

# Time in Therapeutic Range During Therapy with Vitamin K Antagonists Is Lower in Women than in Men and Is Not Explained by Differences in Age

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**Background:** Adherence and efficacy of anticoagulant therapy with vitamin K antagonists (VKA) is evaluated by Time in Therapeutic Range (TTR). Percentage TTR above 65% is considered appropriate. A few reports suggest that TTR in women might be lower than in men, and hypothesize that women on VKA, being usually older than men, are more sick and thus less adherent. Since not all patients are amenable to direct oral anticoagulants, persistence on VKA for these patients is a necessity for preventing embolism. Thus, understanding what affects TTR is relevant since it could promote preventive measures to ensure effective anticoagulation.

**Aims:** To ascertain whether women have a lower TTR than men and to study which factors affect TTR among patients with atrial fibrillation and mechanical valves undergoing chronic VKA therapy at a University Hospital Anticoagulant Clinic.

**Methods:** We retrospectively studied 2428 patients on VKA (1168 women and 1260 men). Differences were analyzed by ANOVA and t-test or non parametric tests, as appropriate. Influence of variables on TTR was evaluated by multiple regression analysis.

**Results:** The Table shows main characteristics of patients. Women were older than men ( $81 \pm 11.2$  vs  $78 \pm 12.3$  years,  $p < 0.0001$ ), had a lower TTR ( $65 \pm 20.3$  vs  $69 \pm 19.8\%$ ,  $p < 0.0001$ ), but did not differ by extent of comorbidity (Charlson Comorbidity Index): median score was 5 in both groups. In multiple regression analysis, sex, type of VKA and indication for anticoagulation (atrial fibrillation or mechanical valves) weighted slightly on TTR in all patients, while duration of anticoagulation and age did not.

sex	Number	TTR % Mean (SD)	Age Years Mean (SD)	CCI index Median (range)	Time on VKAs Days Mean (SD)	Type of VKAs % on warfarin	Indication for anticoagulation % atrial fibrillation
Men	1260	69 (19.8)	78 (12.3)	5 (0-14)	2676 (1888.9)	88	73
Women	1168	65 (20.3)	81 (11.2)	5 (0-10)	2792 (1948.5)	88	70

*[Characteristics of patients on VKAs by sex]*

**Conclusions:** We confirm that women have lower TTR than men. Age did not concur to determine TTR values, nor did comorbidity. We could not identify a variable among those studied that could extensively explain the observed difference in TTR between men and women. Further studies should perhaps focus on dietary habits and/or genetics.

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