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EuroPCR 2013 highlights

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With 12,077 attendees, 560 didactic and interactive sessions, 636 oral presentations, 70 hours of live cases from 16 interventional units worldwide, EuroPCR 2013 is unsurpassed among contemporary interventional congresses.

The Great Debate

The Great Debate illustrated one of the future visions of the EuroPCR organisers, namely, interactivity, connectivity and attending to topics of interest to practitioners. This year the two debate questions posed, by online poll, were; how to use bioresorbable stents and the duration of DAPT following PCI. The interactive discussion was chaired skilfully by Professors Haude and Thomas. For bioresorbable scaffolds, although promising a new era in coronary intervention, the need for more data from enriched patient population trials was noted (currently there are 40 million patient years of data for drug-eluting stents compared to 1,000 patient years for scaffolds). Translating vasomotor reactivity into MACE was also highlighted as a challenge. One of the patient profiles suggested as perhaps being currently best suited is that of the patient with diabetes and diffuse disease not suitable for surgical revascularisation. Off-label use, however, was acknowledged. The importance of lesion preparation and familiarity with the technical differences in deployment was emphasised. Nevertheless the majority of panellists predicted that, although the imminent demise of the conventional second and third-generation drug-eluting stents was premature, bioresorbable platforms would be more affordable in time and become workhorse devices within ten years.

The DAPT topic, divided into stable disease and acute coronary syndromes, was the subject of many practical and safety questions. A key theme to emerge was the importance of balancing the potential for thrombotic/ischaemic and haemorrhagic sequelae, although it was acknowledged that in most populations risk factors for these events overlap. The lack of clinical benefit from platelet reactivity testing was also acknowledged. The duration of six to twelve months DAPT with DES endorsed by the panel was challenged by data from newer-generation DES platforms suggesting no adverse stent thrombosis signal at three and even one month discontinuation. However, as pointed out these data were for unplanned rather than systematic interruption.

For PCI following non-STEMI, the potential emergence of monotherapy with newer more potent antiplatelets was suggested. As for the management of DAPT and patients with an indication for oral anticoagulation, no consensus was reached other than one for an individualised approach.

When the discussion turned to PPCI and STEMI the importance of preventing recurrent events was emphasised including stent thrombosis (3% vs. 0.6% in elective patients). The panel felt there was only a limited role for GPI versus newer DAPT and bivalirudin. The interruption of DAPT in the context of recent PPCI was also cautioned against, owing to the persisting thrombotic tendency with ACS.

The Ethica Award

This year the Ethica Award was bestowed upon the Device Industry for its continued support of technological progress in interventional medicine[1]. Although perhaps a controversial choice for some, for most it will be unsurprising and supported. At a time of extreme societal budget constraints and a challenging ageing demographic, it represents a mature recognition of the importance of the collaborative relationship between technology companies and clinicians.

Hotline and late-breaking trials

In the coronary field, data from studies on biodegradable polymer and bioresorbable platforms were in abundance.

The BIOFLOW II sponsored multicentre RCT results were presented (n=452). This study based on the ORSIRO[2] sirolimus stent with biodegradable polymer was compared to the market leader

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everolimus stent (with durable polymer) platform. *De novo*, predominantly non-complex, lesions in stable patients were the main inclusion criteria. At nine months the primary endpoint of late luminal loss was 0.10±0.32 vs. 0.11±0.29, respectively [non-inferiority ($p<0.001$)]. Secondary composite endpoints were very low for both groups and not different. No stent thrombosis in both groups. OCT measured neointima was 0.74±0.38 vs. 1.00±0.44 ($p=0.024$), including more covered struts, but importantly there was no evidence of mechanical disadvantage with the thinner strut ORSIRO. As the study was not powered to detect clinical events, extending to a larger all-comer group powered for clinical endpoints is awaited. These results, of what is an intellectually appealing stent design, are reassuring. Superiority, however, may be challenging to demonstrate against second-generation stent platforms.

The EVOLVE RCT reporting on PCI in *de novo* coronary disease comparing the SYNERGY[3] (everolimus with biodegradable polymer), both conventional and half-dose, stent with the PROMUS Element found no difference in cardiovascular outcomes at two years with a trend toward less revascularisation in the SYNERGY arm.

The follow-up of the BioMatrix Flex Biolimus stent (from last year's COMFORTABLE-AMI RCT[4]) against BMS in STEMI confirmed sustained superiority at two years with further improvement possibly due to lower late loss as judged by OCT.

The DESolve Nx[5] sponsored six-month multimodality prospective cohort results (bioresorbable PLLA scaffold eluting novolimus) for PCI were presented (n=126). In-scaffold lumen loss was 0.21±0.34 and scaffold recoil 6.6%, comparable to conventional metallic stent platforms. A substantial safety margin against fracture compared to other competitor platforms was also found. A significant increase in vessel and scaffold area 16.9% (OCT) was seen at six months (a much earlier demonstration of vessel restoration than other currently available resorbable platforms). MACCE was 3.25%, with no late acquired ISA with 99% stent coverage. For an innovative platform these data are very encouraging. As with all contemporary stent trials useful mechanistic insights were provided by using OCT.

Registries

In the SCAAR registry, 41,537 patients were analysed by several statistical models (including logistic regression and instrumental variable) to minimise confounders in order to estimate the effect of bivalirudin or UFH in Non-STEACS. These analyses found in favour of equivalence or, in one model, improved outcomes with UFH. Radial access was used in >50% of patients. These data are provocative and challenge the superiority of bivalirudin in contemporary practice but, given the modelling to equilibrate risk, it is only hypothesis-generating. The next step according to the investigators will be a nested randomised study within their national registry.

