

Heart attack patients with strong legs have better prognosis, finds research

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People with strong legs are less likely to develop heart failure after a heart attack, according to research presented today at Heart Failure 2023, a scientific congress of the European Society of Cardiology

(ESC).

Myocardial infarction is the most common cause of [heart failure](#), with around 6–9% of [heart attack patients](#) going on to develop the condition. Previous research has shown that having strong quadriceps is associated with a lower risk of death in patients with coronary artery disease.

This study tested the hypothesis that leg strength is associated with a lower risk of developing heart failure after [acute myocardial infarction](#). The study included 932 patients hospitalized in 2007 to 2020 with acute myocardial infarction who did not have heart failure prior to the admission and did not develop heart failure complications during their hospital stay. The median age was 66 years and 753 participants (81%) were men.

Maximal quadriceps strength was measured as an indicator of [leg strength](#). Patients sat on a chair and contracted the quadriceps muscles as hard as possible for five seconds. A handheld dynamometer attached to the ankle recorded the maximum value in kg. The measurement was performed on each leg and the researchers used the average of both values.

Strength was expressed relative to [body weight](#), meaning that quadriceps strength in kg was divided by body weight in kg and multiplied by 100 for a % body weight value. Patients were classified as 'high' or 'low' strength according to whether their value was above or below the median for their sex.

The median value for women was 33% body weight and the median value for men was 52% body weight. A total of 451 patients had low quadriceps strength and 481 had high strength. During an average follow-up of 4.5 years, 67 patients (7.2%) developed heart failure. The incidence of heart failure was 10.2 per 1,000 person-years in patients

with high quadriceps strength and 22.9 per 1,000 person-years in those with low strength.

The researchers analyzed the association between quadriceps strength (low vs. high) and the risk of developing heart failure. The analysis was adjusted for factors known to be associated with the development of heart failure after myocardial infarction including age, sex, body mass index, prior myocardial infarction or [angina pectoris](#), diabetes, [atrial fibrillation](#), [chronic obstructive pulmonary disease](#), peripheral arterial disease and kidney function.

Compared with low quadriceps strength, a high strength level was associated with a 41% lower risk of developing heart failure (hazard ratio [HR]: 0.59; 95% confidence interval [CI] 0.35–1.00; $p=0.048$).

The investigators also analyzed the association between quadriceps strength as a continuous variable and the risk of developing heart failure. Each 5% body weight increment in quadriceps strength was associated with an 11% lower likelihood of heart failure (HR 0.89; 95% CI 0.81–0.98; $p=0.014$).

Study author Mr. Kensuke Ueno, a physical therapist at the Kitasato University Graduate School of Medical Sciences, Sagamihara, Japan said, "Quadriceps strength is easy and simple to measure accurately in clinical practice. Our study indicates that quadriceps strength could help to identify patients at a higher risk of developing heart failure after [myocardial infarction](#) who could then receive more intense surveillance.

"The findings need to be replicated in other studies, but they do suggest that strength training involving the quadriceps muscles should be recommended for patients who have experienced a [heart attack](#) to prevent heart failure."

More information: Conference:
www.escardio.org/Congresses-Events/Heart-Failure

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