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Cost-effectiveness analysis of olanzapine-containing antiemetic therapy for managing highly emetogenic chemotherapy in South East Asia: A multinational study

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Introduction

Recent studies suggested that olanzapine, together with dexamethasone and serotonin-3 receptor antagonist ($5HT_3RA$), is effective to prevent chemotherapy-induced nausea and vomiting (CINV) associated with highly emetogenic chemotherapy (HEC). This regimen is particularly useful in regions where resources are limited such as South East Asia (SEA).

Objectives

To evaluate the cost-effectiveness of adding olanzapine into standard regimens for the prevention of CINV in patients receiving HEC in SEA countries.

Methods

Using a **decision tree model**, clinical and economic outcomes associated with olanzapine-containing regimen and standard regimen (doublet antiemetic regimen: dexamethasone + ondansetron) in most SEA countries except in Singapore (triplet antiemetic regimen: dexamethasone + palonosetron + aprepitant) for CINV prevention following HEC were evaluated.

This analysis was performed in **Thailand, Malaysia, Indonesia, and Singapore**, using societal perspective with 5-day time horizon.

Input parameters were derived from literature, network meta-analysis, government documents, and hospital databases. Outcomes were incremental cost-effectiveness ratio (ICER) in USD/ quality-adjusted life year (QALY) gained. A series of sensitivity analyses including probabilistic sensitivity analysis were performed.

Results

Compared to doublet antiemetic regimen, addition of olanzapine resulted in incremental QALY of 0.0025 with cost saving of USD2.94, USD5.55, and USD2.20 in Thailand, Malaysia and Indonesia, respectively. Compared to triplet antiemetic regimen, adding olanzapine is cost-effective with ICER of USD31,818/QALY for Singapore. The probability of being cost-effective at a cost-effectiveness threshold of 1 GDP/capita varies from 20-75% across countries.

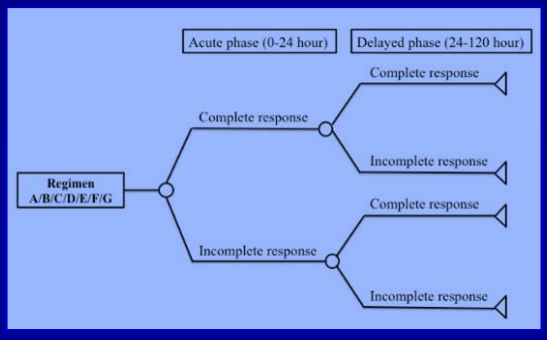

Figure 1. Decision tree model.

The decision tree model shows the possible outcome that a patient can experience after receiving antiemetic regimen –
(A) Dexamethasone + ondansetron,
(B) Dexamethasone + palonosetron,
(C) Dexamethasone + ondansetron + oanzapine,
(D) Dexamethasone + palonosetron + oanzapine,
(E) Dexamethasone + ondansetron + aprepitant,
(F) Dexamethasone + palonosetron + aprepitant,
(G) Dexamethasone + palonosetron + oanzapine + aprepitant.
In the acute phase (0-24 hour), a patient could achieve complete response (CR) or emesis/incomplete response (IR). A patient who achieved CR or experienced IR could have CR or IR in delayed phase (24-120 hour).

Table 1. Summary of cost effectiveness ratio (ICER), represented as incremental cost (in 2016 USD) per quality-adjusted life year (QALY), according to country.

Antiemetic regimen	Thailand*	Malaysia*	Singapore†	Indonesia*
A: DEX+5HT3RA1	Ref	Ref	-	Ref
B: DEX+5HT3RA2	Dominated	Dominated	-	Dominated
C: DEX+5HT3RA1+OLN	Cost-saving	Cost-saving	Cost-saving	83.24‡
D: DEX+5HT3RA2+OLN	35,528.57	15,357.14	14,637.50‡	30,593.33
E: DEX+5HT3RA1+APR	Dominated	Dominated	Ref	Dominated
F: DEX+5HT3RA2+APR	Dominated	Dominated	Dominated	Dominated
G: DEX+5HT3RA2+OLN +APR	Dominated	Dominated	Dominated	Dominated

Abbreviations: DEX, dexamethasone; 5HT3RA1, first generation serotonin-3 receptor antagonist (ondansetron); 5HT3RA2, second generation serotonin-3 receptor antagonist (palonosetron); OLN, olanzapine; APR, aprepitant.
* The incremental cost effectiveness ratio is calculated based on DEX+5HT3RA1 as reference treatment.
† The incremental cost effectiveness ratio is calculated based on DEX+5HT3RA1+APR as reference treatment.
‡ This antiemetic regimen is cost-effective based on willingness-to-pay value of 1 gross domestic product per capita (value) and reference of that GDP.

Conclusions

The addition of olanzapine is cost-effective and viable to prevent CINV in patients receiving HEC in multiple SEA countries.

References

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