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Rosuvastatin dose should be case individualized: An observation from inherited hypercholesterolemia case study

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Rosuvastatin dose has long been a controversy especially for diabetic and cardiovascular disease patients. Although dose-dependent effect was suggested (Al-Kuraishy and Al-Gareeb 2019), many fixed dose suggestions are reported (Ostroumova et al. 2018). Many recommendations (Al-Kuraishy and Al-Gareeb 2019; Ostroumova et al. 2018; Mitsiou et al. 2018; Kameda et al. 2017; Guo et al. 2017; Liang et al. 2017; Kilit et al. 2017; Shah et al. 2016; Karlson et al. 2016 a,b; Homma et al. 2015; Pan et al. 2015; Aydin et al. 2015; Makariou et al. 2015; Katabami et al. 2014; Igase et al. 2012) are showing a controversy regarding the use of very low dose (5 mg) against very high dose (40 mg). A clear lesson was predicted from a rosuvastatin case study (in the current letter) that we will mention in brief to show the importance of the appropriate dose in achieving the best results with the lowest possible side effects. All the case reports and laboratories' investigations are available from the authors on request.

The case study with reported familial hypercholesterolemia was firstly on rosuvastatin 5 mg daily for three months and as the dose was not enough (very low dose) to control lipid levels, he was hospitalized for chest pain (with positive troponin) and diagnosed with myocardial infarction that required PCI and a stent in SA branch of the right coronary artery. On the 5 mg dose (Table, columns A & B), the total cholesterol was 269 mg/dL, LDL was 200 mg/dL, TG was 268 mg/dL and the HDL value was only 26. The total cholesterol/HDL ratio was more than 8.5 (recommended <4.4) and LDL/HDL ratio was more than 6.5 (recommended <3.2). Directly after catheterization and stenting, he was on very high dose rosuvastatin (40 mg daily) for 1 month. This high dose decreased total cholesterol by 60% in one month to 111 mg/dL (Table 1, column C) in addition to increasing the HbA_{1c} up to 5.6 near the pre-diabetic level (insulin resistance is a known side effect for rosuvastatin). The patient was hospitalized again due to severe

Table: Different lipid profile results accompanied with different doses of rosuvastatin

Parameters	A 5 mg Rosuvastatin	B 5 mg Rosuvastatin	C 40 mg Rosuvastatin	D 20 mg Rosuvastatin	E 10 mg Rosuvastatin	F 10 mg Rosuvastatin
Total Cholesterol (mg/dL)	**269**	**256**	**111**	**133**	**170**	**187**
HDL (mg/dL)	**40**	**30**	**34**	**38**	**40**	**46**
LDL (mg/dL)	**176**	**200**	**62**	**78**	**99**	**103**
Triglycerides (mg/dL)	**268**	**132**	**77**	**85**	**155**	**188**
VLDL Cholesterol (mg/dL)	**54**	**26**	**15**	**17**	**31**	**38**
Serum Apo A1 (mg/dL)	**–**	**71**	**115**	**108**	**118**	**137**
Serum Apo B (mg/dL)	**–**	**142**	**64**	**91**	**106**	**93**
Ratio of T. Cholesterol / HDL Cholesterol	**6.73**	**8.53**	**3.26**	**3.50**	**4.25**	**4.07**
Ratio of LDL/HDL Cholesterol	**4.40**	**6.67**	**1.82**	**2.05**	**2.48**	**2.24**
Ratio of Apo A1/Apo B	**–**	**0.5**	**1.8**	**1.19**	**1.11**	**1.47**

chest pain, but the hospital laboratory results confirmed that it was only muscle chest pain. A "rosuvastatin tablet" was extracted using methanol by the first author who conducted laboratory LC-MS/MS analysis for rosuvastatin that confirmed the structure of the raw material showing the reported (Elgawish et al. 2019) parent and daughter m/z (Figs. 1 & 2). The dose was decreased to 20 mg daily for 5 weeks leading to a slight increase in cholesterol parameters (Table 1, column D) but the patient was still suffering from severe muscle pain and insomnia. Finally, after adjusting the dose to 10 mg daily, all the cholesterol results (including Apo B & Apo A) were within the normal range (after 6 months, Table, column E) or on the border-line range (after 1 year, Table 1, column F) without any side effects reported by the patient. The message is how the inappropriate dose could result in hilarious consequences either the low dose or the high one while using the accurate appropriate dose will show the most beneficial results. So, rosuvastatin dose should be case individualized.

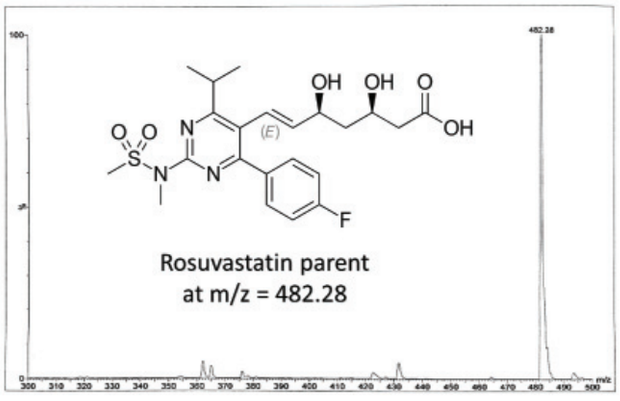

Fig. 1: Rosuvastatin parent at m/z = 482.28.

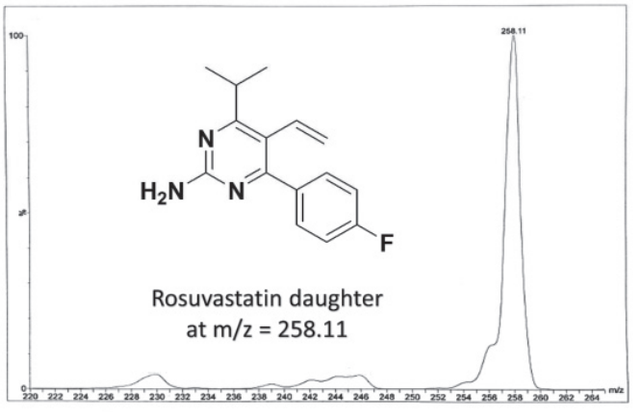

Fig. 2: Rosuvastatin daughter at m/z = 258.11.

Conflicts of interest: None declared.

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