CASE REPORT

Focal myositis and contracture secondary to amiodarone extravasation from a peripheral cannula

David Ledingham,¹ Dennis Cordato²

¹Department of Neurology,
James Cook University Hospital,
Middlesbrough, UK

²Department of
Neurophysiology, Liverpool
Hospital, Sydney, New South
Wales, Australia

Correspondence to
Professor Dennis Cordato,
dennis.cordato@health.nsw.
gov.au

Accepted 26 December 2018

SUMMARY

A 63-year-old man underwent cardioversion of atrial fibrillation with intravenous amiodarone through an antecubital fossa cannula. Mid-infusion, the cannula tissueed. He developed immediate pain and swelling. At 3 weeks, he continued to have significant pain and had developed a fixed flexion deformity. MRI demonstrated focal myositis of the biceps and brachialis muscles. Treatment included physiotherapy and plastic surgery but sadly in spite of this, the patient has had minimal symptomatic improvement at 1 year. Amiodarone extravasation is well recognised to cause local injection site reactions. Involvement of deeper tissues is rare. To our knowledge, this is only the second description of a consequent focal myositis in the literature.

BACKGROUND

Intravenous amiodarone is widely used in the management of cardiac arrhythmias. This case highlights the toxic effects on local soft tissues if a peripheral line delivering amiodarone extravasates mid-infusion. We hope this will serve as a reminder to use a central or long line where possible when administering acidic solutions. The case also details the approach we took in managing the long-term consequences of a focal toxic myositis.

CASE PRESENTATION

A 63-year-old, previously fit and well, man underwent pharmacological cardioversion of newly diagnosed atrial fibrillation with intravenous amiodarone through a wide-bore antecubital fossa cannula. The amiodarone was diluted in 1 L of 5% glucose, equating to a low concentration (<2 mg/mL) and was administered over 1–2 hours as per local guidelines. Unfortunately, mid-infusion, the cannula tissueed and a significant amount of amiodarone extravasated into the soft tissue.

The cannula was removed but swelling and bruising of the elbow and forearm developed quickly. Over the next 3 weeks, his arm developed a fixed flexion deformity whereby he was unable to extend the elbow beyond 90° or flex the elbow beyond 110°. The overlying skin remained discoloured and tender although there was no frank blistering or necrosis.

INVESTIGATIONS

MRI imaging of the elbow demonstrated a focal toxic myositis of the right biceps and brachialis

muscles, with possible extension into the brachioradialis muscle.

TREATMENT

He underwent both neurology and plastics review and was initially managed with passive stretching exercises and physiotherapy. In spite of this, he continued to have significant pain and very little functional movement in his hand. He ultimately underwent debridement of the necrotic tissue and median and ulnar neurolysis in an effort to improve his elbow and hand function.

OUTCOME AND FOLLOW-UP

At 1-year post injury, he was left with significant impairment in the forearm flexor muscle function and a type 1 complex regional pain syndrome relating to median and ulnar nerve involvement.

DISCUSSION

Management of acute-onset atrial fibrillation can involve either rate control with agents such as beta-blockers and digoxin, or focus on rhythm control where options include electrical or pharmacological cardioversion. Amiodarone, as an intravenous infusion, is often used to mediate pharmacological

Patient's perspective

The whole experience has been very traumatic for me. After the medication was started, the hand became very swollen and red, this then gradually turned yellow. The pain was significant, and I required intermittent endone and paracetamol. My arm and hand stiffened, and I lost all ability to move my hand shortly afterwards.

I undertook physiotherapy for over a year but there was very little improvement in hand function. I eventually opted for plastic surgery in the hope it may improve my hand function and pain. After the operation, the surgeon explained that I sustained necrosis to all three main nerves in my hand and has little hope that I will regain any function in my hand. I am currently seeing a pain specialist and psychologist to help me cope with my chronic pain and secondary anxiety. I have no usable function in my hand currently as my nerves and muscles there are non-existent.

I feel that I was not informed of the risks at the time of the incident, and I remain very unhappy about this.

© BMJ Publishing Group Limited 2019. No commercial re-use. See rights and permissions. Published by BMJ.

To cite: Ledingham D, Cordato D. *BMJ Case Rep* 2019;**12**:e227725. doi:10.1136/bcr-2018-227725

cardioversion. Unfortunately, our patient presented to a different facility from where we reviewed him later in a routine neurology outpatient clinic, and hence we cannot be certain as to why amiodarone was used as the first-line therapy in this instance.

Amiodarone injection is a highly acidic solution (pH 3.5–4.5). Given this property, it is ideally administered by a large central line where the chances of tissue extravasation are minimised. This is not always possible particularly in the acutely unwell patient when using a cannula in a large peripheral vein may be the next best option. Ideally, sites of flexure, which are more prone to cannula extravasation, should be avoided. Extravasation of amiodarone is well recognised to cause local injection site reactions. Involvement of the deeper tissues is much rarer. Typically, soft tissue exposure to highly acidic substances results in coagulative necrosis, oedema and ulceration. In the long term, the inflammatory oedema is replaced by tight scar tissue which can further limit movement as well as providing a barrier to prevent soft tissue healing. General recommendations for the management of extravasation of acidic solutions is to elevate the arm, apply a warm compress, provide adequate analgesia and monitor for signs of secondary infection.¹ Topical, for example, 1% hydrocortisone or even systemic hydrocortisone has also been used if inflammation is severe, although the evidence base for this is unclear. Our patient did not recall having any compresses applied following the extravasation injury and was primarily managed with analgesia and rest.

To our knowledge, this is only the second description of a fixed flexion deformity and focal myositis described in the medical literature following amiodarone extravasation.² There are no previous cases where MRI evidence of myositis has been confirmed. This outcome arises from the direct toxic effects of the highly acidic amiodarone infusion on the upper arm

soft tissues with consequent fibrosis and deformity. It serves a powerful reminder of the importance of cannula site monitoring and early recognition of tissue extravasation during amiodarone infusion.

Learning points

- ▶ Amiodarone infusions wherever possible should be administered through a central or well sited large peripheral line.
- ▶ Amiodarone is a highly acidic solution. Extravasation from a cannula site into local tissue can result in significant soft tissue damage with long-lasting consequences.
- ▶ Amiodarone extravasation is best managed by early termination of the infusion and supportive care including adequate analgesia, skin care and early physiotherapy if muscle is involved in order to help prevent contracture.

Contributors DC had the original idea for the manuscript, looked after the patient in question and edited the finished manuscript. DL wrote the manuscript and compiled the images.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Reynolds PM, MacLaren R, Mueller SW, *et al.* Management of extravasation injuries: a focused evaluation of noncytotoxic medications. *Pharmacotherapy* 2014;34:617–32.
- 2 Simoni P, Scarciolla L, Maréchal C, *et al.* Cordarone Extravasation Inducing Volkmann's-like Syndrome. *Cardiol Res* 2011;2:307–9.

Copyright 2018 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <https://www.bmj.com/company/products-services/rights-and-licensing/permissions/>
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow