

Original Research Article

Cost benefit analysis of intralesional injections in keloids using Luer lock and non-locking syringes

Amit Prabhakar Phadnis¹, Sumedha Shinde², Sachin Kale³, Arvind Vatkar^{3*},
Arindaam Arjunrao Pol⁴, Shobhan Mandal³, Ashmit Verma³, Sonali Das³, Sachiti Sachin Kale⁵

¹Department of General Surgery, Terna Medical College Nerul, Kharghar, Navi Mumbai, Maharashtra, India

²Sir JJ group of Hospital Blood Bank, Byculla, Mumbai, Maharashtra, India

³Department of Orthopedics, Dr. Y. Patil Medical College and Hospital Navi Mumbai, Maharashtra, India

⁴AJ Institute of Medical Sciences and Research Center, Mangaluru, Karnataka, India

⁵Lokamanya Tilak Municipal Medical College and Hospital, Sion, Mumbai, Maharashtra, India

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*Correspondence:

Dr. Arvind Vatkar,

E-mail: vatkararvind@gmail.com

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ABSTRACT

Background: For keloid scarring, intralesional corticosteroid injections continue to be the most often utilised first therapeutic option. This is a common procedure done on an outpatient basis by surgeons and orthopaedists. Luer lock syringes which lock the needle with syringe prevent any leakage or spillage of drug while pushing it near the keloid compared to normal syringes.

Methods: We intend to do a cost benefit analysis based on the retrospective data of intralesional steroid injections done by the authors (AP and SK) in their private practice.

Results: The time between 2021 to 2022, 200 injection data was retrieved, 100 each using non locking syringes and Luer lock syringes. The spillage rate with non-Luer lock syringes was 14%.

Conclusions: We found that luer lock syringes prove to be cost effective after giving more than 200 injections in keloids than non-locking syringes.

Keywords: Leur lock syringes, Keloid injection, Cost benefit analysis, Steroid

INTRODUCTION

Keloid scarring is a disorder that is distinguished by raised, hard papules and ill-defined plaques with colour fluctuation.¹ It goes beyond the initial damage and does not relapse.² Keloid scarring, when present, can cause aesthetic deformity, functional disability, psychological discomfort, and a low quality of life.³ Surgical cuts, burns, trauma injuries, piercings in the body, bug bites, folliculitis, chickenpox, herpes zoster infection, immunisations, and acne are some of the causes.^{3,4} The most widely used, first-line therapy for keloid scarring is still intralesional corticosteroid injections such as triamcinolone acetonide (TAC; Kenalog).⁵ When treating

a developed keloid, this procedure can be utilised alone or in conjunction with laser therapy or surgical removal.⁶

The employment of a Luer-lock syringe aids in the locking of the needle with the syringe, allowing the surgeon to inject the steroid intralesional at high pressure, which is required in keloid-like lesions. Using non-locking standard syringes might result in drug spillage, delivering the drug at greater pressures. This results in drug waste.

We propose to conduct a cost-benefit study of the usage of Luer lock syringes versus nonlocking syringes in patients treated for intralesional injection in keloid treatment during a two-year period.

METHODS

The study was a two-year retrospective analysis that compared cost-benefit of employing Luer lock syringes vs non-locking syringes for injecting keloids into patients.

Inclusion criteria was all the patients who had received local steroid injection for keloid treatment done in our private practice at Medicity hospital, Kharghar, Navi Mumbai and Sachi hospital, Airoli, Navi Mumbai from period of 1st January 2021 to 30th October 2022. Exclusion criteria were patients who had inadequate information in records. As it was a retrospective data with no need to contact patients, no ethical approval was required. A total of 200 consecutive patients were considered in the study, with 100 receiving injections using Luer lock syringes and the remaining 100 patients receiving injections with non-locking syringes. Demographic data and spill rate of drug resulting in medication waste, was retrieved. A cost benefit analysis was done based on the spill rate, the average cost of syringes (Luer-locking and non-locking) and drugs. The rates on medications and syringes were taken from online pharmacy information of amazon.com, smart medical buyer and India Mart. Cost of surgeon fees, operating theatre cost and other consumables standard in all patients. SPSS software version 22 was used for statistical analysis.

Table 1: Cost of syringes at various online medical facilities in India.

