its potential for misuse, dependence, and significant adverse outcomes. Recent pharmacovigilance data and case-based evidence suggest that tramadol is not free from abuse liability. Although earlier classifications placed it among weak opioids with minimal dependence risk, increasing reports of tramadol-related dependence, withdrawal syndromes, and recreational misuse have contradicted this assumption. The risk becomes particularly pronounced in populations with easy access to medications & limited regulatory enforcement. In India, opioid misuse has become a growing public health concern. The *Magnitude of Substance Use in India* report (2019) highlights that opioids are among the most misused substances in the country, with a significant proportion of users reporting non-medical consumption patterns [3]. Tramadol, due to its availability through over-the-counter purchase, online pharmacies, & illicit distribution channels, has emerged as a drug of concern.

The lack of stringent prescription monitoring further facilitates its misuse, contributing to increasing cases of dependence and addiction-related complications.

Parenteral use of tramadol is particularly associated with severe health risks. Intravenous administration leads to a rapid onset of euphoric and sedative effects, which reinforce compulsive drug-seeking behaviour. This rapid pharmacodynamic response increases the likelihood of dose escalation and frequent use, ultimately resulting in physical dependence. Injection drug use also exposes individuals to a range of complications, including local infections, abscess formation, venous thrombosis, and soft tissue necrosis. These risks are further amplified when injections are administered in non-sterile conditions or without medical supervision. Polysubstance abuse is another emerging concern among tramadol users. Self-medicating individuals often combine tramadol with other centrally acting agents such as antihistamines, particularly chlorpheniramine maleate, to enhance euphoric effects. This combination can result in synergistic central nervous system (CNS) depression, increasing the risk of excessive sedation, respiratory compromise, and other systemic toxicities. Such practices significantly elevate the risk of morbidity and unpredictable clinical outcomes [6]. Patients with chronic comorbid conditions, especially diabetes mellitus, represent a highly vulnerable group in the context of opioid misuse. Diabetes is associated with impaired immune function, reduced leukocyte activity, microvascular complications, and delayed wound healing. When combined with intravenous drug use, these factors substantially increase susceptibility to infections, tissue damage, and chronic non-healing ulcers. Moreover, poor glycemic control further exacerbates the risk of severe soft tissue complications and systemic infections,

