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Coronary Heart Disease has become a leading cause of death in the United States over the past twenty years. Surgical procedures that bypass plaque deposits in major vessels are a commonplace form of treatment, allowing blood to flow past obstructions that may otherwise be lethal. All bypass procedures including femoropopliteal bypass grafting and carotid angioplasty have similar post-surgical consequences, namely intimal hyperplasia (IH). Although IH has been well documented, it is a phenomenon not fully understood. IH is characterized by the influx of cells from the middle portion of the artery (tunica media) into the innermost portion of a major artery. This causes obstruction of the artery, and decreases overall blood flow in the body. IH seems to occur with greater frequency in post-menopausal women who have undergone angioplasty than pre-menopausal women who have undergone the same procedure.

Currently the Computational Sciences and Engineering Division (CSED) of the Oak Ridge National Laboratory (ORNL) is partnering with the University of Tennessee Graduate School of Medicine (UTGSM) to design a computational model to explain this, and other phenomenon related to IH. Although our mechanistic study focuses on carotid angioplasty, the risk factors for vascular disease are the same regardless of the method of surgical repair. Thus the intended study will examine the IH resulting from femoropoplietal bypass grafting to generate more knowledge pertaining to the study of post intervention IH.

The main objective of this present study is to identify the risk factors in women who are taking HRT, and who undergo femoropopliteal bypass grafting. Specifically, we wish to identify the underlying variables that may determine success or failure of such a procedure. The overall desired outcome of this study is to more accurately tailor a prospective study by the formation of a statistical model that may eventually lead to a screening tool for use in a diagnostic setting.

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