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POST32 **NEBULISATION OF VANCOMYCIN INJECTION – EFFICACY OF THE NEBULISATION PROCESS FOR PULMONARY DELIVERY**

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Objectives To evaluate if vancomycin injections can be successfully nebulised via the Pari LC Plus and eFlow rapid

nebulisers, by measuring particle size of droplets produced, proportion and concentration of drug remaining in the nebuliser, including calculating the percentage of drug nebulised available for inhalation, as well as investigating the stability of the drug during the nebulisation process.

Method Doses of 250 mg vancomycin (50 mg/ml–500 mg vial dissolved with 9.6 ml water for injection) were nebulised via both nebuliser systems. Particle size distributions were measured using a HELOS KF particle sizer (Sympatec, Germany) at four different flow rates (representing inhalation) ranging from a low flow rate (10.4 l/min) more representable of a patient with impaired lung function to a high flow rate (40.0 l/min) to study the impact of flow rate on the nebulisation process. The percentage of drug remaining in the residual volumes was calculated by measuring residual volume and concentration. Sample stability and residual volume concentration were evaluated by high-performance liquid chromatography.

Results Pari LC Plus nebuliser – average median particle sizes ranged from 2.37–2.55 µm across the four flow rates with an average median particle size of 2.52 µm at the lowest flow rate (representing people with impaired lung function). The percentage of particles produced in the respirable range (particles between 1–5 µm) ranged between 65.99–75.92%. Of the 250 mg dose nebulised, between 26.26 and 46.65% was retained in the nebuliser. The residual concentration showed a slight increase which ranged from 52.9 mg/ml to 56.87 mg/ml across the four flow rates compared to 50 mg/ml at initiation. No degradation was detected after nebulisation of vancomycin injection. eFlow rapid nebuliser – average median particle sizes ranged from 2.93–3.64 µm across four flow rates with an average median particle size of 2.93 µm at the lowest flow rate (representing people with impaired lung function). The percentage of particles produced in the respirable range (particles between 1–5 µm) ranged between 68.80–77.29%. Of the 250 mg dose nebulised, between 17.87% and 25.06% was retained in the nebuliser. The residual concentration after nebulisation ranged between 44.68 mg/ml and 44.35 mg/ml for the three lower flow rates with the highest flow rate showing an increase in residual volume concentration to 64.61 mg/ml. The concentration before nebulisation was 50 mg/ml. No degradation was detected after nebulisation of vancomycin injection.

Conclusion: Both the Pari LC Plus and eFlow rapid effectively nebulise vancomycin injection with more than 65% of the particles produced being in the respirable range. As also reported in literature, the eFlow rapid nebuliser has a smaller residual volume of solution remaining which impacts on the dose nebulised available for inhalation.[1] The characteristics of the inhalation do vary depending on the nebuliser selected, but it is not known whether this is clinically significant.

REFERENCES

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