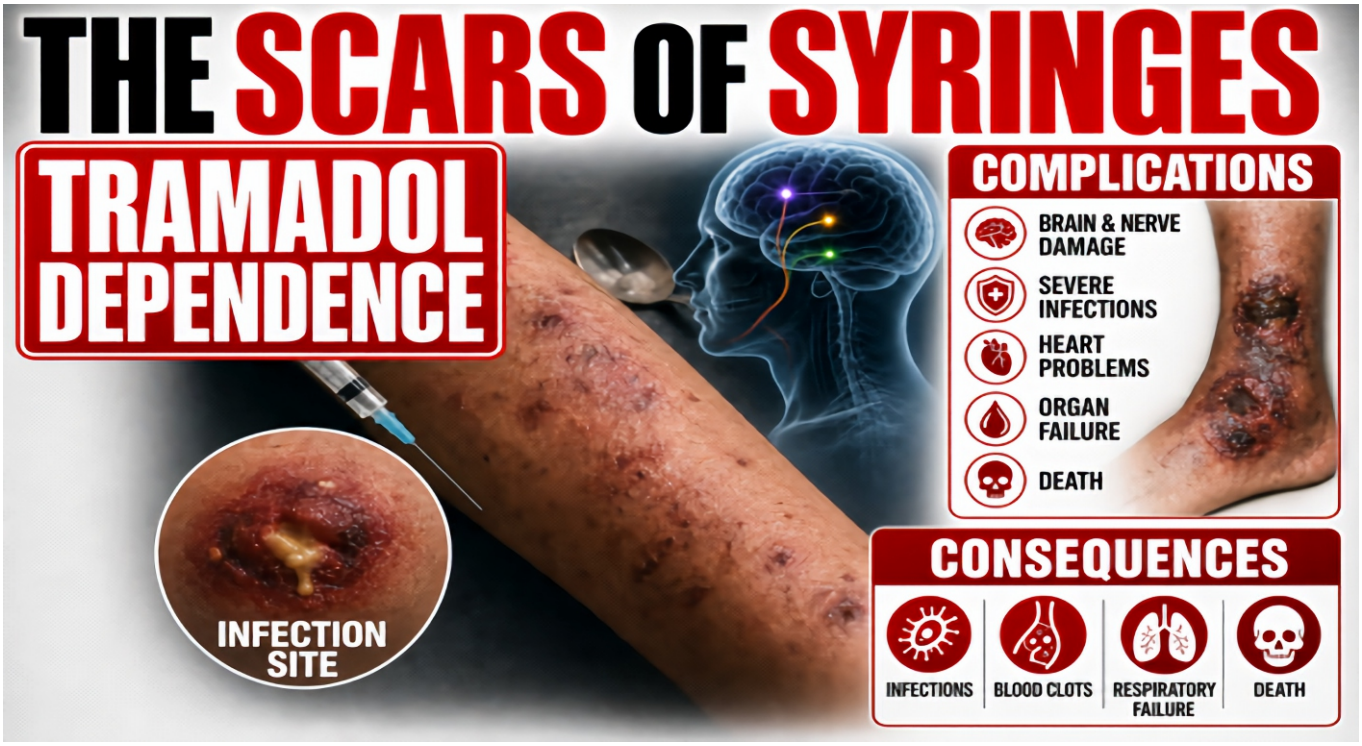

Figure 1: Clinical complications and consequences of tramadol dependence with injection-site infection and ulceration.

thereby increasing overall morbidity and healthcare burden. Graphical overview of tramadol dependence and injection-site complications **(Figure 1)**.

Given these risks, tramadol misuse represents a growing clinical challenge that extends beyond pharmacological dependence to include infectious, metabolic, and systemic complications. This highlights the urgent need for rational prescribing practices, strengthened regulatory control, early identification of substance uses disorders, and integrated multidisciplinary management strategies to reduce the burden of opioid-related harm.

CASE PRESENTATION

The patient, a 48-year-old male with a known history of uncontrolled diabetes, was initially prescribed tramadol for musculoskeletal pain. However, within weeks, he began administering it intravenously for faster relief. He self-injected 1–2 ampules daily, which gradually increased to 8 ampules per day. He reported crushing over-the-counter chlorpheniramine tablets and mixing them into the injection for enhanced sedation.

He misused a single prescription by obtaining it from multiple pharmacies and local dispensaries, thereby evading detection. His symptoms included persistent fatigue, withdrawal tremors, decreased appetite, and disturbed sleep. Upon physical examination, multiple indurated ulcers measuring 3–5 cm in diameter were seen over the bilateral thighs and anterior legs. The ulcers were purulent & foul-smelling, surrounded by hyperpigmented, inflamed tissue. The patient had tachycardia but no fever. Investigations revealed WBC count: 14,500/mm^3, random blood sugar: 430 mg/dL, HbA1c: 10.4%, CRP: elevated, wound culture: *Staphylococcus aureus* (sensitive to ceftriaxone). He was admitted for combined medical and psychiatric management.

Treatment included broad-spectrum intravenous antibiotics, insulin therapy with endocrinology consultation, wound debridement, opioid substitution therapy using Buprenorphine + Naloxone, individual psychotherapy with motivational interviewing, education on injection hygiene, nutrition, and diabetes control. The patient responded well to the integrated approach. Ulcer healing progressed, glycemic control improved (RBS: 160–180 mg/dL), and his cravings reduced. At the two-month follow-up, he remained abstinent and was compliant with outpatient follow-up. **Figure 2** shows that the scars of syringes: injection site ulcers in tramadol dependence.

RESULT

The patient exhibited progressive tramadol dependence characterized by escalation of dosage from 1–2 ampules to 8 ampules daily, along with concurrent misuse of chlorpheniramine maleate. Clinical examination revealed multiple tender, indurated, and infected ulcers over both thighs and legs at injection sites, indicating severe injection-related complications. Laboratory investigations demonstrated leukocytosis & poorly controlled diabetes mellitus, suggesting active infection & impaired wound healing. Following multidisciplinary management, including insulin therapy, antibiotics, wound care, and opioid substitution therapy with buprenorphine–naloxone, the patient showed marked improvement in local infection, ulcer healing, glycemic control, & withdrawal symptoms. Significant reduction in drug-seeking behavior and improvement in overall functional status were observed during the two-month follow-up period. These findings support the diagnosis of tramadol dependence complicated by injection-site ulceration & demonstrate the effectiveness of integrated medical & addiction-focused treatment.

