

# **Is there a correlation between injecting heroin into the groin and abscesses, leg ulcers, deep vein thromboses and pulmonary emboli?**

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## **Abstract**

Heroin is a class A drug in the UK, and has a very high rate of abuse. There are many health implications to using heroin such as malnutrition, leg ulcers, abscesses, hepatitis B and C, HIV and DVTs. In this project I have attempted to find out if there is a connection between injecting heroin into the groin and the occurrence of DVT, abscesses and leg ulcers in addicts. My conclusion from the project is that patients who inject into the groin are more likely to suffer with DVTs, but further work would need to be done to find out if there was a link with abscesses and leg ulcers.

## **Introduction**

In the UK, heroin is a class A drug, due to its addictive and potentially fatal properties. It belongs to a group of drugs called opiates, which are derived from the opium poppy. <sup>[1]</sup> 90% of heroin is produced in Afghanistan. Heroin, or Diamorphine, is synthesised from morphine, which is commonly used as a strong pain killer. <sup>[1][2]</sup>

Heroin was originally produced by Bayer, a German pharmaceutical company, as a 'non-addictive morphine substitute' to be used as a cough suppressant. In reality, they had manufactured a drug more addictive than morphine, which now has one of the highest rates of abuse.

Substance abuse is described as 'self-administration of drugs that deviate from medically or socially accepted use, which can lead to the development of physical and psychological dependence'. <sup>[3]</sup> Drug abuse

is a massive social problem. Heroin addicts make up 70% of Home Office notified addicts,<sup>[4]</sup> but only 10% of all drug users in total.<sup>[5]</sup>

Heroin can be used by patients in two main ways; it is either smoked or injected. To inject heroin, patients mix citric acid with the heroin on a metal spoon or 'cooker,' they then use a lighter to heat the mixture. Using a filter, they draw up the liquid into a syringe, and inject it into a vein.

Patients start by using their peripheral veins, such as the ones in their hands, arms and feet. As these veins become overused, they start to use bigger more central veins, such as the veins in the legs, groin and neck.<sup>[6]</sup>

There are several health implications of using heroin, including; malnutrition, superficial skin abscesses,<sup>[6]</sup> leg ulcers,<sup>[6]</sup> hepatitis B and C, human immunodeficiency virus (HIV), deep vein thrombosis (DVT - clots in the leg or arm)<sup>[7]</sup>, pulmonary emboli (PE - clots in the lungs), heroin withdrawal and heroin overdose.

#### Skin abscesses

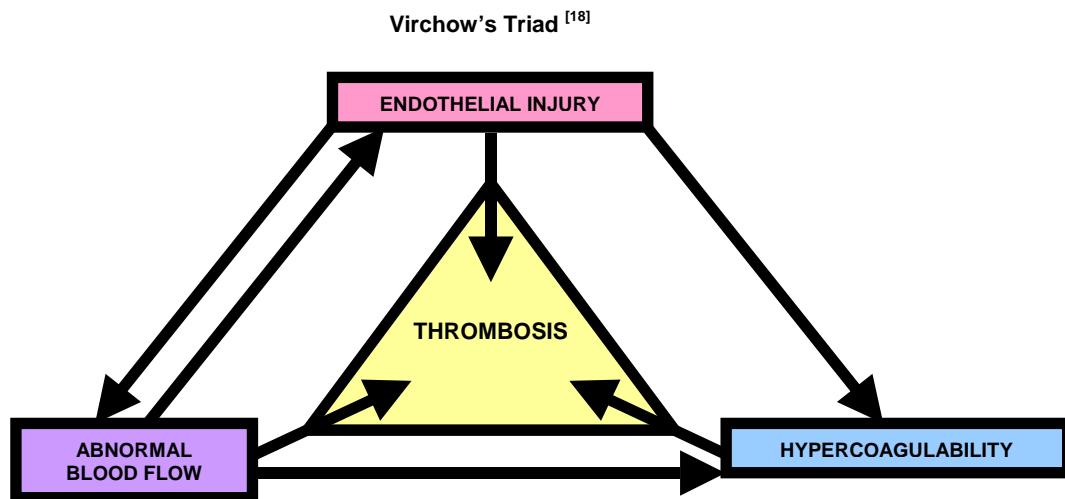
Skin abscesses are usually a result of a practice known as 'skin popping.'<sup>[1]</sup> This is where they inject directly into tissue, and not a vein. Most abscesses are found in the groin or leg, but can occur at any wound site.<sup>[1]</sup> The most common pathogen found in the abscesses is MRSA.<sup>[1]</sup>

