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“Krokodil” –a designer drug from across the Atlantic,with serious consequences.

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We, the authors of the article entitled “**Krokodil**” –a designer drug from across the **Atlantic with serious consequences**’ submitted for consideration for publication in the American Journal of Medicine declare that

1. We have seen and approved the text of the manuscript, and take responsibility for its contents as its authors.
2. This work in the submitted or an essentially similar version has not been published elsewhere in any language, is not under simultaneous consideration for publication elsewhere, and will not be submitted for publication elsewhere while under consideration by the American Journal of Medicine. This does not duplicate any data previously reported.
- 3) We **do not have any conflict of interest** and **do not have any source of funding** for the manuscript being considered.
- 4).All authors had access to data and have contributed significantly in writing the manuscript including literature search.
5. All authors have seen the final manuscript, have seen and approved the contents.
- 6). Dr Santhosh Gheevarghese John MD had no access to patient identifiable information.

Sincerely,

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Background: “Krokodil”, a deadly Russian designer drug, has been rapidly spreading across Europe. It can turn an addict's skin dark, scaly, necrotic and to wither away. First reported to be used in Siberia in 2002 and so far reported only in European countries¹, our case aims to shed light on the alarming fact, that this deadly mixture has made its way into the United States. Here we report a case of a young male who has been admitted multiple times in a 5 month period, with rapidly progressing necrotic leg ulcers, following intravenous (IV) abuse of homemade heroine.

Case report: Our patient is a 30 year old man presented to the hospital with pain, swelling and ulceration of his left thigh. Patient mentioned that he had been injecting homemade drug called ‘Krokodil’ into his affected area for the past 2 months. He initially noticed blisters at the skin popping sites, which rapidly turned black along with painful swelling of the legs. Within 1 month the black necrotic area peeled off, leaving a painful necrotic ulcer (Fig-1). Two months prior to this admission, he noticed rapidly progressing swelling of his left little finger with blisters, which later turned black and auto amputated. He has a history of injecting heroin into his arms and thighs for the past two years. Being a daily heroin user, it cost him around \$300 a day, forcing him to go for cheaper home-made heroin substitutes prepared from codeine. While in the hospital, he was treated with IV antibiotics and intensive wound care along with precautions for opiates and benzodiazepine withdrawals. Unfortunately, as soon as he felt some relief from his pain, he left the hospital against medical advice. Unfortunately patient lost to follow up in spite of multiple attempts.

Discussion: Krokodil a mixture of several chemicals, with the root agent being desmorphine a synthetic derivative of morphine. It can be manufactured at home from codeine, along with easily available additives and is significantly cheaper compared to heroin. Desmorphine has 8–10 times higher analgesic potency, faster onset of action and shorter half-life, compared to morphine, which accounts for its increased addictive potential^{2, 3}. The simple and cheap domestic production process involves boiling codeine with a diluting agent (mostly paint thinner), gasoline, hydrochloric acid, iodine, and red

phosphorous (which are scraped from the striking surfaces on matchboxes), resulting in the production of desmorphine and various toxic byproducts¹. Due to the high degree of contamination with different toxic chemicals, which vary among users, scientific analysis of the chemical composition is not available. Its regular use results in severe damage to the vasculature, muscles, bones and results in multiorgan failure with a mean survival time of than 2 years since its first use^{1, 4}. This novel flesh eating drug has been rapidly spreading across Europe due to its low cost and higher addictive potential. With a significant amount of prescription opiate drug abusers in the United States, it will not be difficult for a drug like "Krokodil" to find a breeding ground.

Conclusion: Our case highlights the need for physicians to be cognizant of this deadly flesh eating drug, which can spread rapidly in our addict population. Considering the ease of manufacture, low cost, higher potency, it has a higher chance for popularity among the vulnerable group of people. All kinds of governmental and non governmental authorities must be aware and on the watch for preventing this devastating and fatal drug addiction from spreading in our society.

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Figure-1, Patients lower extremity showing injection site ulcers with necrotic scar tissue.

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Figure Legends;

Patient's lower extremity showing injections site ulcers with necrotic scar tissue.

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