

A new type of harm reduction: Creating an arteriovenous fistula for a compulsively injecting opiate user

Colin Brewer, MB
Mohammed Sobeh, FRCS

ABSTRACT

Compulsive intravenous opiate injectors often cause themselves recurrent physical damage, which sometimes threatens life or limb. Unsuccessful attempts to find a vein can occupy several hours of each day, during which blood may clot in the syringe, making injection even more difficult. Adding small amounts of heparin to the opiate in the syringe before injecting prevents clotting but may be only partially helpful. The authors describe the first reported case in which an arteriovenous fistula was created specifically to enable a compulsive injector to inject quickly, easily, and safely.

Key words: arteriovenous, fistula, compulsive, opiate user, injecting, methadone, heparin, harm reduction, addiction

INTRODUCTION

Many opiate addicts never inject opiates or other drugs. Of those who do, many inject at least partly for economic reasons, since injecting is less wasteful and more efficient than smoking for getting opiates into the body. Unfortunately, for a significant proportion of opiate injectors, the process of injection itself is a very powerful habit. Although some authors have questioned the existence of a true “needle habit,”¹ others have provided detailed accounts of the psychological and social factors that can underlie the injecting process.² In any case, whatever view is taken of the nature of the process, the fact is that in clinical practice one quite often sees patients who spend a lot of time trying to inject opiates intravenously, even when they have run out of superficial veins.

The problem takes two forms. Sometimes it is simply a question of being unable to gain venous access because all superficial veins have been occluded by recurrent injection trauma and thrombosis. Alternatively, when a functioning vein is finally accessed after several attempts, blood drawn back into the syringe to confirm access then

clots, making continued injecting difficult or impossible. Patients may spend literally hours trying and failing. At this point, some patients cross an anatomical Rubicon and start injecting into the femoral vein. For others, this is a vein too far, though they may use the external jugular or more *recherché* vessels such as the dorsal vein of the penis. If unsuccessful, they usually resort to the intramuscular route rather than suffer increasing discomfort from withdrawal symptoms.

In Britain, the tradition of offering injectable methadone to patients who continue to inject street heroin despite adequate doses of oral methadone is one well-documented and increasingly well-supported aspect of harm reduction.³⁻⁵ In Britain itself, though to a comparatively small extent, and in a rising number of other countries, prescribing intravenous (IV) diamorphine^{6,7} is the ultimate manifestation of this philosophy, short of a return to Victorian values, in which the choice of intoxicant was not thought as an appropriate matter for legislation.

Adding small doses (ca 0.5 mL) of heparin to injectable methadone, using dilute 10 U/mL formulations prepared for flushing intravenous cannulae, prevents the clotting of blood in the syringe without any systemic effects. This particular prophylactic indication for heparin (as opposed to its use for treating established injection-related deep vein thrombosis) does not appear to have been described previously. However, even this technique does not help patients who can rarely find a vein but still have a strong compulsion to inject. In this situation, patients occasionally ask wistfully if it is possible to create an “artificial vein,” since many know that patients on renal dialysis commonly undergo this procedure. We describe the first reported case in which an arteriovenous (AV) fistula was created specifically for a compulsive opiate injector.