Supplier	5 ml Luer lock syringe	5 ml non-lock syringe
Amazon India	₹6.49	₹3.50
Smart medical buyer	₹8.36	₹3.85
IndiaMART	₹6.00	₹3.00
Average cost	₹6.95	₹3.45

Table 2: Cost of triamcinolone maleate medication 40 mg vial at various online medical facilities in India.

Supplier	Cost of triamcinolone maleate
Netmeds	₹151.60
Amazon India	₹136.00
IndiaMART	₹110.00
	₹132.53

Technique of injection

The syringes were used to administer triamcinolone maleate injection (40 mg/ml) with a few millilitres of lignocaine 1% local anaesthesia. Each patient received 40 mg of triamcinolone maleate medication. If there was a spillage, the new vial of triamcinolone maleate medication was used, adding to the cost of the procedure.

RESULTS

Demographics- In patients using Luer locking and non-Luer locking syringes, the male: Female ratio was 62:28

and 69:21, respectively. The average age of patients using Luer locking syringes and non locking syringes was 56.2 years and 52.4 years, respectively. All patients were given intralesional steroids for keloids on various regions of their bodies.

Table 3: Table showing demographic data of patients studied.

Variables	Luer Locking syringe used	Non- Locking syringe used
Male gender in study	62	69
Female gender in study	28	21
Average age of patients	56.2 years	52.4 years

Table 4: Cost benefit analysis of locking and non-locking syringes.

Variables	Luer lock	Non Luer lock
cost of syringes for 100 procedures	₹695.00	₹345.00
cost of triamcinolone for 100 procedures	₹13,253.33	₹13,253.33
Cost of spillage	₹0.00	₹1,722.93
Total cost	₹13,948.33	₹15,321.27
Difference between the cost of syringes (Non-locking syringes-Luer lock syringes)	₹1,372.93	

Luer lock syringes cost 6.95 rupees each syringe, for a total of 695 rupees for 100 injections. Normal syringes cost 3.45 rupees each syringe, with a total cost of 345 rupees for 100 injections. The medication cost is 132.53 rupees each injection of triamcinolone, with a total of 100 injections costing 13253.33 rupees. The cost of additional medicine because of spilling is 1722.93 rupees. Both versions cost 13948.33 rupees in total, with a cost difference of 1372.93 rupees. As a result, using standard syringes costs 1372 rupees extra. As a result, Luer lock syringes are the less expensive choice.

DISCUSSION

In our study we conducted the cost benefit analysis of use of Luer lock syringes versus non-locking syringes for intralesional steroid injection in keloids. In our 200 injections study we found 13% spill rate in non-locking syringes whereas no spill was seen while using locking syringes. The analysed cost benefit of using Luer lock syringe was 1372 rupees compared to use by non-locking syringes.

Because of its leak-free connections and heat resistance, the Luer lock syringe, invented in 1894, is an essential medical instrument.⁷ An anti-rotation device has been

added to the design, increasing safety and usefulness.⁸ The syringe's Luer-lock attachment is built into a variety of medical instruments.

Use of non-locking syringes increases danger of drug spillage since they are readily removed or mistakenly pushed, resulting in possible contamination and exposure. As illustrated by Ki, this risk is especially concerning in hospital settings where dangerous medications are handled.⁹

The precise percentage of drug spills using non-locking syringes is unknown due to a variety of factors including aetiology, syringe features, drug viscosity, and user technique. However certain observations show a larger risk as compared to Luer-lock syringes. Healthcare professionals and individuals should handle syringes carefully, ensure appropriate needle attachment, draw and inject medication slowly, and dispose of syringes safely to reduce spillage.

However, there have been instances of malfunctions in the Luer lock system, raising worries about possible risks and standardisation.¹⁰ Furthermore, low-level microbial contamination in syringe hubs endangers product and patients.¹¹

Based on the information provided, this is the first article to do a cost-benefit analysis of Luer lock syringes vs non-locking syringes. This research, on the other hand, contains significant shortcomings. Because this is a retrospective study, there is some memory bias. The sample size is limited. It solely counts the number of spills in keloid injections and ignores other parameters such as additional drugs such as lignocaine. There are other instances, such as epidural injections and facet joint injections, when high push pressure is required while providing steroid medicine.

CONCLUSION

In our investigation, we discovered that using Luer lock syringes saves money because there is no risk of leakage. We advocate using Luer lock syringes for medications that need strong push pressures, such as keloid injections.

A multi-center prospective research is recommended to further understand the utilisation of Luer lock syringes and their cost-saving implications in healthcare.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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