Suboptimal use of statins at treatment initiation

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The benefits of statins in reducing the risk of cardiovascular (CV) events in various high-risk patient groups are well-established [1-2]. Recently, more intensive versus less intensive statin therapy has been suggested to reduce the event rates further [3]. Despite the widespread and increasing use of statins [4-5], the above benefits may be diluted due to prescription of doses lower than those shown to be effective in randomized trials [6-8].

Finland, as many other countries, has implemented policies to contain statin costs [9]. Beginning in October 2006, reimbursement of the most expensive statins, atorvastatin and rosuvastatin, was restricted to treatment of severe lipid metabolism disorders in high-risk patients when less expensive statins were ineffective or not tolerated. We sought to characterize new statin users in the fall 2007, approximately one year after the restriction, with respect to the type and dose of the initial statin and CV risk status. Additionally, the initiators were followed up for one year since initiation, for detecting potential changes in the therapy.

Using the Prescription Register maintained by the Social Insurance Institution of Finland (SII) [10], a cohort of individuals aged 18 years or older purchasing statins for the first time between 1 September and 31 December 2007 was identified. Initiators had no statin purchases during the 3 years preceding the cohort entry. Individuals who were institutionalized permanently or died within one year following initiation and those using lipid modifying drugs (World Health Organization Anatomical Therapeutic Chemical classification code C10) other than statins (C10AA) at the cohort entry were excluded. Initiators' CV risk status was classified as high, moderate, or low based on diagnostic information extracted from the SII Special Reimbursement Register and purchases of cardiovascular drugs during the preceding year (Table 1).

Statin therapy was typically initiated with simvastatin (94% of the cohort), using 10 or 20-mg tablets (Table 1). Only every fifth simvastatin initiator received 40-mg tablets and 0.1% 80-mg tablets. Atorvastatin was most commonly initiated with 10 or 20-mg tablets. Almost one third of the cohort was classified as having high CV risk. Of those with high CV risk, 20% initiated with 10-mg and 48% with 20-mg simvastatin tablets, and additional 3% with other low-potent statin doses [11]. Of all simvastatin initiators, 20% switched to another dose or to another lipid-lowering medication within one year following initiation, 4% switching to atorvastatin or rosuvastatin. Among those who initiated with rosuvastatin, atorvastatin, pravastatin, and fluvastatin, the proportions of those switching dose or medication were 19, 29, 31, and 34%, respectively. Between 9 and 14% of the initiators purchased only one prescription during the first year.

In compliance with the reimbursement restriction [9], a vast majority of new statin users in the fall 2007 in Finland were prescribed simvastatin. However, potential underdosing at initiation was common, even among patients with high CV risk. A considerable proportion of those initiating with less potent doses also remained at the initial dose after one year. Furthermore, the wholesale statistics show that, of all statin tablets sold in Finland in 2010, 21% were 10-mg and 49% 20-mg simvastatin tablets [12]. That is, most simvastatin users in Finland still receive doses lower than the 40-mg dose used in many clinical trials [2, 13] and recommended by current clinical guidelines [14-15]. While this study has limitations due to the reliance on the SII data on drug use and comorbidities, the results support the notion that potential benefits of statin therapy may be compromised due to low doses prescribed at the initiation and during the subsequent year.

NOTE: The results of this study have been previously published in the Finnish Medical Journal [16].

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Conflict of interest

Piia Peura has participated in a research project on cost-effectiveness of statins funded by Astra Zeneca and received a fee for consulting from ESiOR Oy. The other authors declare that they have no conflict of interest.

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Table 1 Characteristics of statin initiators and treatment changes during the first year following initiation

Characteristic	**Simvastatin 10 mg *n*=6,418 (23.9)**	**Simvastatin 20 mg *n*=14,002 (52.1)**	**Simvastatin 40 mg *n*=4,916 (18.5)**	**Fluvastatin *n*=529 (2.0)**	**Atorvastatin *n*=408 (1.5)**	**Rosuvastatin *n*=269 (1.0)**	**Pravastatin *n*=253 (0.9)**	**Any statin *n*=26,862 (100.0)**
Age. mean (± SD), years	61.9 (12.0)	60.4 (11.8)	60.4 (11.8)	60.6 (11.4)	59.2 (11.6)	57.2 (11.8)	60.9 (11.9)	60.7 (11.8)
Male	42.7	51.2	63.3	47.4	62.0	57.2	48.2	51.5
Initial statin dose								
10 mg	100.0	-	-	-	48.8	91.1	2.0	25.6
20 mg	-	100.0	-	15.1	34.3	8.2	58.1	53.7
40 mg	-	-	100.0	16.1	12.3	0.7	39.9	19.3
80 mg	-	-	-	68.8	4.7	-	-	1.5
CV risk								
High [a]	25.9	28.0	43.6	28.4	40.0	27.9	29.6	30.6
Moderate [b]	46.3	44.1	35.1	41.6	35.5	40.9	41.5	42.8
Low [c]	27.8	27.9	21.3	30.0	24.5	31.2	28.9	26.7
Comorbidities								
Coronary artery disease	5.8	7.8	27.5	7.9	20.8	11.5	13.8	11.3
Familial hypercholesterolemia	0.0	0.1	0.1	0.2	2.2	1.9	0.0	0.1
Diabetes	20.7	21.0	17.8	20.8	20.6	15.2	18.6	20.2
Hypertension	29.6	29.0	28.3	29.5	28.7	26.4	30.4	29.0
No other CV drugs [d] in use	33.5	33.5	25.2	34.5	30.9	39.0	32.0	32.0
Changes in statin therapy during 1 year following initiation								
No change	63.4	68.9	73.6	56.3	61.0	68.0	52.6	67.9
Changed dose	17.0	11.5	5.9	25.0	18.4	15.6	23.3	11.6
Changed to another statin	6.9	7.8	11.3	5.7	10.8	5.2	10.3	9.0
Single prescription during the first year	12.7	11.8	9.3	13.0	9.8	10.8	13.8	11.5

SD, stardard deviation; CV=cardiovascular. Unless stated otherwise, data are given as percentages.

[a] Individuals with high CV risk were entitled to special reimbursement for drug treatment of coronary artery disease, diabetes or familial hypercholesterolemia, or had purchased clopidogrel (Anatomical Therapeutic Chemical [ATC] code B01AC04) or antidiabetic medications (A10) within one year prior to cohort entry. [b] Individuals with moderate CV risk did not meet the criteria for high-risk status but had purchased cardiovascular drugs (ATC codes B01, C01, C02, C03, C07, C08, C09) or were entitled to special reimbursement due to hypertension. [c] Individuals with low CV risk did not meet the criteria for high or moderate-risk status. [d] Refers to ATC groups B01, C01, C02, C03, C07, C08 and C09.