CASE REPORT

The patient first came under the care of CB at the age

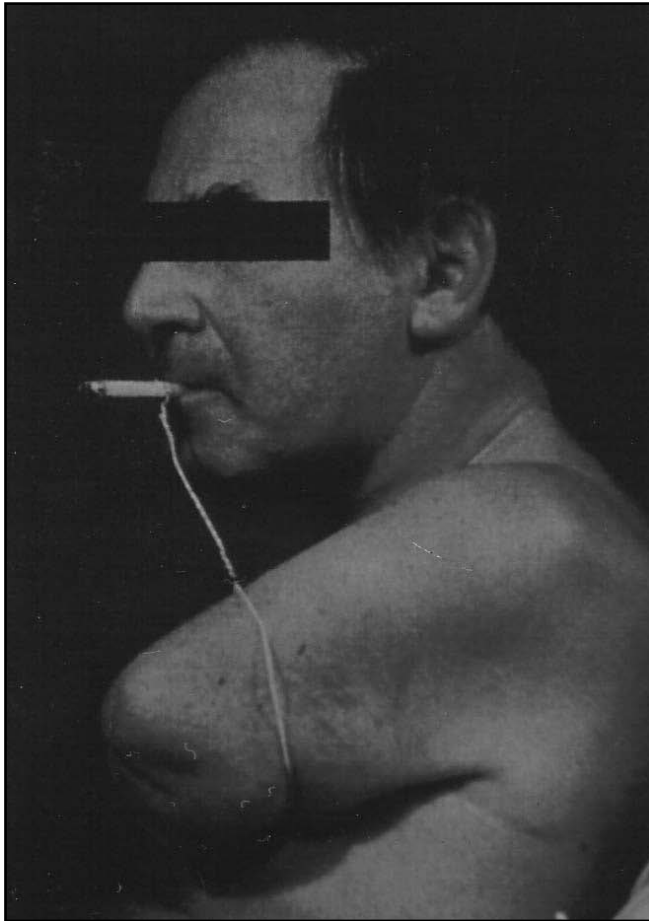


Figure 1. A well-known photograph of a patient suffering from Buerger's Disease (thromboangiitis obliterans).

of 21 when she was injecting both heroin and cocaine. Despite poor physical health and recently losing the custody of her son, she was not at that time willing to contemplate withdrawing from opiates. Maintenance on oral methadone at doses around 90 mg daily did not prevent her from continuing to inject and she was therefore maintained on injectable methadone 10 mg/mL at a dose of 85 mg daily. During the next three years, she was able to regain the custody of her son, and her maternal ability has not subsequently caused any concern. She has been in a stable relationship for over 10 years, and her partner is in regular employment.

Although she had been consistently uninterested in opiate detoxification, it was discussed from time to time along with the range of available techniques. In 1997, after six years of IV methadone maintenance treatment (IVMMT), she felt that she could contemplate detoxification if it could be done under general anaesthesia (GA).⁸⁻¹⁰ She also requested the simultaneous insertion of a 1 g naltrexone implant to prevent the early relapse,^{11,12} which otherwise usually occurs in at least 50 percent of the cases during or after planned detoxification.^{13,14} Withdrawal under GA was completed without any problems and the

residual withdrawal symptoms had largely settled within three weeks. However, she still experienced strong urges to inject and tested the opiate-blocking ability of the implant on several occasions though without getting any breakthrough.^{11,15} She did not request removal of the implant, but said that she would not have a second one and wanted to return to IV methadone maintenance when its effects wore off. To minimize the risk of inadvertent opiate overdose from loss of tolerance,¹⁶ she was given a small supply of 15 mg morphine ampoules and advised to inject one every few days until she experienced opiate effects. With this model of implant, the blockade normally lasts about seven weeks,¹⁷ but in her case she reported that it did not disappear until about 10 weeks after insertion. Implants providing opiate blockade (and protection against opiate overdose) for six to nine months have become available since then.^{18,19}

She resumed injecting methadone but reported no particular problems other than increasing obesity, which aggravated her injecting difficulties. Methadone dose remained stable at 85 mg/d, and hair testing²⁰ showed only intermittent and low levels of morphine or of heroin metabolites, consistent with her account of only occasional opportunistic heroin use. In summer 2001, the question of creating an AV fistula was first raised and she was referred to MS. Because of the unusual context, once a decision had been made that creating a fistula was practicable and would not involve an unacceptable level of medical risk (e.g., increased cardiac output leading to cardiac failure), the matter was referred to the ethical committee of the hospital and received its approval.

