Comparative assessment of allergic reactions to COVID-19 vaccines in Europe and the United States

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Abstract

Background: COVID-19 vaccines are safe and effective at preventing severe disease. Among the rare complications that may compromise vaccine acceptance are allergic reactions. This study aimed at comparing the incidence and potential triggers of the most commonly reported allergic reactions related to licensed COVID-19 vaccines in Europe and the United States (US) based on data of the two of the world's largest vaccine adverse event reporting systems, EudraVigilance and VAERS. **Methods:** Data pertaining to allergic reactions post COVID-19 vaccination reported from week 52/2020 to week 39/2021 were collected from EudraVigilance and VAERS databases and analyzed. Incidence rates were calculated using the corresponding administered vaccine doses as denominators for all licensed vaccines and both platform types (mRNA or vectored). The composition of the novel mRNA and vectored vaccines was examined to identify potential allergic triggers. **Results:** Anaphylactic reactions and anaphylactic shock were the most common allergic reactions, predominantly reported by females, at estimated incidence rates of 9.91/million and 1.36/million vaccine doses, respectively. A 2- to 5-fold higher incidence of both allergic reactions was found in Europe compared to the US for both vaccine platforms. Most cases were benign. Fatalities were extremely rare and associated with vectored rather than mRNA vaccines. **Conclusions:** The precise mechanism(s) for allergic reactions after vaccination with COVID-19 vaccines are not fully known. Plausible explanations include exposure to components of the final pharmaceutical product and cross-reactivity to ingredients or unintentional impurities in the final formula. Additional research is warranted to further improve vaccine safety.

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