

INHALATION OF TOBRAMYCIN IN PATIENTS WITH CYSTIC FIBROSIS: A COMPARISON OF TWO METHODS

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Patients with cystic fibrosis typically develop an ongoing destruction of the lung and impairment of pulmonary function due to frequent exacerbations of their chronic infection. The latter is often caused by resistant bacteria, e.g., *Pseudomonas aeruginosa*. Tobramycin, which is effective against *P. aeruginosa*, is relatively toxic after intravenous administration. Therefore, its inhalative application has been established in the treatment. However, conventional nebulizers require a high amount of the expensive substance, because it is often not deposited in the targeted lung region. In contrast, techniques based on controlled inhalation allow a controlled and reproducible deposition of the drug. In this study, we compared the efficiency of two techniques based on conventional and controlled inhalation in 16 cystic fibrosis patients aged 13-39 yr. Inhalations were performed twice daily for three days. The administered doses of tobramycin were 300 mg and 150 mg in the conventional and controlled inhalation techniques, respectively. The efficiency of drug deposition was measured by the determination of its serum concentration one hour after the end of inhalation. The FEV₁ values in our subjects ranged between 36% and 116% predicted (mean 61%). There were no differences of tobramycin serum concentrations between the different study days (means \pm SD; days 1, 2, and 3; controlled inhalation: 0.983 \pm 0.381 mg/l, 1.119 \pm 0.448 mg/l, and 1.194 \pm 0.568 mg/l; conventional inhalation: 1.075 \pm 0.798 mg/l, 1.294 \pm 0.839 mg/l, and 1.269 \pm 0.767 mg/l). Even though the drug amount was twice as high in the conventional inhalation technique, there was no significant difference of its serum concentration (conventional inhalation: 1.21 \pm 0.783 mg/L, controlled inhalation: 1.092 \pm 0.461 mg/l). In addition, the coefficient of variation and the required inhalation time were shorter in the controlled inhalation than those in the conventional inhalation (42% vs. 65% and 10 min vs. 20 min, respectively). Our data suggest that controlled inhalation can significantly reduce the amount of drugs required for therapy, the inhalation time required for drug deposition, and the variability of drug deposition. The method of controlled inhalation appears to provide better treatment efficiency of pulmonary infections combined with lower costs and better patient compliance.