One year outcomes from SOURCE XT (2010-11) looking at safety and efficacy of the SAPIEN XT aortic valve were presented. A 2,688 strong cohort from 17 countries (predominantly European, but also including Israel and South Africa) completed 96.8% follow-up at one year using VARC-1 endpoints and an independent clinical events committee, but no echo core lab. A large positive treatment effect on dyspnoea and angina was seen at one year, with maintained effective aortic orifice area with low rates of moderate/severe regurgitation. Large differences in mortality between TF and non-TF approaches likely reflect the underlying comorbidity of patients. Many of these comorbidities (such as porcelain aorta, and frailty) are not reflected in the surgical score systems, although they will be incorporated in upcoming studies of intermediate risk patients. Overall these data give reassurance that TAVI outcomes continue to improve with experience and technical improvements.

The ORBIT II study (n=443) looking at the Diamondback 360 degrees rotational atherectomy technology[6] reported attaining safety endpoints in a cohort of patients selected angiographically or with IVUS for severe calcific stenoses. Already studied in the peripheral field, safety and improved clinical outcomes were described for coronary lesions when compared to historical controls using the rotablator. This may prompt a future randomised head-to-head comparison in this challenging disease subset.

The ADVISE II registry of pressure wire derived instantaneous wave-free ratio[7] (iFR) reported its analysis of 300 patients and found 88.2% of significant stenoses were correctly identified (using FFR <0.8 as the standard) outside of the pre-specified <0.85 and >0.96 cut-offs. The optimal iFR to identify patients with FFR <0.8 was 0.89. The investigators estimated avoidance of adenosine could occur in >70% of patients using a hybrid strategy of FFR and iFR.

Interventional strategies

A provocative hypothesis-generating RIPCORD observational study of systematic FFR of 200 patients undergoing diagnostic angiography for chest pain reported that 26% of the clinical plans were altered when the treating cardiologist was aware of the FFR evaluations carried out by a second cardiologist immediately following the angiogram. Investigators aim to take these data forward with a larger randomised study, which may be practice-changing.

ELISA-3 added important randomised data to the numerous studies looking at optimal timing of intervention for Non-STEACS[8]. A population (n=542) of high-risk, non-STEMI patients were randomised to immediate angiography (<12 hours; 2.1-10.7 hours in the study) vs. delayed (>48 hours; 45.2-78.7 hours in the study). Underpowered for the primary endpoint, no difference in MACE at 30 days was seen, but there was a significantly shorter hospital stay in the early intervention arm and a trend toward less recurrent ischaemia. Pre-specified subgroups of ST depression >5 mm or transient ST elevation, admissions from non-PCI centres and GRACE >140 seemed to show the most benefit for early intervention.

The peripheral track

In the peripheral track, two studies stood out. The 4EVER cohort study looked at 4 Fr infra-inguinal interventions (SFA stenosis >50% and Rutherford 2-4) demonstrating 81.4% patency and 89.3% freedom from TLR comparable with 6 Fr interventions, but with less access site complications (compared to historical controls). In addition,

the BioMimics 3D stent, designed to elevate shear stress and improve patency, was evaluated in a small MIMICS RCT (n=76) and showed a primary patency of 80.4% vs. 72% for the control stent.

Emerging technologies and future trials

Emerging technology, particularly in the field of structural disease, with preliminary data were presented. New transaortic valves designed to reduce AR providing initial data included the Lotus valve, Direct Flow, the transapical JenaValve and the Engager transapical/transaortic valve. In addition, the PROTAVI-C study data suggested fewer DW-MRI cerebral infarcts and reduced infarct volume following TAVI using the Embrella device. Similarly, the DEFLECT-1 study suggested some efficacy with the TRIGUARD shield when compared to historical controls.

Of further interest, the potential and active research of device technologies for transcatheter mitral valve replacement was explored in several sessions. For those involved with the apex of innovation, cardiovascular pipeline provided a useful glimpse into the next technologies that intend to come to market.

Future trials to whet the appetite of the interventional community were also announced and their overview described. These include EnligHTNment which will address the lack of clinical outcome data in the renal denervation field with a sponsored prospective 4,000-patient multicentre hard event-driven RCT and five-year follow-up comparing denervation and medical therapy with medical therapy alone. Interestingly, the population will be hypertensives with additional risk factors for cardiovascular events. Furthermore, resistant hypertension will be defined as uncontrolled BP despite two antihypertensive agents.

Following on from the SYNTAX trial, SYNTAX-2 will be an investigator initiated non-randomised 450-patient study comparing the SYNERGY everolimus DES with biodegradable polymer against TAXUS (in a superiority analysis) and CABG (in a non-inferiority analysis). Selection will be based on a new SYNTAX II score[9] (incorporating clinical variables and comorbidities), heart team discussion and entry into the PCI arm if similarly predicted five-year mortality. Subsequent to selection for PCI, patients will undergo iFR/FFR examination to ensure ischaemia is present and, if PCI is indicated, then systematic IVUS will be used to ensure adequate stent deployment.

EUROMAX, a sponsored multicentre RCT of 2,200 patients investigating the role of pre-hospital initiation of bivalirudin and prolonged infusion or UFH±GPI in primary PCI patients was described. Using randomisation in the ambulance or non-PCI unit prior to transfer to a PCI centre this study is close to completion.

Approaching the debate in a different way, HEAT-PPCI will be a single-centre all-comer 1,800-patient open-label RCT testing bivalirudin against UFH and a 28-day composite of MACE as well as a mixture of interesting secondary endpoints. It has a radically novel design in that the trial uses delayed consent and as such has 100% entry with only two withdrawals of consent thus far. Quite apart from the results of this study, whose recruitment is near completion, its design features may have a lasting impact on future acute interventional research.

Conflict of interest statement

The author has no conflicts of interest to declare.

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