An Unexpected Post Egg-Free Influenza Vaccine Granulomatous Reaction

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Introduction

- Vaccines are an essential component of public health and disease prevention.
- Vaccine-associated hypersensitivity reactions can be due to the active vaccine (antigen) or another component and can range from localized to systemic reactions.[1]
- Hypersensitivity reactions after influenza vaccination are important due to the large number of people vaccinated annually and are unique due to annual changes in the vaccines' antigenic composition.
- Here, we report a case of granulomas resembling sarcoidosis arising at the site where an influenza vaccination was injected.

Case Presentation

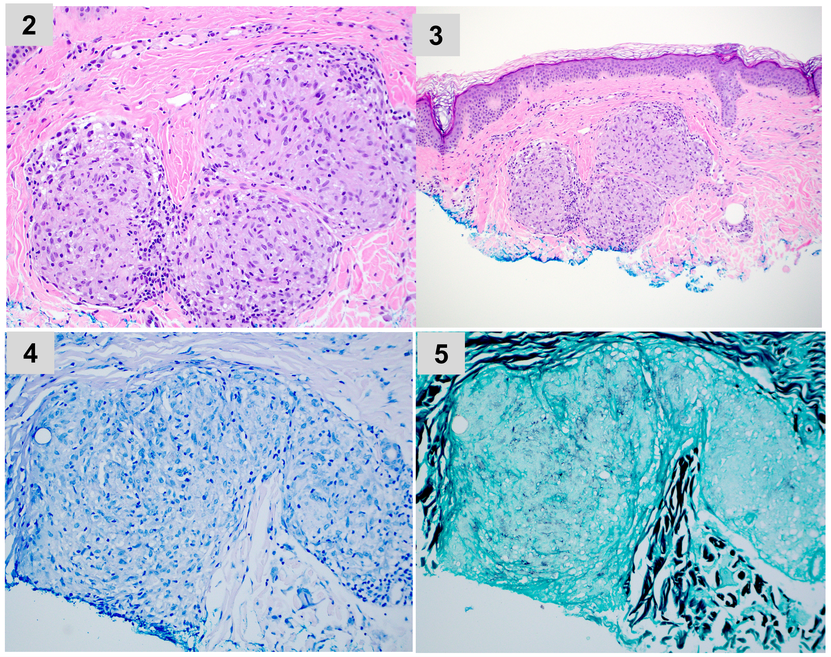
- A 53-year-old female presented for evaluation of a pruritic plaque on the left upper arm that appeared following a flu vaccine. The patient received the egg-free influenza vaccine due to a history of reaction to the standard vaccine. The affected area was enlarging for several months following vaccine administration. The associated pruritus worsened with heat.
- The patient had a past medical history of type 1 diabetes, hypertension, psoriasis, and Sjogren's disease.
- On physical examination, there was an 8 x 4 cm pink plaque studded with small coalescent papules on the left upper arm. The patient also had a large psoriatic plaque on her right elbow.
- A shave biopsy was performed of the pruritic plaque and showed dermal "naked" granulomas, or granulomas with sparse lymphocytic infiltrate at the margins, similar to those typically seen in sarcoidosis.
- Special stains, including AFB, GMS, PAS and Gram were negative for organisms.
- The diagnosis of granulomatous dermatitis was made.
- The patient was treated with clobetasol 0.05% cream.

The authors have no significant relationships with, or financial interests in, any commercial companies pertaining to this poster.

Figures

Figure 1: *Left upper arm 8 x 4 cm coalescent pink papular plaque*

Figure 2: *H&E 20X*
Figure 3: *H&E 10X*
Figure 4: *AFB 20X*
Figure 5: *GMS 20X*



Discussion

- While vaccine-associated hypersensitivity reactions occur frequently, these reactions are typically due to individual vaccine components such as egg protein and do not normally result in the formation of granulomas.
- Vaccination-induced granulomas are more often associated with the use of aluminum as an adjuvant; however, aluminum is not present in the egg-free influenza vaccine.[1]
- Our patient received Flublok, the first recombinant hemagglutinin (HA) influenza vaccine. Flublok uses insect cells to produce purified HA that contains no egg protein, preservatives, or antibiotics.[4]
- However, allergic reactions to Flublok have been self-reported among patients with an egg allergy or prior allergic reaction to the inactivated influenza vaccine.
- Not all delayed reactions are immunologically mediated. Reactions at the injection site can also be due to inflammation or irritant reactions caused by vaccine adjuvants.[2]
- Delayed reactions are often self-limiting and do not contraindicate recurrent administration of the same vaccine.
- A case of subcutaneous granuloma annulare following influenza vaccination (non-egg-free) has been reported. Histopathology demonstrated a globular, well-demarcated, cell-infiltrating lesion in the subcutaneous fat, with a nodule containing a central necrotic area with irregular configuration and epithelioid histiocytes surrounding the necrosis in a palisading manner.[3]

Conclusion

To our knowledge, this is the first report of a granulomatous reaction to the egg-free influenza vaccine.

References

1. Sampath, V., Rabinowitz, G., Shah, M., Jain, S., Diamant, Z., Jesenak, M., Rabin, R., Vieths, S., Agache, I., Akdis, M., Barber, D., Breiteneder, H., Chinthrajah, S., Chivato, T., Collins, W., Eiwegger, T., Fast, K., Fokkens, W., O'Hehir, R. E., Ollert, M., … Nadeau, K. C. (2021). Vaccines and allergic reactions: The past, the current COVID-19 pandemic, and future perspectives. *Allergy*, *76*(6), 1640–1660. https://doi.org/10.1111/all.14840
2. McNeil, M. M., & DeStefano, F. (2018). Vaccine-associated hypersensitivity. *The Journal of allergy and clinical immunology*, *141*(2), 463–472. https://doi.org/10.1016/j.jaci.2017.12.971
3. Suzuki, T., Shimauchi, T., Moriki, M., Tokura, Y., Subcutaneous granuloma annulare following influenza vaccination in a patient with diabetes mellitus, *Dermatologica Sinica*, Volume 32, Issue 1, 2014, Pages 55-57, ISSN 1027-8117, https://doi.org/10.1016/j.dsi.2013.03.004.
4. *Flublok: Package insert / prescribing information*. Drugs.com. (n.d.). https://www.drugs.com/pro/flublok.html#:~:text=A%20single%200.5%20mL%20dose,20)%20(27.5%20mcg).