SURGICAL PROCEDURE

The ideal choice for vascular access is a native AV fistula utilizing the patient's own arteries and superficial subcutaneous veins in the wrist, forearm, or antecubital fossa. Unfortunately, no superficial veins could be identified for this purpose. Instead, an artificial conduit made from 6 mm stretch Gore-Tex was placed subcutaneously in the left upper arm to join the brachial artery in the antecubital fossa with the axillary vein in the medial upper arm (brachioaxillary arteriovenous graft). Axillary vein diameter was approximately 8 mm but the brachial artery was relatively small at 3 to 4 mm. The operation was performed under local anaesthetic and the left arm was chosen because the patient was right handed, thus allowing easy self-injection. Flucloxacillin and amoxicillin were given before surgery for prophylaxis and the patient was able to return home later in the day. Although these grafts can be needled immediately, injecting is best delayed for seven to 10 days to allow wound healing and resolution of any swelling that might occur, particularly with the use of prosthetic conduits.²¹

For the first 15 months, the AV fistula was trouble-free but it then occluded at the junction of the graft with the axillary vein, the arterial junction being unaffected. The old graft was removed and a new one was inserted running from the arterial stump to an unoccluded adjacent part of the vein. Since then, it has remained patent. However, in April 2005, the patient noticed some localized pain and swelling in the left hand. A duplex ultrasound scan showed moderately severe (> 50 percent) stenosis at the graft-vein junction but following percutaneous balloon venoplasty, a subsequent scan was normal and the symptoms resolved.

DISCUSSION

Advocates of harm reduction recognize that we do not live in a perfect world. While not losing sight of the best possible outcome for their patients, they may settle for less than perfection if they manage to achieve substantial reductions in the amount of medical, psychological, anatomical, social, and legal damage that patients cause to themselves and others through their drug use. Harm reduction also recognizes that the process of addiction can involve some extremely strong urges or compulsions, which are not amenable to rational persuasion. This certainly applies to cigarette smoking (Figure 1). The patient has lost all four limbs to this recognized consequence of tobacco addiction but continues to smoke, using an improvised cigarette-holder fashioned from a coat-hanger and attached to the humeral stump of one of his arms.

Thanks to a relatively simple intervention that has long been routine in chronic renal disease, our patient no longer spends several hours each day trying to find a vein and no longer suffers multiple bruises and occasional abscesses from failed attempts. The risk of serious limb damage or loss from inadvertent intra-arterial injection has also virtually disappeared. She reports that she still does not inject more than twice daily but about two years ago, she felt that the dose of methadone was not "holding" her. However, she did not press for an increase in IV dose and found that the suggested addition of 20 mg/d of oral methadone mixture (1 mg/mL) was satisfactory. Because she spends much less time in the process of injecting, all but a few minutes of her waking day are now devoted to ordinary, noncompulsive activities with a consequent improvement in her mood and self-esteem. After 12 years of private IVMMT, her prescription was taken over by her local NHS clinic without any time limit.

We do not believe that doctors have a duty to protect patients from all consequences of all the dangerous habits that they may have acquired. However, where the possibility of effective intervention exists, we think that a physician who wants to help should not be automatically

deterred by moralistic considerations. If we, or society, took a different view, we would also have to question whether to offer orthopedic treatment to sportsmen who repeatedly injure themselves during their preferred activity. Whether or when state-funded services should pay for harm-reduction treatments is a different issue but that was not a consideration in this case. However, we know of one other patient, also having private IVMMT, who is under active consideration for an AV shunt at her local NHS (i.e., state) hospital to reduce the harm caused by her compulsive injecting.

Colin Brewer, MB, Research Director, The Stapleford Centre, London, United Kingdom.

Mohammed Sobeh, FRCS, Consultant Surgeon, The Royal London Hospital and The London Clinic, Devonshire Place, London, United Kingdom.

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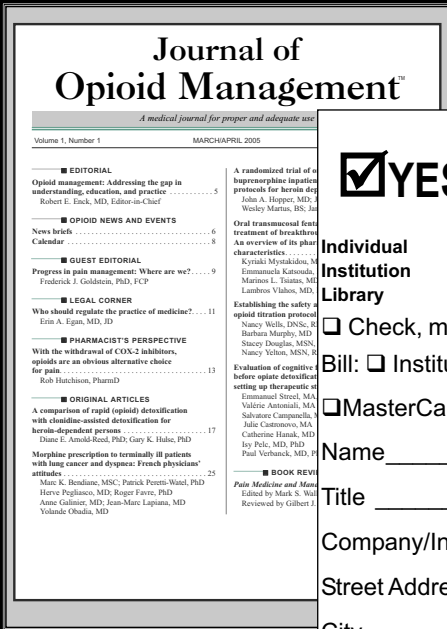
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