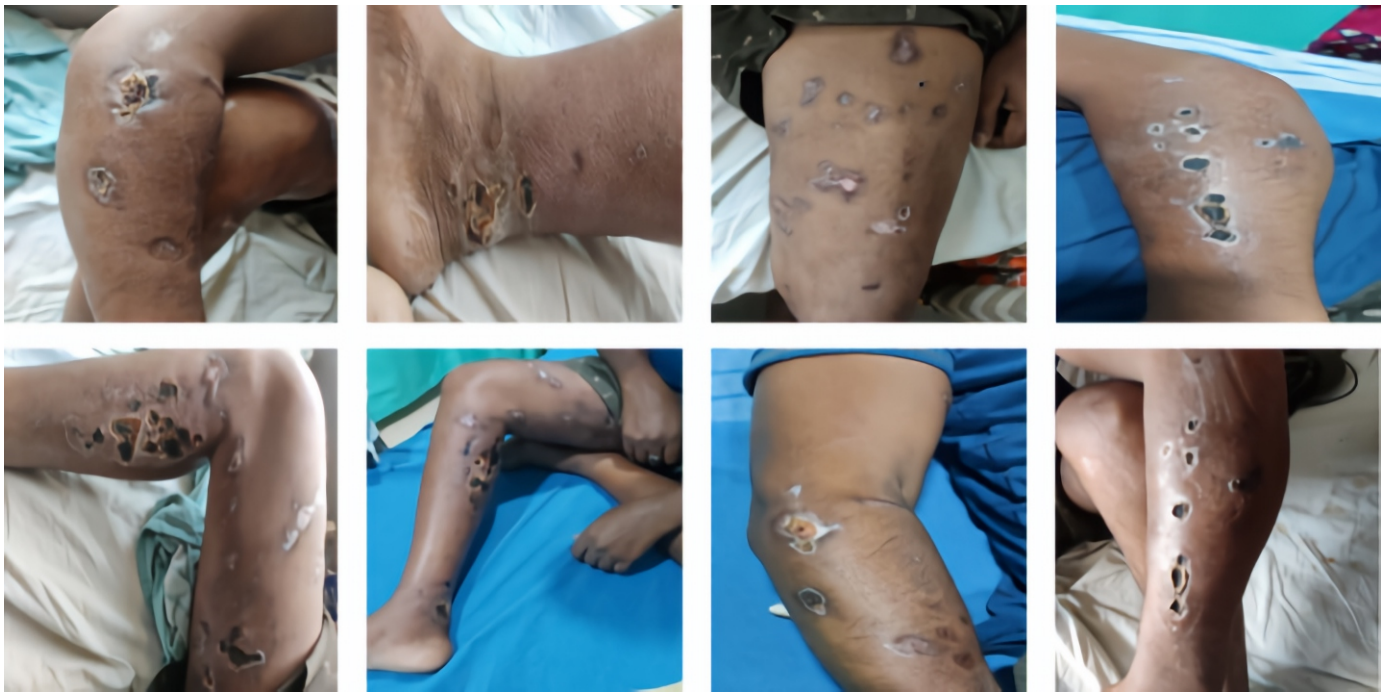

Figure 2: The Scars of Syringes: Injection site complications associated with tramadol dependence presenting as multiple ulcerated and infected lesions.

DISCUSSION

Although tramadol is not currently scheduled under the Narcotic Drugs & Psychotropic Substances (NDPS) Act in India, its dependence potential has been well documented in clinical literature. Multiple pharmacological and epidemiological studies have demonstrated that tramadol possesses significant abuse liability despite its initial classification as a "weak opioid" [1,2]. Its widespread availability, minimal regulatory restricti-ons, low cost, and easy accessibility contribute to its high-risk profile, particularly in rural and underserved populations where structured pain management services are limited or absent. These factors collectively facilitate unsupervised consumption, dose escalation, and long-term misuse. The present case illustrates several important risk factors that predispose individuals to tramadol dependence and complications. Chronic pain with inadequate symptom control often serves as a primary trigger for prolonged opioid use. In the absence of structured pain management services, patients frequently rely on repeated prescriptions or self-medication, increasing the likelihood of misuse. Additionally, the presence of medical comorbidities such as diabetes mellitus further complicates clinical outcomes. Diabetes is associated with impaired immune function, reduced leukocyte activity, microvascular dysfunction, and delayed wound healing, all of which significantly increase susceptibility to infection and tissue damage when combined with substance misuse. Socioeconomic vulnerability also plays a critical role in substance dependence. Individuals from lower socioeconomic backgrounds often face barriers in accessing specialized healthcare services, psychological support, & addiction treatment facilities. This gap in healthcare access promotes reliance on easily available pharmacological agents, including tramadol, for pain relief and self-medication. Furthermore, polypharmacy involving over-the-counter sedatives & antihista-mines, such as chlorpheniramine maleate, is increasingly report-ed among opioid users. These combinations are often used to enhance sedative or euphoric effects, but they significantly increase the risk of central nervous system depression, cognitive impairment, and physical dependence.

