

## **Nurse-managed Anticoagulation Clinic in Finland – How Point-of-care testing (POCT) affects TTR in Primary Care Setting**

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**OBJECTIVE:** A long term treatment with oral anticoagulant warfarin is commonly used for patients with atrial fibrillation, deep venous thromboembolism and patients with mechanical heart valves. The goal of warfarin therapy is to interfere with clot formation, preventing future clots from forming in the circulation. Approximately 60 % of atrial fibrillation strokes are prevented by warfarin therapy. Warfarin therapy is challenging due to its narrow therapeutic window. There are numerous factors that affect the efficacy of the treatment and create a risk for complications. Thus a specific patient guidance and frequent INR (International Normalized Ratio) value monitoring is required to achieve and maintain the therapeutic INR range, which usually is 2.0 to 3.0. Among treated patients, many have INRs outside of the therapeutic range, placing them at risk for complications such as stroke and bleeding. Warfarin therapy may be managed by many different models of care. Instead of the traditional laboratory measurement, the INR value can be measured by a point-of-care device in a nurse-managed anticoagulation clinic. Point-of-care tests (POCT) are known as laboratory tests that are carried out outside of the traditional laboratory to speed up the response delay. The aim of this study was to find out how point-of-care testing affects TTR (time in therapeutic range) in primary care setting.

**METHODS:** The study design was retrospective and it was conducted in a primary care setting during a two 12-month period of time before and after POCT. The first 12-month period was from the 1 January 2012 to the 31 December 2012 before POCT, when INR values were measured traditionally in a central laboratory via venipuncture and the primary care physician ordered change or continued same warfarin dosing and follow-up testing. The second period was from the 31 August 2014 to the 1 September 2015 after POCT, when INR values were measured by a point-of-care device in a nurse-managed anticoagulation clinic where a registered nurse measures INR value and orders warfarin dosing and follow-up testing. For each patient the following data was extracted: age, sex, INRs and dates of sampling. The indication of treatment was unknown. The TTR for individual patients (i-TTR) was calculated according to the method proposed by Rosendaal, which uses linear interpolation to assign an INR value to each day between two successively observed INRs. If the sampling interval exceeded 70 days, values were not interpolated. Patients with less than three consecutive INRs were excluded. The target INR interval was set between 2.0–3.0 and 1.9–3.5. Patients whose INR values measured by point-of-care device were less than 1.5 or more than 4.0 were changed into INR values obtained via venipuncture at a laboratory.

**RESULTS:** During the first 12-month period before POCT a total of 6746 INR values were obtained by venipuncture at the central laboratory. 66, 9 % of the 672 patients had an i-TTR above 70 % (INR values within the therapeutic range 2.0–3.0). 90, 3 % of the 672 patients had an i-TTR above 70 % (INR values within the therapeutic range 1.9–3.5). During the second 12-month period after POCT a total of 3488 INR values were obtained by POCT. 79, 7 % of the 306 patients had an i-TTR above 70 % (INR values within the therapeutic range 2.0–3.0). 93, 1 % of the 306 patients had an i-TTR above 70 % (INR values within the therapeutic range 1.9–3.5).

**CONCLUSION:** According to our study results, more patients achieved good therapeutic control when INR values were measured in a nurse-managed anticoagulation clinic. The result of our study showed improvement in the percentage of patients who were in the therapeutic range (an increase from 66,9 % to 79,7 %) with the use of POCT.