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Impact of mRNA and Adenoviral Vaccines on Immunocompromised Groups

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Introduction

The advent of mRNA and adenoviral vaccines against COVID-19 has marked a pivotal moment in global efforts to combat the pandemic. While these vaccines have shown remarkable efficacy in the general population, questions have arisen about their effectiveness and safety in immunocompromised individuals. This group includes people with conditions such as organ transplants, autoimmune diseases, and those undergoing immunosuppressive therapies. Understanding the impact of mRNA and adenoviral vaccines on immunocompromised groups is crucial for optimizing vaccination strategies and mitigating disparities in vaccine protection.

Description

The mRNA vaccines represents a revolutionary leap in vaccine technology, particularly demonstrated by the success of the Pfizer-BioNTech and Moderna COVID-19 vaccines. mRNA vaccines work by introducing a small piece of messenger RNA that encodes for the spike protein of SARS-CoV-2. This prompts the body to produce the spike protein, which in turn stimulates an immune response. As these vaccines have been deployed globally, understanding their mechanism, efficacy and specific impact on immunocompromised populations has become crucial. mRNA vaccines work by introducing a synthetic messenger RNA (mRNA) sequence into the body. This mRNA sequence encodes the spike protein found on the surface of the SARS-CoV-2 virus. When injected into muscle cells, the mRNA instructs the cells to produce the spike protein, which then triggers the immune system to recognize and attack the virus if the body is exposed to it in the future. Studies have shown that mRNA vaccines can elicit a robust immune response in immunocompromised individuals, although the response is generally lower than in the general population. For instance, research indicates that a significant proportion of organ transplant recipients developed an antibody response after receiving two doses of an mRNA vaccine, though the response rate was markedly lower compared to immunocompetent individuals. The efficacy of mRNA COVID-19 vaccines, such as those developed by Pfizer-BioNTech and Moderna, is a topic of significant interest, particularly for immunocompromised populations [1-3].

Immunocompromised individuals represent a diverse population with varied responses to vaccines due to their compromised immune systems. Studies examining the efficacy of mRNA (e.g., Pfizer-BioNTech, Moderna) and adenoviral (e.g., Johnson & Johnson, AstraZeneca) vaccines in these individuals have yielded mixed findings. While some immunocompromised individuals mount adequate immune responses post-vaccination, others may exhibit attenuated responses with lower antibody levels and reduced protection against COVID-19 infection. Factors influencing vaccine efficacy in this cohort include the type and severity of immunocompromising condition, the specific immunosuppressive treatments received, and the timing of vaccination relative to treatments. This group includes individuals with conditions or treatments that weaken the immune system, such as organ transplant recipients, cancer patients undergoing chemotherapy, people with autoimmune diseases and those living with HIV/AIDS. Understanding the nuanced response of these populations to mRNA vaccines is crucial for optimizing their protection against COVID-19. Adenoviral vector vaccines use a modified virus (not the coronavirus) to deliver the genetic material encoding the spike protein. This method aims to induce an immune response without causing disease. Adenoviral vector vaccines, such as those developed by AstraZeneca (Vaxzevria) and Johnson & Johnson (Janssen), have played a crucial role in the global fight against COVID-19. These vaccines use a different technological approach compared to mRNA vaccines and offer unique advantages and challenges, especially for immunocompromised populations. Adenoviral vector vaccines are a vital component in the global strategy to combat COVID-19, offering effective protection, particularly against severe disease and hospitalization. For immunocompromised populations, while the immune response may be lower compared to the general population, these vaccines still provide critical protection. The administration of booster doses can help enhance immunity in these vulnerable groups.

Adenoviral vector vaccines have also been studied in immunocompromised groups. Data suggests that while these vaccines are effective, their immunogenicity may be less robust compared to mRNA vaccines. For example, a study on patients with hematologic malignancies showed that fewer participants developed a detectable antibody response after adenoviral vector vaccination compared to those who received mRNA vaccines. Direct comparisons between mRNA and adenoviral vaccines in immunocompromised populations reveal some key differences like mRNA vaccines generally elicit higher antibody titers in immunocompromised individuals compared to adenoviral vector vaccines.Studies suggest that mRNA vaccines may induce a more robust T-cell response, which is essential for combating the virus, especially in immunocompromised individuals. Immunocompromised patients often benefit from additional booster doses. Evidence shows that a third dose of mRNA vaccines significantly enhances the immune response in these individuals, suggesting a strategy to improve protection. Immunocompromised patients often benefit from additional booster doses. Evidence shows that a third dose of mRNA vaccines significantly enhances the immune response in these individuals, suggesting a strategy to improve protection [4,5].

Conclusion

While both mRNA and adenoviral vector COVID-19 vaccines offer valuable protection to immunocompromised individuals, mRNA vaccines tend to provide a stronger and more consistent immune response. Given the higher antibody titers and robust T-cell responses elicited by mRNA vaccines, they may be preferred for initial and booster vaccinations in these high-risk groups. However, the choice of vaccine should be personalized based on individual health profiles, availability and potential contraindications. Continued research and surveillance are essential to optimize vaccination strategies for immunocompromised populations, ensuring they receive the most effective and safe protection against COVID-19. As the pandemic evolves, so too must our approaches to safeguarding the most vulnerable among us.

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Conflict of Interest

None.

References

1. Yadav, Tushar, Swatantra Kumar, Gourav Mishra and Shailendra K. Saxena. "Tracking the COVID-19 vaccines: The global landscape." *Hum Vaccines Immunother* 19 (2023): 2191577.
2. Lim, Chin Peng, Boon Hui Kok, Hui Ting Lim and Candy Chuah, et al. "Recent trends in next generation immunoinformatics harnessed for universal coronavirus vaccine design." *Pathog Glob Health* 117 (2023): 134-151.
3. Farrera-Soler, Lluc, Jean-Pierre Daguer, Sofia Barluenga and Oscar Vadas, et al. "Identification of immunodominant linear epitopes from SARS-CoV-2 patient plasma." *PloS One* 15 (2020): e0238089.
4. Geraci, Gaia, Janis Bernat, Céline Rodier and Virginia Acha, et al. "Medicinal product development and regulatory agilities implemented during the early phases of the COVID-19 Pandemic: Experiences and implications for the future—An Industry view." *Ther Innov Regul Sci* 57 (2023): 940-951.
5. Excler, Jean-Louis, Melanie Saville, Lois Privor-Dumm and Sarah Gilbert, et al. "Factors, enablers and challenges for COVID-19 vaccine development." *BMJ Glob Health* 8 (2023): e011879.

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