A particularly concerning aspect of this case is the transition to parenteral drug use. Although tramadol is most administered orally, injection drug use represents a severe escalation in the pattern of misuse. Intravenous administration is associated with the rapid onset of euphoric effects, reinforcing compulsive drug-seeking behavior, and accelerating dependence. However, this route of administration carries substantial medical risks, including local injection site infections, thrombophlebitis, tissue necrosis, and systemic sepsis. These complications are further exacerbated by poor injection practices, non-sterile conditions, and the use of contaminated or inappropriate materials. In the present case, the development of multiple infected ulcers at injection sites reflects the severe consequences of such misuse.

This case strongly emphasizes the need for a comprehensive biopsychosocial approach to the management of substance use disorders. Pharmacological detoxification alone is insufficient in addressing the complex interplay of biological, psychological, & social determinants of addiction. Effective management requires multidisciplinary integration involving internal medicine, endocrinology, psychiatry, pain management specialists, & addiction medicine services. Such an approach ensures not only detoxification but also long-term rehabilitation, relapse prevention, and management of associated comorbidities.

Furthermore, this case highlights critical gaps in medical education & healthcare policy. Studies have shown that less than 3% of medical professionals receive formal training in safe opioid prescribing & pain management principles [8]. This deficiency contributes significantly to irrational prescribing practices, inadequate monitoring, and unrecognized dependence on clinical settings. Strengthening undergraduate & postgraduate medical curricula with structured training in pain management, opioid stewardship, and addiction medicine is essential. At a policy level, stricter regulatory control over opioid dispensing, improved prescription monitoring systems, & enhanced pharmacy surveillance are urgently needed. Although tramadol is currently unscheduled under the NDPS Act, reconsideration of its regulatory status may be warranted, considering increasing misuse patterns. Implementation of electronic prescription tracking systems and enforcement of dispensing guidelines can further reduce diversion and non-medical use.

In conclusion, tramadol dependence represents a growing clinical & public health challenge with a multifactorial etiology. The present case underscores the need for early identification of risk factors, integrated multidisciplinary care, improved physician education, and stronger regulatory frameworks to mitigate the burden of opioid misuse and its complications.

CONCLUSION

Tramadol misuse is emerging as a hidden public health crisis in India. This case illustrates how a prescription opioid, perceived as safe due to its classification and widespread availability, can result in serious physical, psychological & social consequences when misused. The progression from therapeutic use to intravenous abuse is often insidious and overlooked, particularly in patients with chronic pain and comorbid medical illnesses.

Primary care physicians, psychiatrists, emergency medicine practitioners, and surgeons must collaborate in detecting early signs of opioid misuse, especially in high-risk individuals. Clinical guidelines should encourage routine screening for substance use disorders during chronic pain management. Additionally, patients should be educated about the risks of misuse and offered safer alternatives or multimodal approaches to pain management. Policy makers must implement and enforce stringent prescription regulations, curtail over-the-counter access to opioids, and support public awareness campaigns to highlight the dangers of unsupervised opioid consumption.

Finally, efforts should be made to integrate pain management and addiction treatment into primary care, ensuring early intervention and reducing long-term harm.

CLINICAL SIGNIFICANCE

The clinical significance of this study lies in its potential to bridge the gap between research findings and practical healthcare applications. It emphasizes the importance of translating scientific observations into meaningful improvements in patient care, diagnosis, and treatment outcomes. By highlighting realworld relevance, the study contributes to evidence-based medical practice and supports informed clinical decision-making. Ultimately, the findings aim to enhance patient quality of life, optimize therapeutic strategies, and promote better disease management in clinical settings.

ABBREVIATIONS

OD: Opioid Dependence
OTC: Over the counter
CPM: Chlorpheniramine Maleate
DM: Diabetes Mellitus

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AUTHOR CONTRIBUTIONS

All authors significantly contributed to the study conception and design, data acquisition, or data analysis and interpretation. They participated in drafting the manuscript or critically revising it for important intellectual content, consented to its submission to the current journal, provided final approval for the version to be published, and accepted responsibility for all aspects of the work. Additionally, all authors meet the authorship criteria outlined by the International Committee of Medical Journal Editors (ICMJE) guidelines.

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CONFLICT OF INTEREST

Authors declared that there is no conflict of interest.

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CONSENT FOR PUBLICATION

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All data generated and analyzed are included within this research article. The datasets utilized and/or analyzed in this study can be obtained from the corresponding author upon a reasonable request.

USE OF ARTIFICIAL INTELLIGENCE (AI) & LARGE LANGUAGE MODEL (LLM)

The authors confirm that no AI & LLM tools were used in the writing or editing of the manuscript, and no images were altered or manipulated using AI & LLM.

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This article serves as an important educational tool for the scientific community, offering insights that may inspire future research directions. However, they should not be relied upon independently when making treatment decisions or developing public health policies.

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