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Lack of evidence-based practice leads to major geographical variations in elective coronary revascularization by stents or surgery in England

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Since their introduction, coronary artery bypass grafting (CABG) and percutaneous coronary intervention (PCI) have become the standards of care for the large majority of patients with coronary artery disease (CAD) and, by the way, two of the most performed procedures in medicine, worldwide. Both therapies are ubiquitously available in the western world but, interestingly, there are large differences in the provision of PCI and CABG: first between different countries and, as demonstrated by Baig *et al.*, also within the same country with a maximal degree of variation of the ratio PCI/CABG of more than 13-fold. The authors have to be congratulated for bringing these important pieces of informations to the readership of *EJCTS* and thereby for stimulating thought on how to interpret these numbers?

In the last 20 years, numerous randomized trials comparing PCI to CABG have shown comparable outcomes for selected patient populations [1, 2] and provided more evidence for wider use of PCI despite the fact that several developments (off-pump surgery, minimized extracorporeal technology, improved myocardial protection, endoscopic vein harvesting) have made CABG less invasive and highly competitive to PCI. Unfortunately, and because CABG is sometimes described by cardiologists as a procedure where ‘the chest is cracked open’, patients often prefer PCI to CABG because they believe a stitch in the groin is always better than a scar on the chest. In addition, a shorter stay in hospital and the hope for a shorter rehabilitation are attractive prospects.

The paper by the group of David Taggart present some expected but also some unexpected items of information concerning the provision of PCI and CABG in the UK [3]. It is very interesting for several aspects: it shows that the provision of PCI and CABG (expressed at least partially by the ratio of PCI to CABG) may be extremely different, even in the same country. In addition, the authors have shown that these differences were not patient related and cannot be explained by the volume of interventions performed. The large differences in the treatment of CAD in the UK call for additional hypotheses:

- (i) the geographical location of the cardiology and cardiac surgery units;
- (ii) the organization of the cardiology unit (run alone or with a cardiac surgery unit);
- (iii) the presence or not of a heart team on the site;
- (iv) and finally from the knowledge and education of general practitioners and patients.

For judicious decision-making in every single patient, it is essential to consider the risk/benefit ratios of both procedures; this means careful evaluation of procedural invasiveness and the associated short-term complications against the probability of an adverse long-term event (death, myocardial infarction, repeat revascularization and absence of improvement in quality of life).

The lecture of this paper leads to some comments: some are directly related to the observations described in this paper, while others are general statements on how patients with significant CAD are dealt with today in a majority of institutions:

- (i) First of all, both the European Society of Cardiology and the European Association for Cardio-Thoracic Surgery have published Guidelines for the treatment of CAD [4]. While the indications have been described in detail for every type of coronary vessel involvement, it is surprising to assert that a substantial proportion of patients are treated by PCI outside of evidence-based indications [5].
- (ii) In several situations, it appears that the patients decide—on the basis of a biased piece of information through cardiologists—which type of treatment should be performed. Do the patients have enough knowledge for this? Certainly not. Let us just imagine a similar decision-making situation in oncology: the patient would choose the option with the less durable results, just because it is less invasive (or it causes less side-effects) but is followed by a higher rate of recurrences!
- (iii) It is a clear fact that the information given to the patients in the cath lab disproportionately emphasizes short-term results

even though CABG has been shown to be superior to PCI with respect to long-term survival and angina relief, at least in the presence of left main stenosis and three-vessel disease.

- (iv) There have been extended discussions about the necessity and the value of 'heart teams' in the recent literature, not only following the results of the SYNTAX study but also to implement robust TAVI programmes. Unfortunately, the heart team approach is usually considered as a 'nice to have' option and not as an effective discussion tool to exchange scientific arguments between cardiologists and cardiac surgeons. As a result of this, for instance, the SYNTAX score, which was warmly recommended in the publications, is not used routinely in a majority of institutions.
- (v) The value of 'ad hoc' PCI should be questioned. Although it is desirable to improve the efficiency within the organization (saving money and reducing delay until definitive treatment), it is not the best solution for all patients. *Ad hoc* PCI does not allow in-depth discussion with colleagues and patients. In addition, this approach does not allow an alternative treatment (CABG) to be presented to the patient the cardiologist informs the patient about CABG surgery (!!!). This is medically not justifiable and ethically questionable.
- (vi) In the last decade, there has been an explosion of cardiology units that are able to offer PCI without the need nor the possibility to properly discuss the pros and cons but sometimes in those patients in whom CABG would lead to superior results. Moreover, when problems happen during the short- or mid-term follow-up, the control examinations are usually performed by the same team that provided the initial PCI. This precludes a critical appraisal and control of the results obtained by PCI.
- (vii) Finally, a word of caution is needed: cardiologists are not always responsible for this development. Hospital managers nowadays deal increasingly (when not exclusively) with financial incentives when the budgets of their units are concerned. Therefore, health-care providers (in this case cardiologists) have only the possibility of increasing the

number of PCIs (in the worst scenario with marginal or even inappropriate indication) to fulfil the budget numbers and satisfy their managers. These incentives are not only perverse but also expensive for the overall healthcare system. A discussion in depth is urgently needed to fix these problems.

The SYNTAX trial has been a significant work to establish the optimal revascularization strategies for patients suffering from CAD with left main stenosis disease and three-vessel disease. Significant differences were found following CABG and PCI between patients with left main stenosis and three-vessel disease. Since this trial has provided strong evidence that CABG is superior to PCI in reducing long-term adverse clinical end-points like death and myocardial infarction, one can hope that the results described in the paper of Braig *et al.* belong to the past.

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