Invasive treatment of claudication is indicated for patients unable to adequately ambulate during cardiac rehabilitation

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Abstract:
Cardiac rehabilitation (CR) is proven benefit for patients with coronary artery disease (CAD). Periperal arterial disease (PAD) is common in patients with CAD. We investigated whether PAD predicts the successful completion of CR and whether there is a benefit of PAD for patients unable to complete CR. METHODS: The records of 216 consecutive CR patients were reviewed for outcomes, using the same criteria (THR, and Walking Impairment Questionnaire (WIQ) values to compare PAD among successes and failures. Failure of CR was defined as inability to walk sufficiently to achieve THR. Major distress and age were excluded. Data was assessed for differences in the prevalence of treatment strategies in which PAD was recorded compared with non-PAD patients. Results: PAD occurred significantly more among patients who completed CR (26% vs. 22%). Failure was more common in patients with claudication (76%) than in those without (26%; OR, 8.9; 95% CI, 1.1–71.1). Number of fatal peri-procedural complications from PAD revascularization procedure in the base-case model was 15% vs. 2%. In the presence of PAD, the event rate was 20% vs. 26%. The probability of fatal peri-procedural events was < 8%. If this probability was > 8%, the strategy for PAD was recommended. The model predicted that PAD was significantly associated with the presence of PAD based on WIQ walking distance score (OR, 2.8; 95% CI 1.1–7.1; P = .03). Results: (1) PAD is a significant cause of CR failure. Preventing patients from successfully completing cardiac rehabilitation patients who fail CR was recommended. (2) Strategies that include PAD for patients failed CR. Conclusions: Although the selective strategy included more fatal peri-procedural events due to the revascularization procedures, the reduction in the number of fatal cardiac events outweighed the number of fatal procedure-related deaths, saving an additional 54 lives compared with the base strategy.

Introduction:
Heart disease (HD) is the major cause of death and disability in the United States. Numerous strategies, both pharmacological and invasive, have been identified to reduce the enormous toll of this disease. One of the most effective, but least utilized strategies is cardiac rehabilitation (CR). CR has been shown to reduce cardiovascular mortality by 31%, all-cause mortality by 21%, and improve cardiovascular health, blood pressure, left ventricular function, and quality of life in patients with HD. Although CR is multifaceted, our patient’s ability to ambulate is the primary determinant of CR success, and performance in a comprehensive exercise and physical conditioning program. Unfortunately, the exercise demands of CR may exceed the capabilities of the patient with intermittent claudication (IC). The primary purpose of this study was to determine whether PAD or IC interferes with the successful completion of CR and cardiopulmonary risk reduction. The secondary purpose was to evaluate through Markov decision analysis whether the invasive treatment of PAD is indicated in those patients unable to successfully complete CR.

Methods:
Study Population: To determine whether IC interferes with the successful completion of CR, 230 consecutive CR patients presenting with intermittent claudication (IC) were identified at Advocate Lutheran General Hospital were reviewed. Demographic information, type of cardiac rehabilitation program, attendance and THR performance were recorded.

Evaluation of PAD: The presence and extent of PAD and IC were assessed by the Walking Impairment Questionnaire (WIQ) and, in a subset of patients, calculation of the ankle-brachial index (ABI). The WIQ was obtained by self-administration or telephone interview. The ABI was calculated by sphygmomanometer. The leg with the lowest ABI was used in the analyses. The presence of PAD was defined as an ABI of 0.90.

Results:
IC and CR Failure: The records of 230 consecutive patients undergoing CR were reviewed. Of these 136 had both complete and incomplete THRs. Figure 6 compares the patient characteristics and severity of cardiac disease. PAD was present according to the WIQ claudication symptoms data in 29%, by the WIQ walking distance score in 24%, and by ABI in 26%. Based on the definition of success and failure, 75 of 126 patients (60%) successfully completed CR and 51 (40%) failed. Failure was significantly more common in patients with claudication (76%) than in those without (26%; OR, 8.9; 95% confidence interval (CI), 1.1-71.1; P < .001). The presence of PAD, determined by the WIQ, was significantly associated with failure (91% vs. 35%; OR, 31.4; 95% CI, 1.6-630; P = .03). The presence of PAD determined by ABI was higher in the failure group (80%) versus the success group (14%; OR, 3.6; 95% CI, 1.8-7.7; P = .06). Logistic regression analysis when cardiac rehabilitation failure was adjusted for age and gender was significantly associated with the presence of PAD based on WIQ walking distance score (OR 2.8; 95% CI 1.1-7.1; P = .03).

Conclusions:
1. PAD is a significant cause of CR failure.
2. Despite the small risks of intervention, there is a clear indication for invasive treatment in the subset of patients with IC, known ischemic heart disease, and the inability to ambulate.
3. A strategy of invasive therapy, only if PAD interfered with the successful completion of CR, would save an additional 54 lives per 10,000 patients compared with no intervention.

References:

Figure 5. Schematic of Markov Decision Model

Figure 6. Patient Characteristics: Success vs. Failure, P = .05 vs. total complications.

Figure 7. Intermittent claudication. Number of fatal cardiac events during follow-up and number of fatal peri-procedural complications from PAD revascularization procedure in the base-case analysis in a hypothetical cohort of 10,000 patients.

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