

Establish a pharmaceutical care mode for therapeutic drug monitoring of Vancomycin and evaluate its effectiveness and economics

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Objective

The traditional TDM mode of vancomycin (first the physicians prescribe medicines by experiences, then the nurses collect specimen and the technicians test concentration of medicines, then physicians adjust the dosage) was reported just achieved about 30% standard therapeutic trough levels. This study aimed to design and implement an innovative pharmaceutical care model (PC model) involving clinical pharmacists based on multidisciplinary teams of physician - pharmacist - nurse - technician, and evaluate its effectiveness and economics.

Methods

Patients with MASA infection were involved in study in according to inclusion and exclusion criteria and divided in trial group (PC model) and control group (traditional model) randomly. The blood drug concentrations of vancomycin were measured and the achievement rates of standard therapeutic trough level were calculated as Intermediate outcome. The total treatment effective rate and the incidence of adverse reactions was measured as the final outcome. Cost of pharmacist time, vancomycins, additional examinations suggested by pharmacists, and adverse reaction treatments in two models were measured. Incremental cost-effectiveness analysis(ICER) was conducted.

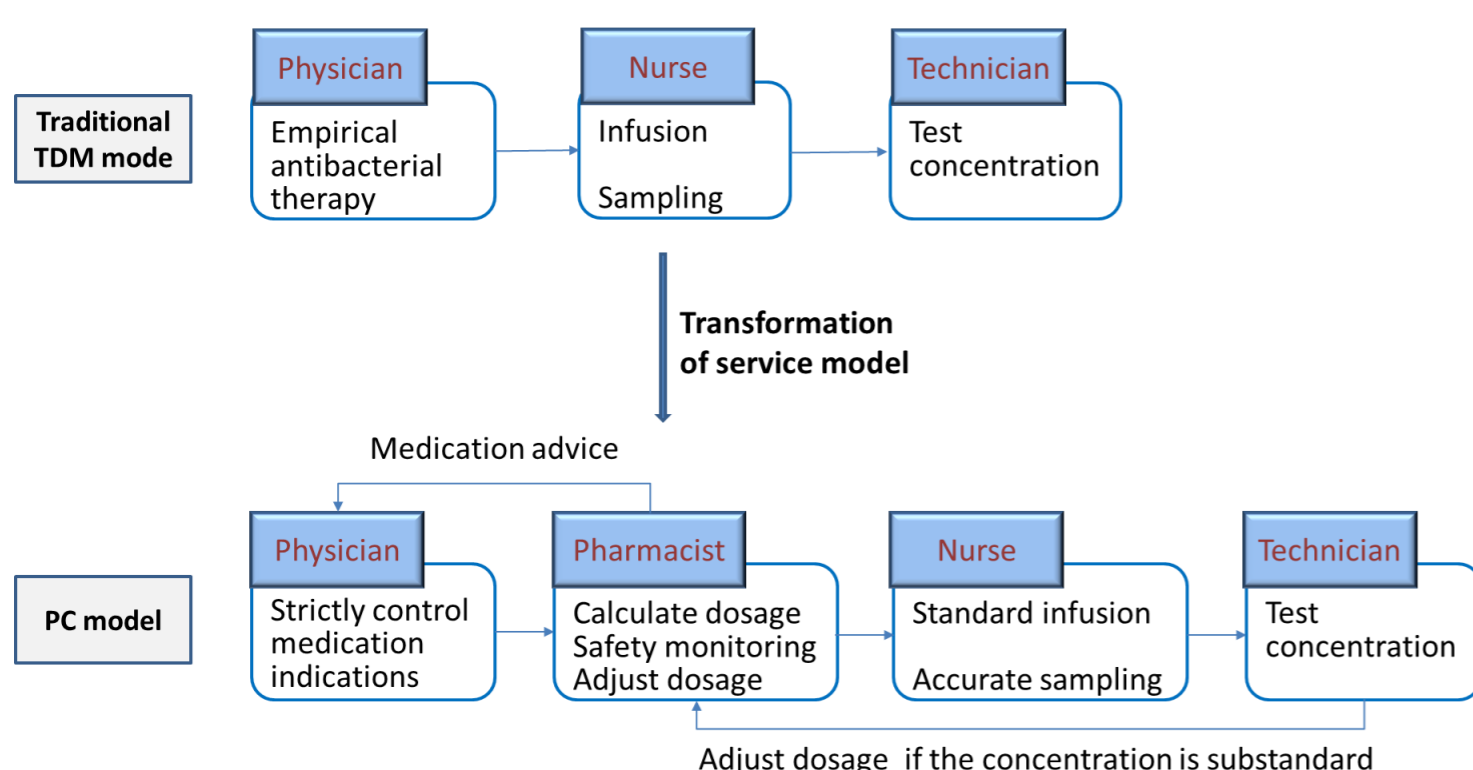


Fig 1. Innovative PC model based on multidisciplinary teams

Results

Compared with the traditional model, the PC model increased the achieving rate of vancomycin therapeutic through level (74.58% vs 33.87%, $p=0.000$), decreased the incidence of renal toxicity (1.69% vs 12.90%, $p=0.045$), and showed no statistical difference in the treatment effective rate (83.05% vs 72.58%, $p=0.167$). The incremental cost-effectiveness ratio (ICER) of increasing the achieving rate of therapeutic through level by 1% was 23.77 yuan (3.45 USD). And the ICER of reducing the incidence of nephrotoxicity by 1% was 86.31 yuan (12.54 USD).

Tab.1 cost-effectiveness analysis

Group	Cost (yuan)	Effectiveness*(%)	ΔC	ΔE	ICER
PC mode	7059.4	13.31	967.5	11.21	86.31
Traditional mode	6091.9	2.10			

*Reduce the incidence of nephrotoxicity/%(The incidence of vancomycin-related nephrotoxicity is about 15% reported in the literature)

Conclusion

The pharmaceutical care model of vancomycin therapeutic drug monitoring can improve the achievement of therapeutic through level, reduce the risk of adverse reactions, while the total treatment effectiveness rate showed no difference with traditional model in this study because of other therapeutic factors. And PC model of vancomycin TDM shows cost-effectiveness in terms of the general willingness to pay of Chinese patients.

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