Exploring National Variations in Revascularization of Critical Limb Ischemia

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Despite recent data supporting both surgical-first and endovascular-first revascularization approaches for critical limb ischemia (CLI), approximately 25% of patients with CLI undergo major amputation within 1 year of diagnosis and only a minority undergo revascularization prior to amputation.[1,2] Therefore, an improved understanding of contemporary variations and outcomes associated with each approach among capable U.S. hospitals offering both treatments is necessary to help standardize care within this heterogeneous patient population.

In the latest issue of *JACC: Cardiovascular Interventions*, Raja et al aimed to fill this gap by analyzing trends in the institutional use of endovascular revascularization and surgical bypass among 196,070 Medicare beneficiaries aged 66 and older with CLI treated at 1832 institutions in the U.S. between 2015 and 2021.[3] A marginal Cox regression approach was utilized, and models were adjusted for patient-level covariates. The study found that 83% of patients underwent endovascular interventions to manage CLI. These patients were older, more often female, and had a higher burden of comorbidities compared to those treated with surgical revascularization. Also, there was significant variability in different interventions across institutions with an adjusted median odds ratio of 2.32 for endovascular procedures. This means that if an average patient went to 2 different hospitals with the same condition, there was a 2.3-fold chance they would get a different revascularization strategy at one hospital compared to another. Finally, patients undergoing endovascular revascularization at the highest quintile hospitals experienced a lower rate of major amputation but a higher rate of repeat procedures. These trends were also seen among the same endovascular sites that had a high frequency of atherectomy. Conversely, patients undergoing surgical revascularization at a high-volume surgical center experienced a higher rate of major amputation but a lower rate of repeat procedures.

Despite the rising rates of amputation among patients with CLI, comparative studies on endovascular vs surgical bypass treatments are limited. Landmark randomized controlled trials, such as BASIL and BEST-CLI, which analyzed outcomes among patients with CLI undergoing either endovascular or surgical treatments, have produced discordant results.[4,5] The current findings align with prior large-scale Medicare studies, which similarly found a lower rate of major amputation following endovascular revascularization, a lower rate of amputation at institutions with higher use of atherectomy, and a higher rate of amputation at institutions with higher use of surgical bypass.[6,7] These data suggest that institutional expertise may be an important factor when determining optimal treatment strategies for patients with CLI and potentially associated with better outcomes. Interestingly, the small signal of harm noted among higher quintile surgical institutions suggests that high-volume surgical centers could be taking on higher risk patients and/or have lower mortality rates, which was in part reflected in the lack of difference between groups when death was considered. Despite this, high-volume surgical care will still be a key component of optimizing CLI outcomes, especially when institutions with endovascular expertise are not readily available.

These findings should be put in the perspective of the study's limitations, which include unmeasured factors that could not be captured by utilizing claims-based datasets; the exclusion of procedures performed at privately owned centers (ie, ambulatory surgery centers and office-based laboratories); the potential for treatment misclassification with the use of claims-based codes; the lack of generalizability when analyzing an older patient cohort with a higher burden of comorbidities; and the inability to capture patients insured by other carriers.

Overall, the study demonstrated the significant heterogeneity in CLI revascularization and care within a large nationwide cohort of patients and institutions. Although causality could not

be determined because of the observational design, the study sheds important light on the current state of treatment uptake for CLI. These data highlight the need for a multidisciplinary, nuanced, and patient-centric approach to the management of CLI, which incorporates both institution- and patient-based factors. Revascularization strategies for CLI are not one-size-fits-all and may require individualization across institutions, with the goal of matching expertise with treatment selection to ensure consistent and optimal outcomes.

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