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Cost-Effectiveness Analysis of Rivaroxaban Vs Other Anticoagulants

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Introduction

In Peru, Rivaroxaban is one direct oral anticoagulant (DOAC) used in treatments of cardiovascular diseases such as non valvular atrial fibrillation, venous thromboembolism, acute and chronic coronary syndromes, and peripheral artery disease. For these diseases, the consequences for the patient of being treated with drugs that are not effective, would result in thromboembolic events and even death.

Although there is a plenty of studies regarding anticoagulants (Warfarin and DOACs) effectiveness in other countries, none have been published in Peru that carry out the evaluation directly through a clinical study or indirectly through a meta-analysis that standardizes clinical studies to the Peruvian context.

In addition, regardless of how effective they are, treatment costs differ. Thus, in this study we compare anticoagulants cost-effectiveness in the Peruvian context, both in public and private sector, to help the healthcare system decide which treatment should be provided to AF an DVT patients.

Objective

To perform a cost-effectiveness analysis of rivaroxaban vs other anticoagulants (Warfarin, Dabigatran and Apixaban) for patients with atrial fibrillation (AF) or deep vein thrombosis (DVP), in the Peruvian public and private perspective.

Methods

Comparative analysis of the costs and effectiveness of treatment with rivaroxaban and the other technologies. We addressed it through three stages:

1 Effectiveness

A lineal regression was developed based on econometric model to standardize the occurrence rate of efficacy outcomes (proxy of effectiveness) linked to each molecule in relevant clinical studies (meta-analysis). The results of the efficacy outcomes were standardized as DALY's to obtain a single measure of effectiveness.

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2 Costs

Estimation of Peruvian health cost parameters to address direct (treatment) and indirect costs (loss of productive life generated by the ineffectiveness of the treatment) linked with each molecule in the private and public sector, for the average duration of treatment (14 and 9 months for AF and DVT patients, respectively). .

3 Weight

Estimation of the incremental cost-effectiveness ratio (ICER) for each molecule..

Results

1 Direct Oral Anticoagulants (DOACs), like Rivaroxaban and Apixaban are more effective than Warfarin.

Table 1. Effectiveness results

Anticoagulants	Thromboembolic events	Death	DALY 1/
AF			
Vitamin K antagonists (Warfarin)	Scenario base		
X factor inhibitors (Rivaroxaban / Apixaban)	-0.4%	-0.4%	0.12
Thrombin inhibitors (Dabigatran)	-0.5%	-0.2%	0.09
DVP			
Vitamin K antagonists (Warfarin)	Scenario base		
X factor inhibitors (Rivaroxaban / Apixaban)	-0.7%	-1.1%	0.28
Thrombin inhibitors (Dabigatran)	-1%	-1%	0.20

1/ Expressed in absolute value

Simple Lineal Regression

$$Y_i = B_0 + B_X D_X + B_A D_A + B_T D_T + B_1 * Disease + B_2 * Study$$

Y_i: Occurrence of clinical outcome i (% of patients who had clinical outcome i).

D_X: Dichotomous variable that determines whether a factor X inhibitor is used for treatment (1 if treatment is with a factor X inhibitor, 0 otherwise).

D_A: Dichotomous variable that determines whether a VKA is used for treatment (1 if treatment is with a VKA, 0 otherwise).

D_T: Dichotomous variable that determines whether a thrombin inhibitor is used for treatment (1 if treatment is with a thrombin inhibitor, 0 otherwise).

$Disease$: Categorical variable that identifies the disease being treated (AF or DVT).

$Study$: Variable controlling for clinical trial fixed effects.

Conclusions:

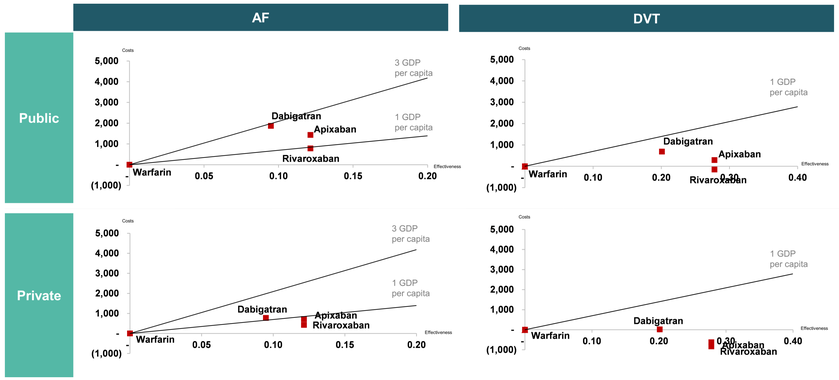
Direct Oral Anticoagulants (DOACs), like rivaroxaban and apixaban, have lower occurrence rate of thromboembolic events and death than warfarin; thus, they are more effective. In addition, rivaroxaban direct costs are the second lowest, after the warfarin, for all the scenarios, and the lowest for DVT patients in the private sector. Moreover, its indirect costs are the lowest of every treatment in both private and public sector. Hence, rivaroxaban is highly cost-effective for DVT patients (absolute dominance); and for AF patients.

Rivaroxaban is cost-effective in Peruvian perspective for AF and DVT patients because its costs per DALY are below the 1 GDP per capita threshold in the public and private sector.

2 In terms of costs, Rivaroxaban direct costs (treatment) are at least the second lowest (US$1,200 on average), after the Warfarin (US$645 on average), for all the scenarios. This is because Rivaroxaban requires a lower dose than the Apixaban and Dabigatran. If indirect costs are considered (loss of productive), Rivaroxaban total costs (US$2,434 on average) are the lowest for DVT patients and the second lowest, after the Warfarin (US$2,376 on average), for AF patients.

As a result, Rivaroxaban is highly cost-effective for DVT patients (absolute dominance); and for AF patients, Rivaroxaban is cost-effective because its costs per DALY are below the 1 GDP per capita threshold in the public and private sector.

3 **ICER with respect to Warfarin**
(US$ costs on the vertical axis; |DALY| on the horizontal axis)



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