Removal of a Venous Intraluminal Needle: A Case Report

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Introduction

In the United States, the population who report intravenous drug use is small but this behavior is associated with dangerous and costly health problems. According to the National Survey on Drug Use and Health (NSDUH) 2009 Report, data from 2006 to 2008 showed that an average of 425,000 people annually aged 12 or older (0.17 %) used a needle to inject heroin, cocaine, methamphetamine or other stimulants [1]. However, within this group, behaviors with significant medical ramifications were quite frequent. The report found that only 29 % of users reported cleaning the needle with bleach prior to their last injection and 13 % of users used a needle they knew or suspected had been used before by themselves or another person [1]. The complications from intravenous drug use and its associated high-risk behaviors can be significant and include local infection, endocarditis, sepsis, human immunodeficiency virus transmission, hepatitis C transmission, drug overdose and even death. Another complication of intravenous drug use is needle breakage with retained needle fragment(s). This is particularly concerning when the needle fragment is intravascular due to the possibility of subsequent embolization of the fragment to distant sites. We report the case of a young woman with a retained needle fragment inside the lumen of a proximal forearm vein 7 days after attempted intravenous injection with Oxycodone. To our knowledge, this is the first successful local removal of a retained intravenous needle fragment reported in the literature.

Case Report

A 30 year old right-handed female with a known history of intravenous drug abuse (IVDA) presented to the emergency department with a 5 day history of erythema, swelling and pain in her left proximal forearm, the dorsum of her left foot and her right jaw. She was febrile to 38.3 °C and her heart rate on arrival was 103 beats per minute. She was found to have a periodontal abscess and superficial abscesses in her left proximal forearm and on the dorsum of her left foot. She admitted to injecting Oxycodone into both her left foot and her left proximal forearm with an insulin needle. The abscesses in the left foot and left proximal forearm underwent bedside incision and drainage. Both the proximal forearm and dorsal foot abscesses eventually grew Methicillin-resistant *Staphylococcus Aureus*.

Upon drainage of the proximal forearm abscess the patient stated she was concerned she may have a retained needle there from an injection attempt seven days prior. X-rays of the left forearm (Figs. 1 and 2) confirmed the presence of a needle at the level of the elbow joint, proximal to the abscess site. X-rays of her left foot revealed no foreign bodies. The patient was taken to the operating room the following day for exploration of her wound (Fig. 3) and removal of the foreign body. A non-sterile tourniquet was applied at the mid portion of the arm and was inflated to 250 mmHg from the beginning of the case until the retrieval of the needle. Upon initial gross investigation, the needle was not visible in the soft tissues. Intraoperative fluoroscopy was used and confirmed the proximal migration of the needle during the procedure. The needle was localized to a vein at the level of the elbow using fluoroscopy, and a fully intact insulin needle was extracted from inside the lumen (Fig. 4). The needle was removed and the damaged venous segment was suture ligated and resected. Further inspection revealed that the needle was significantly smaller when compared to a tuberculin needle (Fig. 5).

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Fig. 1 Anterior-posterior image of the left elbow showing the retained needle fragment

Discussion

To our knowledge, this is the first published case report of successful local removal of a retained intraluminal needle in an intravenous drug user (IDU). Kulaylat et al. attempted to retrieve a retained needle in the antecubital fossa of an IDU but the needle embolized to the lung despite the use of a tourniquet proximal to the needle location [2]. Other failed attempts at local exploration and removal were reported prior to embolization, even when the needle was palpable at the injection site [2]. Multiple case reports in the literature exist of needle embolism to the lungs, heart or pericardium in IDUs [2–4]. The exact prevalence of needle breakage while injecting and the prevalence of needle embolism in IDUs remain unknown. However, self-reported survey data taken from 70 IDUs while held in police custody in Bristol, England indicated that 20 % (14/70) had experienced a needle breaking while injecting with 61 % of those broken needles being re-used at the time of breakage [5]. This study found that of a total of 23 broken needles, 61 % (14/23) were recovered, four by surgical intervention with the remaining ten being retrieved by the individual IDUs [5]. Disposable insulin syringes are the

