Stable Angina: Causes, Effects and Use of GlycerylTrinitratein Medical Therapy

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Stable angina refers to chest pain brought about by myocardial ischemia due to the myocardial oxygen demand being higher than the amount supplied through the blood vessels. Inadequate oxygen in myocardial cells leads to anaerobic metabolism in these cells which disables various heart functions. In case of ischemia, ATP is broken down to adenosine which causes expansion of arteries and hence angina pain through stimulation of A1 receptors present in the cardiac nerve endings (Chierchia&Fragasso, 1996). Symptoms include tightness and pain in the chest along with increased perspiration and shortness of breath. Sharp pains may be experienced in the arms, neck and the upper abdomen, but may subside upon resting (BHC, 2012). If untreated, the condition develops to unstable angina so that the patient may suffer angina attacks even when resting.Ischaemic heart disease led to most deaths in Australia in 2010 through angina, congested cardiac vessels, and heart attacks (ABS, 2012). Management of angina includes avoiding lifestyle activities that make one vulnerable to anginal attacks such as very vigorous exercise, high fat foods, and smoking (Chierchia&Fragasso, 1996).

GlycerylTrinitrate (GTN) has been listed among the most effective nitrates used to treat angina (BMJ, 1969).Sublingual treatment involves administering spray or pills under the tongue. The high number of blood vessels here causes faster absorption ([Horwitz,](http://www.ncbi.nlm.nih.gov/pubmed?term=Horwitz%20LD%5BAuthor%5D&cauthor=true&cauthor_uid=4632992) 1973).Earlier management of angina has solely involved attempts to increase blood supply to the oxygen deprived cardiac muscles(Deedwania et al., 2007**).** Successful management of stable angina involves reduction of deaths related to poor blood flow in the heart, improved ability of the patient to exercise and quality of life. Boden et al. (2012) suggested using short and fast acting sublingual nitrates together with exercise therapy since they would increase the patient’s ability to exercise. In the body, GTN is converted to nitric-oxide which causes blood vessels to relax and increase in size hence decreasing resistance to blood flow (Carson et al., 1969). Experiments have shown that GTN does not affect coronary blood flow greatly though it minimizes the load on the left ventricle and causes relaxation of all blood vessels hence its anti-anginal effect (BMJ, 1969). It is most effective for immediate relief of anginal attacks. However, continued use may result in tolerance. A break of 10-12 hours per day from the drug is recommended (Deedwania et al., 2007).

Pharmacokinetics refers to the fate of a drug once it is administered into the body. When administered sublingually, it reaches the plasma via absorption by blood vessels. Metabolism of GTN in the blood is very fast and its concentrations are found to be less than 1microgram/L. It takes 2 or 3 minutes for its concentration in plasma to drop by half. 75% of the ingested drug is metabolized in the liver and the rest is excreted through the renal system (Boqaert, 1987). Side effects when using GTN include headaches and dizziness. They may also cause hypotension which may be severe in isolated cases and is characterized by irregular heart rate and more angina attacks. Anginal attacks may occur even when the patient is on medication which is called rebound angina. Prolonged use leads to tolerance and is suspected to increase death rate and cause repeated myocardial infarctions. GTN may not be used when a patient is taking phosphodiesterase inhibitors used to treat erectilecomplications since the combination can result in acute hypotension and death. Patients possessing allergies toward nitrates and expectant or lactating mothersare discouraged not to use GTN (Thadani& Rodgers, 2006).

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