

The role of enoxaparin in respiratory virus infections and its therapeutic implications

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Abstract text

Text:
The frequent emergence of new respiratory viruses with pandemic potential, like SARS-CoV-2 or influenza, highlights the need for broad-spectrum prophylaxis. To date, vaccines against both SARS-CoV-2 and influenza are available. However, the reduced efficacy against mutated viruses and newly emerged variants, along with the ongoing risk of new outbreaks, underscores the need for alternative strategies to prevent infection and viral transmission. As respiratory viruses primarily enter through the nose, nasal formulations applied directly to the nasal epithelium are attractive therapeutic candidates to neutralize pathogens and thus prevent or minimize infection.
Enoxaparin, a low molecular weight heparin (LMWH), is widely used as an anticoagulant. However, it also possesses antiviral and anti-inflammatory properties. Here, we found that enoxaparin inhibited influenza A (H3N2) and B (Victoria) virus infection and blocked subsequent release of pro-inflammatory cytokines and chemokines, within highly differentiated human nasal and upper respiratory tract 3D models. Damage to the nasal and upper respiratory tract epithelia caused by infection was attenuated by enoxaparin treatment. This study highlights the inhibitory effect of LMWH on respiratory viruses, with a focus on influenza and SARS-CoV-2. When applied to mucosal entry sites, LMWH shows promise as a prophylactic and valuable alternative to traditional antiviral approaches.

Conflict of Interest statement

Do you have any conflict of interest to declare?: No

Affirmation

- 1. Consent to participate and present onsite:** Yes
- 2. Consent to publication publication:** Yes
- 3. Consent on treatment of contact details saved in this system:** Yes