Fig. 2 Lateral image of the left elbow showing the needle fragment in the anterior soft tissues

Fig. 3 Intraoperative photo of left proximal forearm. P represents proximal, D represents distal and the arrow points to the abscess site. N represents the site where the needle fragment was localized with fluoroscopy at the level of the proximal forearm

most common type of needle used for injection of intravenous drugs, and may be re-used up to 20 times [6]. The problem of frequent breakage of these small caliber needles is well recognized, especially with repeated manipulation [7].

To our knowledge there are no published guidelines on management of locally retained or embolic needle fragments. Kulaylat et al. in their review of the literature, found ten case reports of needle embolization with only one of the ten reporting a complication of pericarditis necessitating pericardiectomy and removal of the needle [2, 8]. Follow-up in these ten studies ranged from 9 days to 3 years [2]. Despite this relatively low reported complication rate, other case reports have shown the potential for significant morbidity from locally retained and embolized needle fragments including deep vein thrombosis (DVT), recurrent local infection, endocarditis, pneumonia, empyema and constrictive pericarditis [3, 4, 9]. Therefore the decision to remove retained needles in IDUs is a complicated decision in which the morbidity of the surgical exploration required to retrieve the needle, with failure possible, must be weighed against the potential local and embolic complications from a retained needle. Fortunately our

Fig. 4 Intraoperative photo demonstrating extraction of the insulin needle from the lumen of a superficial vein

Fig. 5 Size comparison of the extracted needle on the right with a tuberculin needle on the left, demonstrating the significantly smaller size of the extracted needle

patient required only a small incision proximal to her proximal forearm abscess site with local dissection and superficial vein ligation to retrieve the needle.

We recommend radiographs of any fluctuant masses in IDUs to rule out retained needle fragments. If incising and draining an abscess in someone with a history of IVDA, digital dissection of the abscess should not be undertaken to prevent a possible needle-stick injury from a retained needle fragment. If operative retrieval of a retained needle fragment is considered, we believe a proximal venous tourniquet should be used despite the fact it does not prevent embolization in all cases [2]. Orthopaedic surgeons must be aware of the possibility and complications of retained needle fragments, the risk

of subsequent embolization and its associated complications so appropriate discussion of the risks and benefits of needle extraction can be undertaken with patients.

References

1. (October 29, 2009) Substance abuse and mental health services administration, office of applied studies. The NSDUH report: injection drug use and related risk behaviors. Rockville, MD
2. Kulaylat MN, Barakat N, Stephan RN, Gutierrez I (1993) Embolization of illicit needle fragments. *J Emerg Med* 11:403–408
3. Angelos MG, Sheets CA, Zych PR (1986) Needle emboli to lung following intravenous drug abuse. *J Emerg Med* 4:391–396
4. Ngaage DL, Cowen ME (2001) Right ventricular needle embolus in an injecting drug user: the need for early removal. *Emerg Med J* 18:500–501
5. Norfolk GA, Gray SF (2003) Intravenous drug users and broken needles- a hidden risk? *Addiction* 98:1163–1166
6. Murphy S (1987) Intravenous drug use and AIDS: notes on the social economy of needle sharing. *Contemp Drug Probl* 14:373–395
7. Williams MF, Eisele DW, Wyatt SH (1993) Neck needle foreign bodies in intravenous drug abusers. *Laryngoscope* 103:59–63
8. Gytrup HJ, Andreassen KH, Pedersen JH, Mortensen LB (1989) Central embolization of needle fragment following intravenous drug abuse. *Br J Addict* 84:103–105
9. LeMaire SA, Wall MJ, Mattox KL (1998) Needle embolus causing cardiac puncture and chronic constrictive pericarditis. *Ann Thorac Surg* 65:1786–1787