Sublingual Nitroglycerin Administration for Stable Angina: A Review

Name

Institution

Course

Professor

Date

Introductions

Stable angina presents as a consequence of mismatch between myocardial supply and demand. Prognosis is generally positive, with an annual mortality rate of 3.2%. However, the chest tightness and pain radiating across the chest and into the arms is often a cause of concern for the patient and a regular cause for emergency admittance. While stable angina can be managed with lifestyle changes, sublingual nitroglycerine is commonly prescribed to reduce anxiety and hospital admissions (Kim, et al., 2021). Superficial analysis of sublingual nitroglycerine administration elucidates its benefits as an intervention for stable angina, while simultaneously exposing a need for behavioral modifications from the patient.

Mechanism of Action

Sublingual nitroglycerine functions as beta-blockers and calcium channel blockers. These sublingual compounds rapidly absorb into the bloodstream, at which point they are converted to nitric oxide. Nitric oxide activates guanylyl cyclase, which converts guanosine triphosphate to guanosine 3,5 monophosphate in vascular smooth muscle. This enhances reuptake of calcium into the sarcoplasmic reticulum, resulting in the dephosphorylation of myosin light chains and the relaxation of smooth muscle. Relaxed smooth vascular muscle increases lumen diameter, resulting in increased blood flow to the heart and a cessation of symptoms (Rousan, et al., 2019). However, this medication is not without side effects.

Side Effects

Given the indiscriminate vasodilation caused by nitroglycerin, a wide range of side effects exist. Sublingual nitroglycerin has been documented to cause dizziness,

weakness, palpitations, vertigo, headaches, nausea, vomiting and syncope. These side effects must be closely monitored, as they are a common cause of poor patient compliance (Kim, et al., 2021). However, monitoring sublingual nitroglycerin administration proves challenging.

Monitoring

Nitroglycerin possesses a half-life of just two to three minutes. In turn, direct monitoring is not easily accessible. As a result, the attending professional must monitor real time blood pressure to determine treatment efficacy (Rousan, et al., 2019). Drug interactions must also be considered.

Drug Interactions

Sublingual nitroglycerin is a protein bound drug that undergoes hepatic metabolism. In turn, there are several drug interactions. Sublingual nitroglycerin should not be prescribed in conjunction with alteplase, heparin, tricyclic antidepressants or other anticholinergic drugs (Rousan, et al., 2019).

Interprofessional Collaboration

As aforementioned, stable angina can be readily prevented through modifications to lifestyle, such as smoking cessation, stress management, increased exercise, and dietary changes. In turn, the patient should be counseled to engage in treatment with other providers, such as dieticians, physical therapists, and clinical psychologists to mitigate cardiovascular disease severity (Frattaroli, et al., 2008). A healthier lifestyle may circumvent the need for pharmacologic intervention.

Conclusion

Stable angina presents as a concerning phenomenon for the patient and healthcare infrastructure alike. Effective treatment is readily available. However, sublingual nitroglycerin often cultivates unwanted side effects that degrade patient compliance. In turn, interprofessional collaboration should complement pharmacological therapy to encourage lifestyle changes that prevent the pathophysiological progression of stable angina, rather than just the symptoms alone.

Works Cited

Kim KH, Kerndt CC, Adnan G, et al. Nitroglycerin. [Updated 2021 Aug 7]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK482382/

Frattaroli, J., Weidner, G., Merritt-Worden, T. A., Frenda, S., & Ornish, D. (2008). Angina pectoris and atherosclerotic risk factors in the multisite cardiac lifestyle intervention program. *The American Journal of Cardiology*, *101*(7), 911-918.

Rousan, T. A., & Thadani, U. (2019). Stable Angina Medical Therapy Management Guidelines: A Critical Review of Guidelines from the European Society of Cardiology and National Institute for Health and Care Excellence. *European cardiology*, *14*(1), 18–22. https://doi.org/10.15420/ecr.2018.26.1