#### Leg ulcers

Limb ulceration is common amongst intravenous drug users.<sup>[6]</sup> Once the veins in the groin and upper limb are no longer suitable for injecting, the lower limb is used.<sup>[6]</sup> Some patients also do 'skin popping' on the lower limbs.<sup>[6]</sup> Acute thrombophlebitis occurs along the vein, due to contamination from staphylococcus aureus.<sup>[6]</sup> This results in tissue destruction, cellulites and formation of abscesses.<sup>[6]</sup> Ulceration is a direct effect of these complications, along with venous insufficiency in the limbs.<sup>[6]</sup> Patients do not often seek help as quickly as is needed, which increases the severity of the ulcers.<sup>[6]</sup> If ulcers do not heal sufficiently, amputation may be the only option.<sup>[6]</sup>

#### Thrombosis

There are three factors that predispose to formation of a thrombus; the three factors together are called Virchow's triad, as shown in the diagram below.<sup>[18, 29]</sup>



Injection into a vein causes endothelial injury, which is one of the three factors contributing towards thrombosis formation. <sup>[7]</sup> The substances used to 'cut' heroin can cause superficial venous sclerosis and thrombosis, because they act as irritants and cause further endothelial damage. <sup>[8]</sup> Infection in the surrounding area alters the blood flow in the vein. <sup>[9]</sup> These factors contribute towards activation of clotting factors, which initiates thrombosis formation. <sup>[9]</sup> The use of more central veins increases the chance of a deep vein thrombosis. <sup>[8]</sup>

Depending on where the user injects, is dependant on the effects of the thrombosis. If the addict injects into the groin, a deep vein thrombosis may result. <sup>[7]</sup> As with any deep vein thrombosis, pulmonary embolism is a potential risk. <sup>[7]</sup>

The complications discussed above usually occur either in the groin or in the legs. Because of this, I want to see if there is any correlation between patients who inject in their groin and superficial skin abscesses, leg ulcers and DVTs.

## Methods

I planned to devise a questionnaire that could be filled out by all patients who attended the clinic to see if they injected heroin, and if they did, did they inject into their groin. Using the questionnaire, I would also find out how many of them had suffered with superficial skin abscesses, leg ulcers and DVTs.

I did a pilot of the questionnaire, which gave poor results. Not enough patients attended clinic to fill in the questionnaire, some attend very infrequently, and therefore the number of responses would be limited. The questionnaire also took quite a lot of the staff's time to fill in, and staff were finding it difficult to therefore do it with every patient that attended.

Because of this, I decided that I would change my methods. I decided I would look through the 170 patients' medical records and record their injecting status either as: doesn't inject, injects but not into the groin and injects into the groin. At the same time, I would also record whether they had suffered with the relevant medical problems. This method proved to be much more successful, and I obtained the information on 70 of the 170 patients. All information that was recorded was done anonymously, taking patient confidentiality into account.

## Results

The results I obtained are shown in the table below:

Patient	IV/Groin/Smoke	DVT	How many?	Ulcers	How many?	Abscess	How many?
1	Groin	Yes	3	No	0	No	0
2	IV	No	0	No	0	No	0
3	IV	No	0	No	0	No	0
4	Groin	Yes	1	No	0	No	0
5	IV	Yes	1	No	0	Yes	1
6	Smoke	No	0	No	0	No	0
7	Groin	Yes	3	No	0	No	0
8	Groin	No	0	No	0	No	0
9	IV	Yes	2	Yes	1	No	0
10	Smoke	No	0	No	0	No	0
11	Groin	No	0	No	0	No	0
12	Smoke	No	0	No	0	No	0
13	Smoke	No	0	No	0	No	0
14	Smoke	No	0	No	0	No	0
15	Smoke	No	0	No	0	No	0
16	Smoke	No	0	No	0	No	0
17	Smoke	No	0	No	0	No	0
18	Smoke	No	0	No	0	No	0
19	IV	No	0	No	0	Yes	1
20	Smoke	No	0	No	0	No	0
21	Groin	No	0	No	0	Yes	1
22	IV	No	0	No	0	No	0
23	Smoke	No	0	No	0	No	0
24	Smoke	No	0	No	0	No	0
25	IV	No	0	No	0	No	0
26	IV	No	0	No	0	Yes	1
27	IV	No	0	No	0	No	0
28	Smoke	No	0	No	0	No	0
29	Groin	Yes	1	No	0	Yes	2
30	Smoke	No	0	No	0	No	0

