

# Intensive Lipid Lowering Therapy Among Patients with Coronary Artery Disease: a Middle Eastern Tertiary Care Center Experience

\*Torkom Garabedian<sup>1,2,3</sup>, \*Alain Rizkallah<sup>1,2,4</sup>, George E. Sakr<sup>2,5</sup>, Samir Alam<sup>1,2</sup>, Hussain A. Isma'eel<sup>1,2</sup>

- 1 Division of Cardiology, Department of Internal Medicine, American University of Beirut, Beirut, Lebanon;
- 2 Vascular Medicine Program, American University of Beirut Medical Center, Beirut, Lebanon;
3. Department of Internal Medicine, Saint Elizabeth's Medical Center, Boston, Massachusetts;
4. Wayne State University – Detroit Medical Center, Detroit, Michigan;
5. Department of Electrical & Computer Engineering, American University of Beirut, Beirut, Lebanon

**Corresponding author:** Hussain Isma'eel, MD, Division of Cardiology, Department of Internal Medicine, American University of Beirut, Beirut, Lebanon,  
P.O. Box: 11-0236;  
Riad-El-Solh 1107 2020  
Fax: +961 1 370814  
Work: +961 1 35000 ext: 5800/5420  
Email: hi09@aub.edu.lb;

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According to the latest European guidelines of lipid lowering therapy, all patients in the very high risk category should be on high intensity lipid lowering therapy (HLLT), with a goal LDL-C of 70mg/dL or a reduction of LDL-C by 50% if the above target cannot be reached.<sup>1</sup> Similarly, while the most recent guidelines by ACC/AHA abandon LDL -C targets, they insist on the need of HLLT, defined as any statin dose that would lead to ≥50% reduction in LDL-C values.<sup>2</sup>

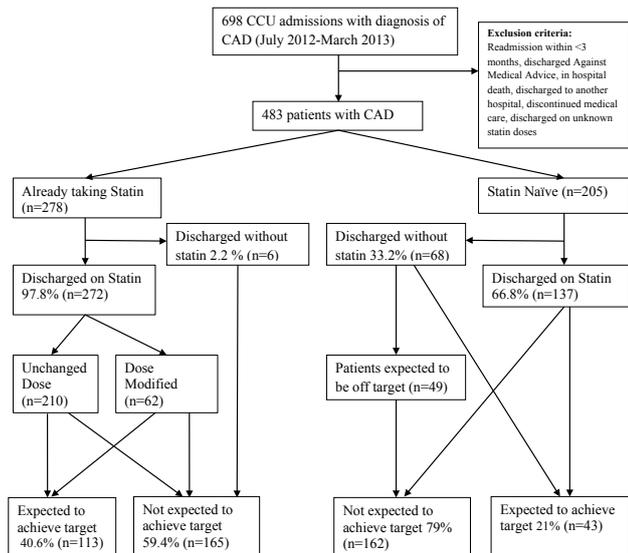
In an attempt to identify areas of improvement in our hospital-based practice, we studied the use of HLLT upon discharge among patients with known Coronary Artery disease (CAD). The study population consisted of 694 admissions to the Cardiac Care Unit (CCU) over a 10 month period, with a final diagnosis of Acute Coronary Syndrome (ST elevation myocardial infarction (STEMI), Non-STEMI or Unstable Angina) or history of documented CAD by invasive or noninvasive imaging, previous MI, Percutaneous Coronary Intervention (PCI), Coronary artery Bypass Graft CABG, or Ischemic Heart Failure.

Exclusion criteria included: Readmission within less than 3 months, patients discharged Against Medical Advice, patients who died in the hospital, those discharged to another hospital, patients who discontinued medical care, and those discharged on unknown statin doses. Retrospective chart review was performed. After applying the exclusion criteria, the remaining number of admissions was 483. All eligible patients had a lipid panel drawn on admission or within a month prior to that. Patients were classified as being on statin therapy (n=278) or statin naïve (n=205). For each patient, we calculated the

percentage drop in LDL-C needed to achieve the target of ≤70mg/dL, as follows:  $T = 100 \times (\alpha - 70) / \alpha$  (where T= Percentage LDL-C needed to drop,  $\alpha$  being the actual LDL-C level of the patient before intervention). Then, for those who were either prescribed a statin or had their statin dose changed, we estimated, based on known individual statin potencies, the expected reduction of LDL-C for each patient when the drug takes its full effect.<sup>2,3</sup> The need for informed consent was waived via IRB review in our institution.

