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## A comparative analysis of the patient characteristics and cost of managing intravenous drug users (IVDU) with soft tissue abscesses with non-IVDU

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### ABSTRACT

**Background:** Intravenous drug users (IVDU) often present to hospitals with complex comorbidities, associated with prolonged in-patient admissions. The aim of this study was to compare a cohort of IVDU patients with soft tissue abscesses with non-IVDUs. We analysed the demographics, comorbidities, location of abscesses, multidisciplinary input and financial costs of managing both groups.

**Methods:** A retrospective cohort study was conducted between January 2010 and September 2013. Two age and sex matched cohorts were compared: IVDU and non-IVDU.

**Results:** We identified 44 IVDU patients and 54 non-IVDU patients. The IVDU had higher rates of smoking (89%  $p < 0.001$ ) and unemployment (73%  $p < 0.05$ ). The most common comorbidities in the IVDU cohort were hepatitis C (17%) and HIV (14%), whereas diabetes mellitus (15%) and hypertension (11%) were the most common in the non-IVDUs ( $p < 0.01$ ). The most common location for an abscess in non-IVDU patients was the hand, whereas IVDU patients had abscesses in their groin. Groin injecting led to a referral to multiple specialties. The median length of stay for the IVDU patients was 4 days and for non-IVDU patients 1 day ( $p < 0.01$ ). The average cost of managing IVDU patients in our unit was £1280: for non-IVDU the cost was £530 ( $p < 0.001$ ).

**Conclusions:** IVDU patients with soft tissue abscesses have higher rates of smoking, unemployment, infection with hepatitis C and HIV compared to a control group. We have suggested several recommendations to optimise the management of these patients including the implementation of an additional code to compensate for the complexity of their management.

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## Introduction

Brighton, situated on the south coast of England, has the UK's highest prevalence of intravenous drug use and the highest annual opioid mortality rate.<sup>1</sup> In male residents aged 15–44 the prevalence of intravenous drug use is 2%, and the associated mortality rate in this age group is also 2%.<sup>1</sup>

Intravenous drug users (IVDU) often present to hospitals with a range of complex mental and physical co-morbidities that are associated with prolonged, costly in-patient admissions complicated by poor compliance.<sup>2–5</sup> The literature has previously described the complications IVDU may experience after elective joint replacement and spinal surgery.<sup>6,7</sup> However there is little evidence regarding the management of soft tissue infections that are commonly acquired by IVDU.<sup>8</sup>

The aim of this study was to compare the patient characteristics, treatment and cost of two groups of patients, IVDU and non-IVDU, presenting with soft tissue abscesses.

## Materials and methods

### Study design

A retrospective cohort study was conducted at the Royal Sussex County Hospital (Brighton & Sussex University Hospitals Trust, Eastern Road, Brighton, BN2 5BE, UK) between January 2010 and September 2013. The study was registered with the local department of safety and quality.

Patients were identified from two hospital computer systems ('Bluesprier', Bluesprier International Ltd. and 'E-Oasis', Brighton & Sussex Healthcare trust). Two age and sex matched cohorts were compared: patients who used intravenous drugs (IVDU) and non-IVDU. A comparative analysis for IVDU vs non-IVDU patients was performed for each of the following categories:

1. Demographics: employment and smoking status
2. Comorbidities
3. Anatomical location of soft tissue abscess
4. Other specialties involved in care
5. Length of stay (LoS)
6. Financial costs

A Mann–Whitney test was performed to evaluate differences in the length of stay (LoS) in IVDU vs non-IVDU patients using SPSS v16.0 (SPSS Inc, Chicago, IL).

### Study groups

We included only patients who were admitted to our hospital under the care of orthopaedic surgeons with soft tissue abscesses. The IVDU cohort included patients currently using intravenous drugs and those prescribed methadone. All of the patients prescribed methadone also admitted to recently injecting intravenous drugs. All patients with orthopaedic implants in the affected limbs or region were excluded from the study. All patients, both IVDU and non-IVDU, were managed as inpatients with incision and drainage of the

abscess under general anaesthetic with broad-spectrum intravenous antibiotics.

### Calculation of financial costs

We felt the most significant contribution to overall cost of management was the length of inpatient stay (LoS) between the two cohorts. We therefore estimated the cumulative cost of the inpatient stay as; the unit cost of an inpatient bed multiplied by the length of stay (LoS), plus the running costs of a trauma theatre for one hour. The cost of a bed in our trauma unit was £250 per day at the time of writing.

We did not include additional investigations or procedures such as imaging or returns to theatre in our cost analysis as we felt there would have been too much variation between patients within in each group.

## Results

### Demographics, employment and smoking status

We identified 44 IVDU patients (mean age 41 years) of which 73% were male. There were 4 patients on methadone within this group. The control group consisted of 54 non-IVDU patients.

The IVDU patients had significantly higher rates of smoking ( $p < 0.001$ ) and, amongst patients of working age, unemployment ( $p < 0.05$ ) (Table 1).

### Comorbidities

The IVDU cohort had different associated comorbidities to the non-IVDU cohort (Fig. 1). Of the 44 IVDU patients, 7/44 (16%) had hepatitis C and 6/44 (14%) had HIV. Of the non-IVDU patients, 1/54 (2%) had hepatitis C and none had HIV. In contrast, diabetes mellitus and hypertension were common comorbidities in the non-IVDU cohort. There was a statistically significant difference ( $p < 0.01$ ) in the types of co-morbidities between the IVDU and non-IVDU cohorts.

### Anatomical location of soft tissue abscess

The most common location for an abscess in the IVDU patients was in the antecubital fossa, whereas the hand was the most common site in the non-IVDU patients (Fig. 2). Both groups developed abscesses in locations such as the knee and shoulder areas. Only the control group developed abscesses over the buttock or olecranon.

**Table 1 – A comparison of employment and smoking status between IVDU and non IVDU.**

	Employment		Smoker	
	Yes	No	Yes	No
IVDU (%)	27	73	89	11
Non-IVDU (%)	56	44	28	72

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