31	IV	Yes	4	Yes	3	No	0
32	Smoke	Yes	3	No	0	No	0
33	Smoke	No	0	No	0	No	0
34	Groin	No	0	No	0	No	0
35	Smoke	No	0	No	0	No	0
36	IV	Yes	1	No	0	Yes	1
37	Smoke	Yes	1	No	0	No	0
38	Smoke	No	0	No	0	No	0
39	Groin	Yes	2	No	0	No	0
40	Smoke	No	0	No	0	No	0
41	Smoke	No	0	No	0	No	0
42	Smoke	No	0	No	0	No	0
43	Smoke	No	0	No	0	No	0
44	Smoke	No	0	No	0	No	0
45	Smoke	No	0	No	0	No	0
46	IV	No	0	No	0	No	0
47	Groin	No	0	No	0	No	0
48	Smoke	No	0	No	0	No	0
49	Smoke	Yes	1	Yes	1	No	0
50	IV	No	0	No	0	No	0
51	IV	No	0	No	0	No	0
52	IV	No	0	No	0	No	0
53	Smoke	No	0	No	0	No	0
54	Smoke	No	0	No	0	No	0
55	Smoke	No	0	No	0	No	0
56	Groin	No	0	No	0	Yes	5
57	Smoke	No	0	No	0	No	0
58	Groin	Yes	1	No	0	Yes	1
59	Smoke	No	0	No	0	No	0
60	Smoke	Yes	1	No	0	No	0
61	Smoke	No	0	No	0	No	0
62	IV	No	0	No	0	No	0
63	Smoke	No	0	No	0	No	0
64	Groin	No	0	No	0	No	0
65	Smoke	No	0	No	0	No	0
66	Smoke	No	0	No	0	No	0
67	IV	No	0	Yes	1	No	0
68	Groin	No	0	No	0	No	0
69	Smoke	No	0	No	0	No	0
70	Smoke	No	0	No	0	No	0
71	Smoke	No	0	No	0	No	0
72	Smoke	No	0	No	0	No	0
73	Groin	Yes	3	No	0	No	0
Total		15	28	4	6	8	13

The results show that of the 73 patients, 15 suffered with DVTs, with 28 DVTs between the 15 patients. 4 of the 73 patients suffered with ulcers, with 6 episodes between the 4 patients. 8 patients suffered with abscesses, with 13 occurrences between the 8 patients.

To analyse my results further I have split the patients into groups, by injecting status.

Patient	IV/Groin/Smoke	DVT	How many?	Ulcers	How many?	Abscess	How many?
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1	Groin	Yes	3	No	0	No	0
4	Groin	Yes	1	No	0	No	0
7	Groin	Yes	3	No	0	No	0
8	Groin	No	0	No	0	No	0
11	Groin	No	0	No	0	No	0
21	Groin	No	0	No	0	Yes	1
29	Groin	Yes	1	No	0	Yes	2
34	Groin	No	0	No	0	No	0
39	Groin	Yes	2	No	0	No	0
47	Groin	No	0	No	0	No	0
56	Groin	No	0	No	0	Yes	5
58	Groin	Yes	1	No	0	Yes	1
64	Groin	No	0	No	0	No	0
68	Groin	No	0	No	0	No	0
73	Groin	Yes	3	No	0	No	0
Total		7	14	0	0	4	9

The table above contains information regarding the patients who inject into their groin. 7 of the 15 patients suffered with DVTs. Between the 7 patients, 14 DVTs occurred, making an average of 2 per sufferer. The greatest number of DVTs that one patient had was 3. None of the patients who injected into the groin had problems with ulcers. Of the 15 patients, 4 had problems with abscesses in the groin. Between the 4 patients, 9 incidences of abscesses occurred, which works out at just over two per patient.

