



## Editorial

## Coronary artery bypass graft: Is it still an elixir of life?



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On the 40th anniversary of the first coronary angioplasty, which changed the approach to myocardial revascularization dramatically, Susanne Nielsen and colleagues give us the opportunity to discuss the long-term efficacy of the “old” coronary artery bypass graft (CABG) [1]. In their very extensive research based on Swedish population, they collected the data of 96,488 patients who underwent a first isolated CABG from 1987 to 2006. Excluding the 30 days mortality, the patient cohort was stratified according to the gender and further into age groups. Comorbidities were identified according to the ICD system. The study was divided into four periods, allowing for an equal 4 years follow-up for each period encompassing 5 years. The 4-year mortality rates were compared for each period to those of the general population. The main findings were: 1) Annual mortality was stable (below 1% in younger, near 2% in older patients). 2) Older patients had more comorbidities compared to younger ones. 3) The mortality risk of men and women aged >55 years was lower than the general population whereas younger men and women had a higher mortality rate compared to the matched population. 4) After adjustment for increasing comorbidities, there was a continuous decrease in mortality risk for all groups except for women aged ≤55 years. The low mortality rate, stable with time, reflects the general trend towards the improvement of survival in patients with ischemic heart disease, despite the increasing burden of comorbidities. This paper, like the majority of the registry based studies, depicts an intriguing scenario that is certainly reliable due to the relevant number of cases examined, and also raises important questions. First of all, why patients older than 55 years do better after surgical revascularization, compared to the general population. The finding that in large population studies the cohort of CABG patients has a similar mortality rate to that of the general population has been reported in the past. A recent article, which examines the very long-term follow-up after CABG in the Danish population, demonstrates that in the period between 30 days and 10 years after the operation the mortality rate was similar to that of the general population whereas after 10 years the trend was significantly worse for CABG patients [2]. It is likely that, as

underscored by the authors, candidate selection for CABG is based on more stringent criteria among older patients. Therefore, subjects with severe comorbidities –like as neoplasms, severe chronic renal failure or chronic obstructive pulmonary disease– are excluded from surgical therapy. In this way, the burden of such severe comorbidities is relieved from the long-term prognosis of the surgical population. On the other side, the authors observed that mortality among younger patients who underwent CABG was higher as compared to the general population. A possible explanation for this unexpected and somehow paradoxical finding is that coronary artery disease may be more aggressive and diffuse when it occurs before 55 years. Particularly, young patients affected by type I diabetes mellitus are at increased risk to develop coronary artery disease with peripheral lesions. In such scenario, surgical revascularization is more difficult from the technical point of view. Of consequence, revascularization is sometimes less than complete because of anatomical reasons and the duration of grafts could be limited also by a low-grade run-off of the bypassed vessels. Another explanation of the worse prognosis of younger patients could be related to the significantly higher frequency of previous myocardial infarction and acute hospitalization, as compared to older people. Unfortunately, data derived from administrative database have well known limitations when used in clinical studies: arbitrary definitions, sometimes not updated to the current clinical practice; lack of detail for diagnoses; subjective interpretations and errors in coding; inadvertent mistakes in code entry [3]. Another important message that this research provides is represented by the worse outcome of the young female patients. It has for long been recognized that females constitute a higher risk group and the reason lies in several factors (late diagnosis, high prevalence of comorbidities, metabolic diseases, obesity). The authors assume that for genetic reasons in some young female there could be a lack of the hormonal protecting factors of the fertile age. A recent longitudinal, monocentric study on an adult population of 60,000 tried to identify procedural distinctions in the two genders to explain the difference in the results after CABG. The completeness of the revascularization and the predominant use of arterial conduits were associated with more positive results in both genders. However, after stratification for comorbidities and revascularization quality, the results in female patients continued to be less positive. The combination of best possible surgery with an aggressive prevention of the risk factors probably allows the gap to be reduced [4]. As the authors point out, a comparison of the bypass to other methods of treatment of the myocardial ischemia was not among the aims of this study. However, in the light of strong data such as the mortality reduction among CABG patients compared to the general population, the desire to understand if these results are due to the simple

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procedure of revascularization or is a specific prerogative of CABG arises spontaneously. Recent reports seem to strongly support this second assumption [5–9]. Apart from the left main coronary artery disease, the articles highlight a long-term bypass superiority, linked not only to the lower incidence of relapses but also to reduction in mortality and myocardial infarction. In conclusion, Nielsen's and colleagues' work gives a meaningful contribution, based on real world data, to the understanding of long-term bypass effects. Given such important and stable results over time the clinician seems to be obliged to analyze thoroughly the benefits and disadvantages offered by the different possibilities of myocardial ischemia treatment in different clinical situations and patient categories, not only considering the survival but also the quality of life.

### Conflict of interest

The authors report no relationships that could be construed as a conflict of interest.

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