

EDITORIAL

European Heart Journal - Quality of Care and Clinical Outcomes

What happens to work capacity after coronary revascularization?

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Although ischaemic heart disease still remains a leading cause of disability and death, time trends in age-standardised rates of hospitalization and mortality for this disease are declining.^{1,2} Important advances have been made both in prevention and treatment of the disease. Percutaneous coronary intervention (PCI, a technique to widen a narrowed or obstructed coronary artery by placing a stent or scaffold at the site of blockage) and coronary artery bypass grafting (CABG, a surgical procedure placing new vessels around an obstruction to restore necessary blood flow to the heart muscle) are the two primary modalities for coronary revascularization performed to improve symptoms and reduce mortality.³ CABG was introduced in 1964 and PCI in 1977. Now they are in nearly universal use to complement medical therapy.

Numerous trials and meta-analyses have examined the efficacy of the two coronary revascularization procedures in relation to clinical outcomes, such as mortality, major adverse

cardiac/cerebrovascular events, cardiac arrest, heart failure, myocardial infarction, stroke, repeat hospitalization due to severe angina, readmission for coronary revascularization, and limitations in ordinary physical activity.³⁻⁷ In contrast, comparatively little is known about the benefits of PCI and CABG in terms of capacity to participate in the labour market.⁸ Work capacity is a major issue, widely affecting patients' lives, income, and opportunities to contribute to society. It also has important economic aspects. Spending on disability benefits is an increasing burden on public finances, reaching 4–5% of GDP in countries such as the Netherlands, Norway, and Sweden.⁹

In this issue of the journal, Lautamäki and colleagues report a new study on coronary revascularization and permanent work disability.¹⁰ This is a welcome and timely paper. The study population was 1000 Finnish cardiac patients who at the time of PCI or CABG were less than 50 years old and so more than 10 years off statutory retirement age. The researchers followed the patients after the operation for a median of 3.4 years. During this period one in ten patients who underwent PCI and one in four CABG patients were granted permanent disability pension. Thus, although the majority was capable of returning to work, the probability of permanent work disability was clearly elevated in this patient group. For comparison, less than one in thirty people are granted disability pension within a similar period in the general population of that age. The authors of the study concluded that permanent work disability in patients treated with coronary revascularization is common and that increased supportive measures are warranted at all levels of health care.

It is important to consider the reliability of this new evidence. Lautamäki and others linked each patient to records from nationwide work disability registers.¹⁰ Such registers in Scandinavian countries, including Finland, are considered to be comprehensive; linkage at the individual level being virtually complete using the unique personal identification number assigned to each citizen, and there is minimal loss to follow-up. In light of these strengths, there is little reason to doubt the validity of the outcome of interest. Data on PCI and CABG were collected from procedures undertaken between 2002 and 2012, which is a relatively long period of time given the rapid technological progress in this field. There have been important improvements in coronary

revascularization techniques during the data collection period, including the introduction of newer generation drug-eluting (instead of bare metal) stents, dedicated guidewires, microcatheters, and new strategies for opening chronic total occlusions, as well as better postoperative care. This means that results from this study might not fully reflect outcomes achievable using the most recent coronary revascularization procedures, although major underestimation seems unlikely.

What does the observed elevated risk of permanent work disability tell us about the effectiveness of coronary revascularization? Both methodological and conceptual issues are relevant. First, with observational data on a heterogeneous group of patients undergoing PCI and CABG, such as used in this study, we do not know what the work disability rates would have been had the patients been treated using non-invasive medical therapy only. If most of the patients would have lost their capacity to work without coronary revascularization, then the current observation that 87% patients who underwent the procedure were not in receipt of a disability pension at the end of follow-up would suggest coronary revascularization is extremely beneficial.¹⁰ Second, Lautamäki and colleagues included in the analysis all work disability pensions irrespective of cause. Descriptive statistics in the paper reveal that while cardiovascular disease was the primary diagnosis in the majority of cases, approximately one third of the disability pensions were granted for non-cardiac causes, such as diabetes, musculoskeletal disorders and mental disorders, mostly depression.¹⁰ As such, they are not directly linked to coronary revascularization, although these disorders and coronary heart disease share many risk factors, such as obesity, physical inactivity and psychosocial stress.¹¹⁻¹³ Third, although work disability is defined by the impairment, unlike commonly used clinical outcomes, such as adverse cardiac/cerebrovascular events and mortality, receipt of a disability pension is additionally dependent on nonmedical factors, such as disability pension regulations, the work environment, the nature of the job, and the extent to which the workplace is prepared to accommodate the disability. Taken together, these points indicate that the elevated work disability rates reported by Lautamäki and colleagues are likely not only to be attributable to the effects of coronary revascularization and illness severity, but also the risk profile

of the patient, characteristics of the job and workplace, and the regulations governing the granting of a disability pension.

More information is needed if work disability is to be reduced; a major goal in ageing societies. The paper by Lautamäki and colleagues will motivate new research to determine how widely the present findings can be generalised to countries with different health care systems, social security systems and labour market structures. Further research would be needed to dissect the contributions of treatment, disease severity and pension regulations to disability rates. This work should include the use of comparison groups and be much larger in scale, taking advantage of nation-wide linkage of electronic health, surgical procedure and disability records in countries where this is available.¹⁴ New digital technologies and remote data capture, especially if triangulated with more traditional approaches with known validity, could provide some cost-efficient alternatives to obtain information on functional decline in these patients. Examples of such complementary data include (a) records of income and national insurance contributions before and after revascularisation, (b) wearable devices/smartphones to assess pre/post-procedure changes in physical activity and GPS-assessed mobility, and (c) publicly accessible data by google searches (e.g., Facebook, Twitter contents) on potential markers of functioning. Better understanding will help us to achieve the WHO's ambitious aims to minimize disability and shape the world such that disability is less of an obstacle to productive employment and personal fulfillment.⁹

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