Patient	IV/Groin/Smoke	DVT	How many?	Ulcers	How many?	Abscess	How many?
2	IV	No	0	No	0	No	0
3	IV	No	0	No	0	No	0
5	IV	Yes	1	No	0	Yes	1
9	IV	Yes	2	Yes	1	No	0
19	IV	No	0	No	0	Yes	1
22	IV	No	0	No	0	No	0
25	IV	No	0	No	0	No	0
26	IV	No	0	No	0	Yes	1
27	IV	No	0	No	0	No	0
31	IV	Yes	4	Yes	3	No	0
36	IV	Yes	1	No	0	Yes	1
46	IV	No	0	No	0	No	0
50	IV	No	0	No	0	No	0
51	IV	No	0	No	0	No	0
52	IV	No	0	No	0	No	0
62	IV	No	0	No	0	No	0
67	IV	No	0	Yes	1	No	0
Total		4	8	3	5	4	4

The above table has the results for patients who users heroin intravenously, but not into the groin. Of the 17 patients, 4 had problems with DVTs. Between the four patients, 8 DVTs were reported, working out at an average of 2 per affected patient. 3 of the 17 patients had problems with leg ulcers. There were 5 reported cases of leg ulcers between the 3 patients. 4 of the 17 patients reported problems with abscesses in the groin.

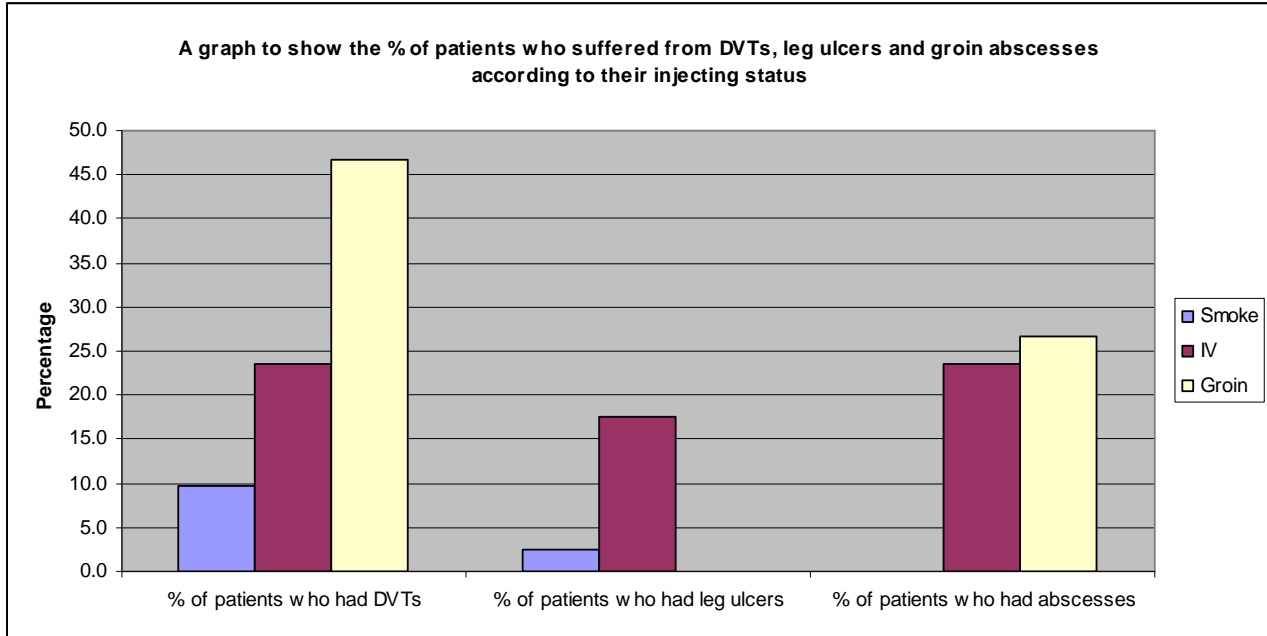
Patient	IV/Groin/Smoke	DVT	How many?	Ulcers	How many?	Abscess	How many?
6	Smoke	No	0	No	0	No	0
10	Smoke	No	0	No	0	No	0
12	Smoke	No	0	No	0	No	0
13	Smoke	No	0	No	0	No	0
14	Smoke	No	0	No	0	No	0
15	Smoke	No	0	No	0	No	0
16	Smoke	No	0	No	0	No	0
17	Smoke	No	0	No	0	No	0
20	Smoke	No	0	No	0	No	0
23	Smoke	No	0	No	0	No	0
24	Smoke	No	0	No	0	No	0
28	Smoke	No	0	No	0	No	0
30	Smoke	No	0	No	0	No	0
32	Smoke	Yes	3	No	0	No	0
33	Smoke	No	0	No	0	No	0
35	Smoke	No	0	No	0	No	0
37	Smoke	Yes	1	No	0	No	0
38	Smoke	No	0	No	0	No	0
40	Smoke	No	0	No	0	No	0
41	Smoke	No	0	No	0	No	0
42	Smoke	No	0	No	0	No	0
43	Smoke	No	0	No	0	No	0
44	Smoke	No	0	No	0	No	0
45	Smoke	No	0	No	0	No	0
48	Smoke	No	0	No	0	No	0
49	Smoke	Yes	1	Yes	1	No	0
53	Smoke	No	0	No	0	No	0
54	Smoke	No	0	No	0	No	0
55	Smoke	No	0	No	0	No	0
57	Smoke	No	0	No	0	No	0
59	Smoke	No	0	No	0	No	0
60	Smoke	Yes	1	No	0	No	0
61	Smoke	No	0	No	0	No	0
65	Smoke	No	0	No	0	No	0
66	Smoke	No	0	No	0	No	0
69	Smoke	No	0	No	0	No	0
70	Smoke	No	0	No	0	No	0
71	Smoke	No	0	No	0	No	0
72	Smoke	No	0	No	0	No	0
18	Smoke	No	0	No	0	No	0
63	Smoke	No	0	No	0	No	0
Total		4	5	1	1	0	0

