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**Editorial**

# (Active) stents are no panacea, a déjà-vu

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**This editorial refers to 'Targeted stent use in clinical practice based on evidence from the BAsel Stent Cost Effectiveness Trial (BASKET)'† by H-P. Brunner-La Rocca *et al.*, on page 719**

Bare metal stents (BMS) and drug-eluting stents (DES) were and are going through similar cycles, albeit in reverse order. BMS went through an initial bashing period only to come out of it worshiped more than really deserved. The opposite happened to DES. They are currently going through their bashing period after having been hailed in as prodigies they not really were. The paper of the Basel group is a first commendable effort to put things back into the places they really belong.[1]

BMS first went through an undeserved period of bad reputation (particularly in the US) because their results were not properly adjusted for the baseline situation. Introduced to prevent abrupt closure in the first place, BMS were initially used exclusively for failed balloon angioplasty cases. Although it was soon known that they also reduced restenosis to some extent,[2] their price, their more difficult handling, and their more complex follow-up drug regimen all but prevented elective use in the beginning. Not surprisingly, results of stented patients were rather dismal[3] when compared with results of elective patients treated with balloon angioplasty alone (after the bad cases had been stented out of this group) and even when compared with elective patients treated with fancy new devices of the period, such as laser angioplasty or atherectomy (later only, identified as harmful rather than beneficial). Then the pendulum swung to the other extreme. Randomized elective stenting trials highlighted the significant reduction in need for re-interventions for BMS compared with balloon angioplasty alone. Within a couple of years in the early 90's, stenting became the default procedure. Although there were fingers lifted that this might not be such a good idea (not unlike the paper of the Basel group in this issue concerning DES), the train had left the station and stenting was never to be challenged again as the routine technique of percutaneous coronary intervention. The long-term follow-up of one of the trials ultimately launching BMS (BENESTENT I) showed an increase in mortality by the stent over the balloon over 5 years of 3%, compounded by an additional 2% increase of cerebral vascular attacks or myocardial infarctions.[4] No head turned. The plausible explanations for this were increased occlusions of side branches, more peripheral embolizations during the procedure, and 'horribile dictu' late stent thrombosis. Operators alerted to this stent disadvantage in prognostic endpoints of great concern tended to use the argument of marked reduction in need for re-intervention for an excuse to carry on stenting in all cases. Again hardly a head turned and no eyebrow went up when an insightful meta-analysis showed that the bulk of reduction of need for re-intervention from about 16% down to 4% was achieved already at a stenting rate of 20%. Higher stenting rates did little if anything to further reduce restenosis but subjected individuals not benefiting from a stent to the stent's banes, in particularly, the risk of late thrombosis.

When DES arrived, it was hardly farfetched to predict that late stent thrombosis would increase.[5] After all, it is the coverage of the stent by neointimal tissue that prevents contact with blood and thus thrombosis. Make that coat thinner or prevent it altogether (remember brachytherapy) and thrombosis is bound to be around the corner. Yet, who wanted to hear this warning? Enamoured with stenting, somewhat frustrated with the finally not so great restenosis rate when using too many and too long stents (even before accounting for the more intricate treatment of in-stent restenosis compared with post-balloon restenosis), angioplasty operators literally jumped on the new active stents. In the selected patients analysed and randomized in the beginning, the further reduction in restenosis in favour of active vs. passive stents was conspicuous. The warners of an increased and prolonged risk of stent thrombosis[5] were sent packing as party poopers. Having been rid of the fear of long and diffuse in-stent restenosis, the DES were implanted at increasing numbers and lengths. This really did not help things. Of course, the increased and timewise extended risk for stent thrombosis with DES over BMS happened as it had to, aggravated by the overzealous numbers, and exaggerated lengths of these devices used per patient. The Basel group reporting their interesting sub-analysis of a randomized trial were among the first to call to reason.[1]

As with all choices between methods, it makes sense to stratify which subgroups create the difference if there is a difference, or to find out if there are subgroups that behave differently if overall there is no difference. It is trivial that a short lesion in a large vessel of a stable patient does not need a drug-eluting stent. It is equally trivial that a short lesion in a large vessel of a stable

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patient with a good balloon angioplasty result does not need a bare metal stent either. The former dictum is now the news of the town, the latter is an old forgotten wisdom. It is trivial that a long diffuse lesion in a small vessel has a high likelihood to wind up with an occlusive dissection if not stented and a high likelihood to wind up with a significant restenosis if stented with a bare metal stent, typically covered by at least 1 mm of neointima (a late loss a small vessel simply cannot afford). It is trivial that a stent put in a large proximal vessel where it was never needed will cause great harm if it goes down. And down it will go, rarely but regularly. So do not fit a patient with anything that he does not need but that might do him harm, even if only rarely. A drug-eluting stent is as unnecessary in a large vessel with a short lesion in the presence of a good balloon result as a bare metal stent and its risk to go down is significantly higher, particularly at a late stage. So the Basel group's appeal not to use DES in this situation, which has grown almost to a deafening choir since their first presentation of the data, is well founded. It is only a pity they did not think the matter to the end.

In the midst of the DES bashing period, it may be premature to make a prognosis about DES use in couple of years. Let me venture on it, just the same. DES use will be 100%. An even better compromise between a thin but still complete and though neointimal coat, allowed by a well-dosed ideal drug on DES, will reduce the risk of late thrombosis. Moreover, people will stop being appalled about 0.6% risk per year of having a myocardial infarction due to the implanted stent.[6] Once the dust has settled, this risk (or a then somewhat smaller risk) will appear acceptable on the background of the average 3–5% overall annual risk in coronary patients to suffer an infarction due to reasons other than DES. In addition, it is unlikely that the DES thrombosis risk will persist forever as nature resolves almost anything within a few years, one way or other. DES will also be the default device, because there will always be that new drug-eluting stent clean of the blemish of stent thrombosis (be it only for the fact that it was not yet given sufficient chance to thrombose in terms of implanted numbers and length of follow-up). So the cloud in the DES sky will be fairly short-lived. Notwithstanding, the hailstorm we are currently going through will have the welcome effect of preventing us from going out of control in terms of numbers and total length of stents we are implanting. After all, 100 mm of DES may have an overall risk of stent thrombosis approaching 10% but 0 mm of DES has one of 0%. Why not settle for something in between. The Basel group has to be applauded for shaking the tree. I am hopeful that the most rotten apples fall out of it.

**Conflict of interest**: none declared.

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