## Results

In the statin naïve arm (n=205), 67% (n=137) were discharged on statins and 33% (n=68) were not discharged on statins. From those discharged on statins, 17.5% (n=24) were prescribed a dose that would achieve the target drop, while 82.5% (n=113) were prescribed a dose that would not achieve the target. Out of the 33% (n=68) who were statin naïve and not discharged on statins, 27.9% (n=19) did not need a percentage drop, while 72.1% (n=49) needed a reduction in cholesterol. To summarize, in the statin naïve arm, 21% (n=43) were expected to achieve target, while 79% (n=162) were not expected to achieve the goal LDL-C of ≤70mg/dL. In the arm of patients already on statin upon admission (n=278), 97.8% (n=272) were discharged on statins. Among these, 77.2% (n=210) were discharged on the same dose and 22.7% (n=62) were discharged on a different dose. 2.22% (n=6) were not discharged on any statin. Interestingly, among those discharged on the same dose, 42.9% (n=90) would be expected to achieve target and 57.1% (n=120) would not. Among those discharged on a different dose



**Figure 1.** Distribution of patients included per expected LDL target

of statin, 37.1% (n=23) would achieve their targets and 46.8% (n=29) were discharged on a higher dose, yet were still not expected to achieve their target. In addition, 16.1% (n=10) were discharged on a dose lower than the one they were originally taking and were not expected to reach target. To summarize, in the already-on-statins arm, 40.6% (n=113) patients were expected to be on target after discharge, while 59.4% (n=165)

were expected to be off target. It is important to note that from the total population of patients with CVD, 74 patients (15.3%) were discharged without statin. Finally, out of the 483 admissions, 32.4% (n=156) were expected to reach a target LDL of  $\leq 70\text{mg/dL}$  after discharge, whereas 67.8% (n=327) were not expected to reach this target.

Suboptimal use of HLLT is well described, with a recent study by Rosenson et al. showing rates of HLLT use on discharge among 8762 Medicare patients hospitalized with coronary heart disease at 23.1% among patients not taking statin prior to admission, 9.4% among those taking low/moderate doses, and 80.7% among those taking HLLT prior to admission.<sup>4</sup> Prescribing statins may be limited by a variety of factors, mainly intolerance, myopathy, liver failure or drug interactions, as well as advanced age.<sup>5,6,7</sup> Moreover, it varies widely among different populations, possibly due to physician preferences, cultural differences, socioeconomic factors, adherence to treatment, drug cost, and population CHD risk profiles.<sup>8</sup> While the reasons for not prescribing statin were not available to us, the study highlights an important discrepancy between guidelines for optimal lipid lowering therapy and current practice.

### Conclusions

Despite that all patients with CAD optimally require HLLT, the majority of this population is not on HLLT in our single center experience. This study demonstrates an urgent need to implement practice guidelines at the institutional level, in order to minimize the recurrence of adverse cardiovascular events.

### Declarations of Interest

The authors declare no conflicts of interest.

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**Table 1.** Clinical characteristics of included patients

Demographics	Number of patients	Percentage of patients
Total number of patients	483	100%
Male	365	75.57%
Female	118	24.43%
Average age	67.09 Standard deviation: +/- 11.80	-
Previous CABG	133	27.54%
Previous PCI	172	35.61%
Previous MI	98	20.29%
HTN	336	69.57%
Diabetes	191	39.54%
Congestive heart failure	124	25.67%
Smoker (past/present)	241	49.90%
ACS as admitting Diagnosis:		
Unstable Angina	236	48.86%
NSTEMI	115	23.81%
STEMI	80	16.56%
STEMI	41	8.49%
Underwent Coronary angiography during hospital stay	294	60.87%
Underwent PCI during hospital stay	231	47.83%
Underwent CABG during hospital stay	10	2.07%