The above table shows the results for patients who smoked heroin. Of the 41 patients, only 4 patients suffered with DVTs. Of the 4 patients, 5 DVTs were reported. 1 patient reported having problems with leg ulcers. No patients reported any problems with abscesses.

Method	% of patients who had DVTs	Number of cases per affected patient	% of patients who had leg ulcers	Number of cases per affected patient	% of patients who had abscesses	Number of cases per affected patient
Smoke	9.8	1.3	2.4	1.0	0.0	0.0

IV	23.5	2.0	17.6	1.7	23.5	1.0
Groin	46.7	2.0	0.0	0.0	26.7	2.3

The table above is a summary of the results.



The graph above is from the table which summarises the results.

As you can see from the table and graph above, almost half (46.7%) of patients who inject into the groin suffer with DVTs, in comparison to less than 10% (9.8%) who smoke heroin and just less than one quarter (23.5%) of patients who inject but not into the groin.

2.4% of patients smoked heroin were affected by leg ulcers, but 17.6% of patients who used heroin IV but not into the groin suffered from the condition. No patients who injected into the groin suffered with leg ulcers.

None of the patients who smoke heroin reported any problems with abscessed. 23.5% of patients who used heroin IV but not into the groin suffered with abscesses and 26.7% of patients who used heroin IV into the groin suffered with abscesses.

## Discussion



As you can see from the results, patients who used heroin IV into the groin were twice as likely to have DVTs in comparison to IV heroin addicts who do not inject into the groin, and were ten times more likely to have DVTs than patients who smoked heroin.

Patients who injected heroin both into the groin and not into the groin were much more likely to have problems with abscesses than those that smoked heroin. It was difficult to obtain the results from the medical records as the site of the abscess was not always recorded.

Patients who users heroin IV but not in the groin were more likely to have problems with leg ulcers than those that smoked heroin and injected heroin into the groin.

## **Conclusion**

In conclusion, patients who inject into the groin are far more likely to suffer with DVTs. I would want to confirm this by proper statistical analysis of the results.

This project has been a fantastic opportunity to further my knowledge in a subject that as a medical student, we do not learn much about. I have spent a lot of time with drug addicts during the project and have learnt a great deal. The project has been an opportunity to do a piece of work independently, which has helped me learn my strengths and my weaknesses. From this project I have learnt that I need to further my knowledge in statistics as I have no experience of this. I have also learnt how time consuming a project can be.

I would like to say thank you to CEEBL for funding and therefore allowing me to do this project.

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