



CASE REPORT

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Localized lipoatrophy and inadvertent subcutaneous administration of a COVID-19 vaccine

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ABSTRACT

A 60-year-old woman presented with a depressed lesion at the site of her first COVID-19 (Astra Zeneca) vaccine injection. The lesion was diagnosed as a case of injection related localized lipoatrophy as markers of autoimmune disease were negative and biopsy differentiated it from localized involutinal lipoatrophy. This case of localized lipoatrophy was likely due to inadvertent subcutaneous injection of the COVID-19 vaccine with a 16 mm long needle.

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Introduction

Localized lipoatrophy is a rare condition characterized by loss of subcutaneous adipose tissue in a particular area of the body.¹ It can be classified¹ as primary/idiopathic (localized involutinal lipoatrophy—LIL) or secondary with particular host factors, connective tissue disease (lupus erythematosus, dermatomyositis, morphea, and T-cell lymphoma), and minor trauma and iatrogenesis (subcutaneous, intramuscular or dermal injection).

There are limited data on vaccine related localized lipoatrophy, with a female predominance and only with adjuvanted vaccines. Nine cases have been reported with DPT (diphtheria, pertussis, tetanus) vaccine (2 males, 7 females),^{2,3} two cases (2 female) with an adjuvanted influenza vaccine,^{4,5} and two cases with quadrivalent human papilloma virus (HPV) vaccine given only to females.^{6,7}

In this presentation, a case of localized lipoatrophy is reported following a Covid-19 vaccination.

Patient presentation

A fit 60-year-old woman (height 156.6cms, weight 76 kg, BMI 31.2) from Hay in NSW was given a first dose of Covid-19 vaccine (Astra Zeneca), on 25.5.2021, into the left deltoid muscle with a 16 mm long, orange hubbed needle. She reported no significant pain post vaccination but slowly developed an indentation shown as the arrowed area (Figure 1). Routine blood tests (FBC, U/E, CR, LFT, CRP, TSH) were negative as were markers of autoimmune diseases (antinuclear antibodies—ANA, antinuclear cytoplasmic antibodies -ANCA and extractable nuclear antigens—ENA).

Ultrasound on 13/7/2021 revealed an area of subcutaneous fat necrosis at this site measuring 25 × 5 × 12 mm with no collection or hyperemia. Biopsy from its lateral border revealed a cuff of adipose tissue adjacent to a cavity which penetrated to the muscle.

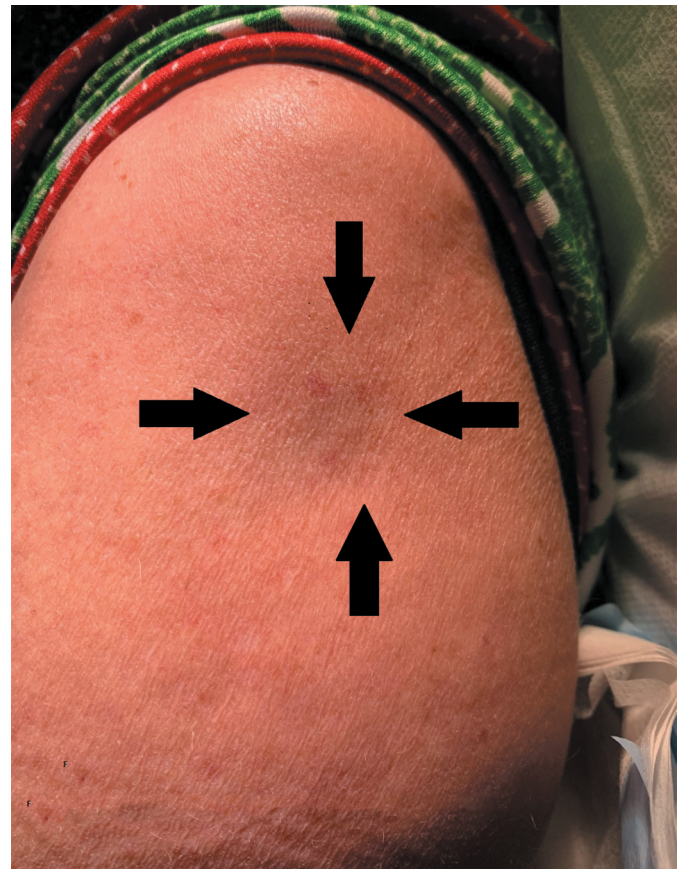


Figure 1. Lipoatrophy of left upper arm.

Histology revealed a mild, predominantly perivascular lymphocytic infiltrate in the dermis with vascular ectasia. A second vaccination of COVID-19 (Astra Zeneca) with a 25 mm long needle gave no similar reaction.

Discussion

An extensive narrative review⁸ has allowed a strong recommendation to be made for intramuscular compared with subcutaneous injection for all vaccine types (adjuvanted, live virus and non-adjuvanted [inactivated whole cell, split cell, and subunit]) where route comparative data have been published.

The recommendation that Covid-19 vaccines should be given intramuscularly is drawn from some of the data in this review.⁹ The needle length for intramuscular injection of the deltoid muscle¹⁰ has been shown to depend on sex and body mass index¹¹ with a 16 mm long needle unlikely to penetrate muscle in a female BMI \geq 30.

Therefore, the case of lipoatrophy reported here is likely due to inadvertent subcutaneous of the Covid-19 vaccine as the patient had a BMI of 31.2, and a 16 mm long needle was used to administer the vaccine. This case can be differentiated¹² from localized involutinal lipoatrophy (LIL) on the basis of histopathology, with LIL showing the presence of diminutive fat lobules composed of small adipocytes that resemble fetal fat tissue.

Other cases of inadvertent subcutaneous administration of a Covid-19 vaccine have been reported by Ng¹³ and Gyldenleve et al.¹⁴ In the latter case, punch biopsy showed perivascular lymphocyte infiltration in the dermis as in the case reported here. Both studies stress the importance of correct intramuscular administration of Covid-19 vaccines.

It is not practical to measure the body mass index of all people presenting for Covid-19 vaccination, but vaccinators should be able to give all males and non-obese females injection with a 25 mm long needle and obese females injection with a 32–28 mm long needle to prevent subcutaneous injection.¹¹

Disclosure statement

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