Cost-Effectiveness Analysis for Chronic Venous Thrombo-Embolism (VTE) treatments in Jordan

Study by

Shatha Zaid Al-Quraan

Supervisor:

Dr. Feras Darwish El-Hajji

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Applied Science University

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Abstract:

BACKGROUND: Venous thromboembolism (VTE), a disorder that consists of deep vein thrombosis (DVT) and pulmonary embolism (PE) is associated with a significant health and economic burden. The traditional standard parenteral anti-coagulant overlapping with oral vitamin k antagonist therapy is associated with several drawbacks including many interactions with drugs and food and the need for frequent lab monitoring. Direct oral anticoagulants are similarly effective to the standard therapy with an extra benefit of mitigating those drawbacks. To date, there has been a lack of pharmacoeconomic evaluations, from a Jordanian perspective, for VTE treatments in adult patients with normal renal function. Therefore, there is no agreement about which treatment strategy should be adopted in the clinical setting, according to our observations for VTE medications prescribing behaviour in Jordan**.**

OBJECTIVE: To conduct cost-effectiveness analysis for VTE 6-month anti-coagulant therapies available in the Jordanian market. When used for chronic VTE treatment over 6 months.

STUDY DESIGN: Cost-effectiveness analysis based on decision tree analysis model. The perspective is a health insurance company (third-party payer).

METHOD: Venous thromboembolism treatment strategies were adopted based on the most recent comprehensive VTE treatment guideline. Treatment failure and major bleeding probabilities were derived from published clinical studies. Only direct medical costs were considered. Medication costs were calculated based on the Jordan Food and Drug administration 2019 price list. Hospitalization and lab testing costs were estimated according to retrospective analysis for VTE patients who were admitted to a private hospital in Amman (Al Israa

hospital) over one year. After that, stepwise incremental cost-effectiveness ratio was calculated for parenteral and oral anticoagulants involved in DVT and PE treatment strategies**.**

RESULTS: 10th edition of the American College of Chest Physicians (CHEST) guideline for VTE treatment was the most comprehensive and commonly followed guideline. The chosen treatment strategies for economic evaluation were: Oral Apixaban Only (1), Oral Rivaroxaban Only (2), Switching (3), Bridging (Overlapping) (4). 32 patients were admitted to the hospital with DVT, PE, or bleeding induced anticoagulants as a primary diagnosis, over one year. The average cost of VTE hospitalization and bleeding management in Jordan were 1659.61 JOD (SD= 1083.61JOD) and 2390.70 JOD (SD= 2058.04), respectively. The average length of hospital stay for DVT patients was 3.5 days (SD= 3 days) and 4.8 days (SD= 2.59 days) for PE patients. Medication cost for six-month therapy of Pradexa® (Dabigatran), Xarelto® (Rivaroxaban), Eliquis® (Apixaban), and Orfarin® (warfarin) was 452.08 JOD, 474.45JOD, 467.44JOD, and 9 JOD, respectively. The cost of 14 INR test for warfarin monitoring was 168 JOD while no lab testing was needed for DOACs or parenteral anticoagulants. Among parenteral anticoagulants, Bemiparin was the dominant alternative with the highest efficacy and lowest cost. The switching strategy was the dominated treatment strategy for DVT and PE treatment. The ICER for (strategy 2) when compared to (strategy 1) was 5000, and 49666 when (2) compared with (strategy 4) for DVT patients. While in PE patients the ICER values for the same compared strategies with the same arrangement were 7500 and 51333. The ICER for (strategy 1) when compared with (strategy 4) for DVT and PE patients was the same, and it was 139000**.**

CONCLUSION: In Jordan, the cost of hospitalization for VTE patients varies depending on the primary diagnosis. Admission of patients diagnosed with PE usually costs more than

admission due to DVT. The cost of medication of anticoagulants, the same as many other drugs, does not always reflect the cost of treatment of VTE. Other direct medical costs (e.g. cost of laboratory tests and management of bleeding) have a high contribution in the total cost calculation. Although the difference in efficacy and safety between most of the antico- agulants seems to be not clinically significant, it can have a considerable effect on cost-ef- fectiveness analysis and making decisions on treatment choices. Pharmacoeconomically, the LMWH bemiparin (Hibor®) is the dominant cost-effective injectable anticoagulant in Jor- dan. Switching treatment strategy has the highest total cost, and lower efficacy when com- pared with oral medications strategies (strategies 1 and 2), and comparable efficacy when compared with the bridging strategy (strategy 4). Therefore, the switching strategy is the pharmacoeconomically-dominated choice. Calculated ICER comparisons between treatmentstrategies for DVT and PE are becoming available for clinicians, insurance companies, pur- chasing departments, and other decision-makers to conduct trade-off between drugs in dif- ferent treatment strategies for VTE.