Student: Sheena Galhotra, MSIV | The University of Arizona College of Medicine – Tucson

EFFICACY OF ALTERNATE DAY STATINS FOR LIPID REDUCTION: A SYSTEMATIC REVIEW AND META-ANALYSIS

Sheena Galhotra, Muhammad Shahzed Khan, Irbaz Bin Riaz, Tam H.Truong, Asad Patanwala, Marion Slack

BACKGROUND: Statins have proven to be beneficial in reducing cardiovascular morbidity and mortality. The data indicates that stains are underutilized due to cost considerations and unpleasant side effects. To overcome this problem, alternate day regimens of statins were proposed. The primary objective of this meta-analysis was to determine if alternate day dosing is as effective as daily dosing in blood lipid levels.

METHODOLOGY: Literature search was conducted using Medline, Embase, Cochrane Central Register of Controlled Clinical Trials, and Cochrane Database of Systematic Review (CDSR). Randomized controlled trials that measured reduction in blood levels in adult patients with hyperlipidemia via alternate day statin strategy use were included. The primary outcome was reduction in serum LDL concentration while the secondary outcomes were triglyceride (TG) and total cholesterol (TC) reduction. Meta-analysis was done using random effects model utilizing DerSemonian and Laird method. Quality assessment was done using Cochrane Collaboration's tool. Heterogeneity was assessed using Q-statistic and quantified with I^2. Publication bias was assessed with a funnel plot.

RESULTS: A total of 315 studies were screened and 16 studies were included in the final analysis. Group 1 was designated as "Dose Independent group" meaning that the daily dose and the alternate day dose was the same, and thus the total weekly dosing was half in the alternate day group. Group 2 was the "Dose Equivalent group" implying that the alternate day dose was more than the daily dose, such that the total weekly dose was the same. The comparison of daily to alternate day regiments in Group 1 showed greater LDL reduction (μ reduction=7.44; CI 0.99 to 13.88; p=0.02; I2=59%) and TC (μ reduction=6.85; CI 0.15 to 13.55; p=0.05; I2=63%) with daily use, and equivalent TG (μ reduction=0.42; CI -7.71 to 8.55; p=0.02; I2=0%) reduction in both regiments. Group 2 showed no difference between the regiments in LDL reduction (μ reduction=-4.25; CI -23.32 to 14.83; p=0.66; I2=90.2%) and TC reduction (μ reduction=-2.32; CI -20.113 to 15.47; p=0.8; I2=85.6%).

CONCLUSION: Our results show that the daily regimen is marginally favorable over alternate day dose if the statin is unchanged (the total weekly dosing is halved in the alternate day group). If the alternate day dose is increased so that the total weekly dose of the statin is the same as the daily regimen, the LDL and TC reductions are comparable. Hence alternative day statin therapy may be a reasonable treatment option in patients with side effects and compliance issues. Our analysis is be limited by the high heterogeneity, missing data points and lack of individual patient data.

Student: Heinrich David Fan, MSIII | The University of Arizona College of Medicine – Tucson

ARDS AND SEVERE SYMPTOMATIC HYPONATREMIA ASSOCIATED WITH MDMA USE. A CASE REPORT

Fan H, Bernardo RJ, Meinke L

MDMA (3,4-methylenedioxy-methamphetamine) is an amphetamine derivative that has gained significant popularity in recent years, becoming the drug of choice for many young adults. MDMA has psychoactive properties and unpredictable toxicity, leading to an increase in emergency department (ED) visits worldwide. MDMA toxicity can manifest as hyperthermia, severe hyponatremia, rhabdomyolysis and potentially major end-organ damage and multi-organ failure. We present a case of severe hyponatremia with cerebral edema, hypoxemic respiratory failure with ARDS and left ventricular failure associated with MDMA use.

A 19-year old female chemistry student with no significant PMH was brought to the ED by her roommate due to altered mental status (AMS), nausea, vomiting and respiratory distress. Her roommate reported that one day before admission she had ingested MDMA, experiencing severe nausea and vomiting after intake and tried to rehydrate with oral intake of fluids. She was left unattended for around eight hours and then found confused, diaphoretic and complaining of shortness of breath. Vitals on admission included an oxygen saturation of 75% on room air, BP 153/122, HR 149, RR 31, afebrile. She was in acute distress, using accessory muscles, somnolent but arousable, pupils PERRLA. Auscultation revealed diffuse crackles, no wheezes, no nuchal rigidity. The rest of her exam was unremarkable. She was intubated for impending respiratory failure and airway protection. Labs revealed VBG 7.19/41/19/15, lactate 7.7. After intubation the PaO2/FiO2 ratio was 100. WBC 16.9 with left deviation, Hb 17.2, platelets 160, Na 118, K 3.7, Cr 1.0, CK 1962, serum osmolality 259, urine osmolality 570, urinary Na 21, troponin 2.65, BNP 3317. UTox was positive for amphetamines. CXR showed diffuse bilateral air-space opacities. Head CT revealed severe diffuse cerebral edema with effacement of the convexity sulci and partial effacement of the lateral ventricles. Bedside echocardiogram revealed a severely decreased LV systolic function, EF < 20 % with diffuse wall motion abnormalities. NS was given as boluses with rapid improvement in serum Na. No hypertonic saline was used. Lung protective ventilation was used for treatment of suspected ARDS. Repeated Echo 24 hours after supportive treatment showed significant improvement (EF estimated at 35%). No diuretics were needed. The patient improved rapidly, was extubated at 48 hours and eventually discharged home with instructions for outpatient follow-up.

MDMA is an amphetamine derivative with a range of psychotropic actions commonly abused by young people in recreation. MDMA can be associated with severe symptomatic hyponatremia and cerebral edema secondary to thirst stimulation. ARDS and multi-organ failure is unusual, related to the oxidative stress triggered by MDMA metabolites. In summary, MDMA use can be associated with significant metabolic disturbances and multi-organ failure with ARDS. Treatment is mainly supportive.