Annals of Clinical and Medical Case Reports

Case Report

ISSN 2639-8109 | Volume 13

Treatment of Acute Inflammation Triggered by Polyamide Acrylic

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Received: 16 July 2024
Accepted: 08 Aug 2024
Published: 14 Aug 2024
J Short Name: ACMCR

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Citation:

Bagirov V, Treatment of Acute Inflammation Triggered by Polyamide Acrylic. Ann Clin Med Case Rep. 2024; V14(1): 1-5

1. Introduction

Acute poisoning and acute inflammation remain significant public health issues worldwide, necessitating prompt and effective treatment strategies. Iodine solutions have been integral in managing various types of acute poisonings, owing to their unique detoxification capabilities (Kaswa, 2024, pp. 1–4). Clinical applications of iodine in acute poisoning have been documented in numerous case studies, highlighting its role in saving lives when conventional treatments might fail (Corlade-Andrei et al., 2023, pp. 1–3). However, despite its proven efficacy, the usage of iodine solutions does come with its own set of challenges, including proper dosage administration and potential side effects, which continue to be areas of ongoing research and discussion (Corlade-Andrei et al., 2023, pp. 8–9). The area of application is promising, which leads to the question of whether the effectiveness can also be transferred to other areas with symptoms of poisoning. It is currently unclear how acute intoxication of polyamide acrylic should be treated, so the following case studies will be presented in which treatment of acute inflammation triggered by polyamide acrylic is practised.

2. Historical Background and General Use of Iodine Solution

The use of iodine for medicinal purposes dates back to the early 19th century, initially employed as a disinfectant and antiseptic. Its efficacy in detoxification became prominent during the 20th century, as researchers explored its benefits in treating various types of poisoning, including radioactive iodine exposure. Early studies indicated that iodine could be rapidly absorbed and excreted by the human body, with the primary excretion route being urine (Nelson et al., 1947, p. 4). There was a historical success in treating radiation exposure (Harris, 2008, p. 52), but despite this, the general use of iodine solutions extends to the management of other acute poisonings. Its role in competitive inhibition—a mechanism by which stable iodine competes with harmful radioisotopes or toxins for binding sites—underscores its versatility in medical protocols (Nelson et al., 1947, p. 10). The adaptability and broad-spectrum efficacy of iodine solutions have cemented their place in the annals of medical history as pivotal agents in both preventive and active therapeutic strategies.

3. Mechanisms of Action of Iodine Solutions in Detoxification

The mechanisms of action of iodine solutions in the detoxification process are multifaceted, involving several biochemical and physiological pathways. Iodine solutions, particularly molecular iodine (I2), have been demonstrated to exhibit significant antiproliferative and cytotoxic effects on various cell lines, which is indicative of their broader therapeutic potential in acute poisoning scenarios (Rösner et al., 2016, pp. 1–4). One of the primary mechanisms involves the oxidative stress response, wherein iodine compounds induce the generation of reactive oxygen species (ROS), leading to cellular apoptosis and the inhibition of cellular proliferation (Rösner et al., 2016, S. 4). Additionally, iodine solutions enhance detoxification through the activation of various signalling pathways, including the peroxisome proliferator-activated receptor gamma (PPARγ) pathway, which plays a critical role in cellular differentiation and apoptosis. This mechanism is particularly evident in studies showing that molecular iodine (I2) and

povidone-iodine (PVP-I) can significantly reduce the proliferation of carcinoma cells, thereby suggesting a potential mechanism for the detoxification of harmful substances (Rösner et al., 2016, p. 3). Furthermore, the chelating properties of iodine solutions help in the neutralisation and elimination of toxic metals and xenobiotics from the body. By binding to these harmful substances, iodine facilitates their excretion through renal pathways, thus reducing their systemic toxicity. Clinical applications have shown that iodine solutions maintain their efficacy even in the presence of biological fluids such as blood plasma, ensuring their functional activity in diverse biological environments (Rösner et al., 2016, p. 4). Moreover, iodine's broad-spectrum antimicrobial properties are crucial for preventing secondary infections during detoxification treatment which can complicate the clinical management of acute poisoning cases. For instance, povidone-iodine has been observed to exhibit rapid virucidal activity against pathogens like SARS-CoV-2, indicating its potential utility in both medical and public health settings (Anderson et al., 2020, pp. 1–7). In conclusion, the detoxification mechanisms induced by iodine solutions are highly comprehensive, involving oxidative stress induction, activation of apoptotic pathways, chelation of toxic substances, and broad-spectrum antimicrobial activity.

4. Case Study

As described above, the problem with acute inflammation with polyamide acrylic is that nobody knows how to treat such inflammation, as there is little experience in this area. Doctors rinse out such polyamide acrylic poisoning with saline solution, whereby even after six weeks of treatment with saline solution, the poisoning continues for years after an acute inflammation. Soft tissue rheumatism (arthritis etc.) is often suspected following acute inflammation with polyamide acrylic, which is due to the fact that polyamide acrylic is soluble and can migrate. Based on the many possible applications of iodine for symptoms of poisoning and inflammatory processes, the application in acute inflammation with polyamide acrylic will be described. A 39-year-old female patient complained after a buttock implantation that the implant felt as if it was migrating, and she developed fever and pain. The MRI of the pelvis (T2 TIRM transversal and coronal, T1 TSE transversal and coronal) showed signal changes equivalent to those seen in the case of fluids which spread along the gluteal muscles to the ventral part of the iliac crest and slightly to the perianal region (right side). The condition suggested that silicone or another substrate had been injected into the gluteal region with spread of fluid-equivalent changes almost circularly in the pelvic region and on the right side also to the perianal region. During the dermatopathological examination, three samples were taken from the buttocks (15*7*5mm;18*12*6mm;15*8*6mm). Histologically, connective tissue with pronounced foreign matter deposition and a neutrophil-rich reaction with admixed serum were recognised; birefringent structures were not detectable. A condition after instillation of aquafilling was found, whereby polyacrylamide gel was instilled after examination of the material. In the blood test, the value for inorganic phosphate was 5.65 mmol/l and PTT was 43.2 seconds. The LDH value was 522 U/l and the CRP value was 0.9 mg/dl. Overall, there was an increased inflammatory process with an existing renal burden.

I treated the patient as follows. The presenting inflammation was aspirated with a 3 mm lipo cannula, and she was flushed daily with a water-based iodine solution and a drain was placed. This procedure was repeated for four weeks, and after just a few days there was a marked improvement in the symptoms. After four weeks, the inflammation had completely subsided.

5. Conclusion

In summary, also taking into account existing studies, it can be said that the described treatment with iodine solution appears to be more suitable for treating an acute inflammatory event triggered by polyamide acrylic. A large-scale double-blind study on this topic could help to better understand the findings of the case study on a little-researched topic.

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