Usefulness of NT-pro BNP in Underwriting Individuals with Atherosclerotic Peripheral Vascular Disease

N Terminal-pro Brain Natriuretic Peptide (NT-pro BNP) is produced by cardiac muscle cells (myocytes) in response to cardiac wall stress resulting from conditions such as congestive heart failure and in response to ischemia as well. NT-pro BNP has been shown to predict all cause mortality in insurance applicants without history of heart disease as well as in general community residents. It also has been found to improve future cardiovascular risk estimation when considered along with classic cardiovascular risk assessors. Since the cause of death in individuals with peripheral vascular disease (PVD) and cerebral vascular disease is due to coronary atherosclerotic heart disease (CAD) at least fifty percent of the time, and is due to CAD in those with diabetes to an even greater extent, it is logical that assessment of NT-pro BNP values might provide helpful information when underwriting these impairments.

Those with PVD involving the lower extremities are at increased risk to not only suffer from CAD but also from other manifestations of the systemic atherosclerotic process as well. Those with PVD experience combined rates of hospitalization, stroke and heart attack that are at least as great as those having CAD alone. NT-pro BNP has been found to be an independent predictor for all cause mortality over a five year period of follow up in Austrian individuals (median age = 70 years, 69.8% male) who are symptomatic with PAD. NT-pro BNP values above the median (NT-pro BNP = 213 ng/L) in this study on individuals with either intermittent claudication (~80.7% of entrants) or critical limb ischemia (~19.3% of entrants) were found to represent a risk ratio for all cause mortality of 2.27 independent of other risk factors. Individuals in this study who had no known cardiac disease were found to have a relative overall mortality risk of 5.2 if their NT-pro BNP level was >213 ng/L. This computes to a mortality risk that is nearly six tables greater than those with NT-pro BNP levels ≤213 ng/L (see table at right).
Individuals with symptomatic atherosclerotic peripheral vascular disease (PVD) of the lower extremities at some point may need to consider lower extremity bypass surgery. Short and long term cardiovascular risk estimation is important in the underwriting evaluation of such insurance applicants. In this setting there is increased risk for perioperative major adverse cardiac events (MACE) including death. Debilitation resulting from PVD makes preoperative assessment of risk from occult CAD problematic. Assessment of preoperative NT-pro BNP levels in this situation lends helpful information that has been found superior to cardiac risk assessment scores and dobutamine stress echocardiography in estimating risk of adverse events occurring perioperatively and in the first six months after major non-cardiac vascular surgery. In a study of 335 Dutch entrants admitted either for lower extremity bypass surgery or for elective abdominal aortic aneurysm repair (mean age = 62 years, 76% male) preoperative NT-pro BNP levels > 319 ng/L were found to have hazard ratios for all cause mortality of 4.0 and for MACE of 10.9 over the six months following their vascular surgical procedure.

In those suffering from PVD, determination of NT-pro BNP levels provides helpful information regarding mortality risk over 6 months from the time of surgery in those undergoing non-cardiac vascular surgical procedures and provides information concerning long-term overall mortality risk.

References:
2. Linssen GCM, et al, N-terminal pro-B-type natriuretic peptide is an independent predictor of cardiovascular morbidity and mortality in the general population, European Heart Journal 2010;31:120-127.

Key Summary Points
- Individuals around 70 years of age, symptomatic with peripheral vascular disease and having NT-pro BNP levels less than or equal to 213 ng/mL have relatively favorable mortality risk over the next 5 years.
- Individuals around 70 years of age symptomatic with peripheral vascular disease and having NT-pro BNP levels above 213 ng/mL have a mortality ratio of ~245%.
- Those in their early 60’s with PVD who will have non-cardiac major peripheral vascular surgery have a hazard ratio of for all-cause mortality of 4.0 during the six month period following their surgery if their preoperative NT-pro BNP is greater than 319 ng/L.

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