Crossroad between Percutaneous Coronary Intervention (PCI) & Coronary Artery Bypass Grafting (CABG) in 2006.

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Can PCI replace CABG after decades of development? The major milestones in PCI were balloon angioplasty in the 80's and then followed by bare metal stents (BMS) in the mid 90's. These were further superseded by the third revolutionary change since 2002, the "drug-eluted stents" (DES), in which the immunosuppressive drugs reduce neointimal hyperplasia and hence achieve a single digit restenosis rate after its implantation.

Early randomized trials involving BMS like RITA, BARI & ARTS have concluded that PCI & CABG for **multivessel disease** were associated with similar rates of long-term mortality, stroke and non-fatal myocardial infarction. PCI was associated with lower one month mortality & morbidity but with higher incidence of recurrent angina and hence revascularisation rate on the long run. Moreover, **diabetics** had a much better outcome in the CABG group. It seemed logical that the DES could facilitate PCI to solve all of the above problems. So, aggressive application of DES nowadays has taken away more than 50% of CABG patients provided it is technically feasible.

Left main disease (LMN) is another group of patients requires special attention. This single critical stenosis limits the blood supply to more than half of the myocardium and tackling the bifurcation carries immediate technical difficulty intraoperatively and much higher restenosis rate even in the era of DES. CABG is currently considered as golden standard for the revascularisation of unprotected LMN disease. It actually remains a contraindication against PCI in the USA unless the patient refuses CABG or the LV or renal function was so bad that makes CABG extremely risky. However, PCI to the LMN became popular in Asian & European countries since the introduction of DES and several registries suggested satisfactory both short & long term angiographic outcome. Thus, the safety and efficacy of PCI in LMN disease remained controversial. Hopefully, the conclusion to this debate will be provided by the COMBAT (Randomised COMparison of Bypass Surgery versus AngioplasTy using Sirolimus-Eluting Stent in Patients with Left Main Coronary Artery Disease) trial in a few years' time. It is a prospective, dual-arm, open-label, randomized, multicentre trial of 1,766 patients enrolled in up to 75 centres around the world. The primary end point is the composite of death & stroke at a mean of 2 years follow-up while the secondary end-point is ischaemia-driven left main target vessel revascularisation.

Despite there were many randomised trials stating the safety & efficacy of DES, they must be interpreted with caution, as the patients excluded were those seen in our daily practice. DES was effective in decreasing in-stent restenosis and the subsequent need of target vessel revascularisation, however, there was no evidence in reductions of cardiac mortality or myocardial infarction. The randomised trials were also not adequately powered to detect or exclude the effect of DES on rare events such as late acute stent thrombosis (LAST), especially after discontinuation of dual antiplatelet therapy. DES is effective only when the drug is eluted from the polymer carrier. In sensitive patients non-biodegradable polymers may promote a hypersensitive reaction, or endothelial dysfunction localised in the stented segment when the drug is completely eluted off the stent. This can lead to late in-stent thrombosis. There is also concern that DES may be susceptible to late thrombosis when antiplatelet therapy is discontinued and endothelialisation of the stent struts is delayed. Acquired late malaposition after DES implantation, aneurysm formation and negative late loss could increase the risk of stent thrombosis. This probably explained the excess death rate of the DES treated patients observed in the BASKET & LATE-BASKET trials. On the other hand, the dual antiplatelet therapy also causes problems in daily clinical practice. For example, should we stop the antiplatelet regimen when a patient with multiple DESs had a traumatic accident or an unplanned surgery?

Thus, it is still too early to draw any conclusion in the year 2006. A better DES or another forms of stent (like the bioresorbable one or one coated with antibodies that can attract endothelial progenitor cells) should have a good balance between efficacy in preventing endothelialisation/restenosis and safety allowing endothelialisation. Last but not the least, coronary revascularisation strategy should be based on the cooperative thoughts of the cardiologists & surgeons, coupled with good discussion with our patients.