

## Insulin Injection: When a Simple Gesture Leads to a Serious Complication; the Importance of Therapeutic Education

Farah El Gharroudi<sup>1\*</sup>, S. Rafi<sup>1</sup>, G. El Mghari<sup>1</sup>, N. El Ansari<sup>1</sup>

<sup>1</sup>Department of Endocrinology, Diabetology, Metabolic Diseases and Nutrition, Mohammed VI University Hospital, Marrakech, Morocco

DOI: [10.36347/sjmcr.2023.v11i02.007](https://doi.org/10.36347/sjmcr.2023.v11i02.007)

| Received: 27.12.2022 | Accepted: 05.02.2023 | Published: 08.02.2023

\*Corresponding author: Farah El Gharroudi

Department of Endocrinology, Diabetology, Metabolic Diseases and Nutrition, Mohammed VI University Hospital, Marrakech, Morocco

### Abstract

### Case Report

The number of patients treated with insulin has increased steadily over the last few decades, and the product has undergone several changes since its invention, mainly with the modification of its structure to allow for greater efficiency and form with the appearance of insulin pens. Despite this, many people with diabetes fail to reach their glycemic targets. One of the reasons for this is errors in insulin injection technique. These errors are numerous but underestimated because they are less well understood, but fortunately they are easily corrected once detected. This requires a good education of the patient on the injection technique, which can already solve part of the diabetes imbalance.

**Keywords:** Insulin, diabetes, injection technique, therapeutic education.

**Copyright © 2023 The Author(s):** This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

## INTRODUCTION

In diabetic patients, insulin therapy is essential in the management of their diabetes, which may be permanent or temporary, depending on whether it is type 1 or type 2 diabetes.

However, strict asepsis is necessary to avoid infection at the insulin injection site, which would be a gateway.

Insulin therapy that is not carried out properly, without respecting certain rules of injection and asepsis, can have infectious consequences on the skin in the presence of favourable factors such as the use of non-steroidal anti-inflammatory drugs (NSAIDs), unbalanced diabetes or immunosuppression. This can lead to complications, such as necrotizing fasciitis, which is a rare and serious infection of the skin and deep subcutaneous tissues with a tendency for rapid spread of infectious necrosis in the absence of urgent medical and surgical treatment. We report a case of necrotizing fasciitis of the arm, due to an insulin injection.

## CLINICAL CASE

A 55-year-old female patient, diabetic for 23 years on insulin, without any particular pathological

history, admitted to the emergency room with a diabetic ketoacidosis.

**On Examination:** Inflammatory placard of the left arm surmounted by pustules since 15 days following an insulin injection, in a context of feverish sensation and AEG.

4 days after her admission to our training, the evolution was marked by the installation of a patch of necrosis on the lesion. The check-up objectified an elevated CRP at 115mg/l. The ultrasound of the arm showed an infiltration of the subcutaneous soft parts of the deltoid region, with the presence of a subcutaneous and aponeurotic collection extending 4cm with a thickness of 6mm.

Two days after curettage of the necrosis, the evolution was marked by reconstitution of the necrosis and enlargement of its extent, justifying a necrosectomy.

Then the patient was put on amoxicillin-clavulanic acid 4g/d + ciprofloxacin 400mg/d, gentamycin 160mg/d for 5 days and ceftazidime 1g\*3/d for 15 days.

At discharge, the evolution was favorable with surgical scar budding and sterilization of bacteriological samples.



**Figure 1: After curettage**



**Figure 2: After necrosectomy**



**Figure 3: Scarring one month later**

## DISCUSSION

This case illustrates the fact that the wrong insulin injection is not consequenceless. In our patient, despite being used to insulin therapy for a long time, she would have used the same syringe and therefore the same needle during several insulin injections.

This complication of insulin injection as well as others can be avoided by a therapeutic education aiming at acquiring skills on the theoretical and practical aspects of the gesture.

Several studies have shown that errors in the rules and techniques of insulin self-injection are due to patients' lack of knowledge of the different steps of insulin administration [1]. The different errors reported in the literature concern injection in the same place, injection in areas of lipodystrophy, reuse of needles, injection through clothing and not mixing cloudy insulins before use. Most patients report that they were not educated or trained in insulin injection techniques [2].

Therapeutic education for the diabetic patient undergoing insulin therapy is essential, it allows the mastery of theoretical skills, adherence to the treatment and therefore a better management of the disease.

This education includes several elements that need to be taught and learned, including: insulin storage, injection site asepsis, injection technique, proper disposal of injection materials, regular needle changes, and rotation of injection sites. Not to mention the complications associated with insulin overdose and underdose, including hypoglycemia and hyperglycemia and their management. It is necessary that this therapeutic education is done through objective educational tools and in an interactive way, and to always make an objective evaluation of the acquisition of new self-care skills by the patient, because a non-evaluated skill is a non-learned skill.

In this sense, there are several elements of insulin use that need to be taught and learned, including insulin storage, injection site care, injection technique, injection site rotation, needle use and length [1]. Other considerations are taught when using insulin, including proper disposal of injection materials, injection complications including hypoglycemia, and management of this complication. The likely consequence of all the information given to the patient during insulin initiation is an inability to retain all the information taught. It is therefore necessary to ensure the transfer of skills from the educator (health care staff) to the learner (patient) through appropriate teaching tools during workshops on insulin injection rules and techniques, and to always objectively evaluate the acquisition of new self-care skills by the patient, because a skill not evaluated is a skill not learned.

A fundamental approach to the evaluation of insulin administration skills is the self-learning method. This method is used to assess learners' skills and understanding by having the patient explain to the provider, in his or her own words, what he or she learned after being introduced to the concept for the first time. The teach-back method also assesses the effectiveness of the educator's ability to convey the concepts to the learner [3, 4]. It allows for immediate correction and clarification of skills and concepts if they are not correctly understood. Indeed, the Institute for Ethics and the Agency for Healthcare Research and Quality promote this learning method a "best practice" to enhance patient knowledge and improve patient outcomes [5].

## CONCLUSION

Our article, and through this clinical case, illustrates the importance of therapeutic education as well as the evaluation of the patient's learning. These should be done at every opportunity to reduce complications and hospitalization rates due to improper injection technique.

## REFERENCES

1. Truong, T. H., Nguyen, T. T., Armor, B. L., & Farley, J. R. (2017). Errors in the administration technique of insulin pen devices: a result of insufficient education. *Diabetes Therapy*, 8(2), 221-6.
2. Louzolo-Kimbembe, R. (2021). Insulin Injection A Non-Trivial Act with Sometimes Serious Consequences: Major Role of Therapeutic Education. *SAS J Med*, 7(2), 47-49.
3. Arcebido, R., Wong, E., Cohen, V., & Likourezos, A. (2013). Pharmacist-led discharge counseling on subcutaneous insulin use and administration. *American journal of health-system pharmacy*, 70(16), 1371-1373.
4. Iowa Healthcare System. Always use teach-back! Article online. 2015. Available from: <http://www.teachbacktraining.org/>. Accessed 7 Feb 2017
5. Truong, T. H., Nguyen, T. T., Armor, B. L., & Farley, J. R. (2017). Errors in the administration technique of insulin pen devices: a result of insufficient education. *Diabetes therapy*, 8, 221-226. <https://doi.org/10.1007/s13300-017-0242-y>