Appendix C. Table 7. Inclusion and exclusion criteria

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| **Study** | **Recruitment Date** | **Inclusion Criteria** | **Exlucsion Criteria** |
| **FFR RCT** |  |  |  |
| Tonino 2009 |  | • At least 2 ≥50% diameter stenoses ≥2 major epicardial vessels, both of which the investigator feels require stenting • Recent Non ST-segment elevation MI < 5 days if the peak CK is <1000 IU • Previous PCI | • Left main coronary disease • Previous coronary bypass surgery • Recent ST elevation MI (<5 days) • Recent Non ST elevation MI (<5 days) if the peak CK is >1000 IU • Cardiogenic shock • Extremely tortuous or calcified coronary • vessels • Life expectancy of <2 y • Pregnancy • Contraindication for drug-eluting stent placement |
| **FFR nonrandomized studies** |  |  |  |
| Wongpraparut 2005 | 2000-2002 | • Stable angina and ≥2 single lesions located in different vessels | • Chest pain not responding to medical therapy• Previous coronary artery bypass grafting  • Vessels that were totally occluded or supplying an akinetic territory by visual assessment of the left ventricular angiogram• Recent myocardial infarction• Ejection fraction <50%. |
| Muramatsu 2002 | 1997-1998 | • Consecutive patients admitted to a single hospital and diagnosed with first-time AMI | • Not reported |
| **IVUS RCT**  |  |   |   |
| Mudra 2001 | 1994 - 1998 | • Angina or documented ischemia • No contraindication to antiplatelets therapy • Lesion length ≤25 mm to be covered with 1 or 2 stents in an artery with a diameter of ≥2.5 mm. | • Acute angina at rest• Complete akinesia in target artery supplied area• Significant left main lesion, bifurcation lesion, involvement of a side branch ≥2 mm in diameter with ostial stenosis. |
| Russo 2009 | 1995 -1999 | • Patients over 18 years • Scheduled for elective coronary stent placement | • Dissection not covered by stent• Thrombolysis in myocardial infarction flow grade <3 after stent placement• Chronic total occlusion, stent placement in a sole remaining circulation or left main equivalent• Stent placement within an aneurysmal portion of a vessel such that complete stent vessel wall contact could not be achieved• A bypass graft supplying a native vessel <2.0 mm by visual estimate• Cardiac transplantation• Performance of IVUS during the index procedure before stent placement |
| Schiele 1998 | 1995 - 1997 | • Symptomatic coronary artery disease with demonstrable ischemia• Single-vessel or native multivessel disease with >70% stenosis of the target lesion, who had percutaneous transluminal coronary angioplasty followed by stent implantation for extensive dissection• Single <20-mm long stent deployment• Optimal angiographic result after stent implantation, without dissection or residual stenosis >20% as assessed visually or with on-line quantitative coronary angiography. | • Vessel diameter <3.0 mm by visual estimation or on-line QCA• Coronary lesion >15 mm in length• Previous bypass surgery• Contraindication to antiplatelet therapy (aspirin or ticlopidine)• Treatment of acute or chronic total occusion, • Saphenous vein graft stenosis, recent (<7 days) acute coronary syndromes |
| Frey 2000 | 1996 - 1996 | • Patients undergoing elective or urgent PTCA or primary stenting in vessels of diameter 2.2 and 4.6 mm. | • Patients undergoing emergency intervention• Patients with planned atherectomy• Those with chronic total occlusion of the target vessel |
| Oemrawsingh 2003 | 1998 - 2001 | • Patients having de novo, nonostial stenosis ≥20 mm length in a native coronary artery with a reference diameter that permitted implantation of ≥ 3-mm stents without involvement of significant side branches (diameter ≥ 2.0 mm). | • Patients with recent (<2 weeks) myocardial infarction (MI) or total occlusion• Those with contraindications for combined antiplatelet therapy with ticlopidine and acetylsalicylic acid |
| Jakabcin 2011 | 2004 - 2005 | Patients fulfilling following criteria were included• Lesion type B2 and C according to the American Heart Association • Proximal left anterior descending artery • Left main disease• Reference vessel diameter <2.5 mm• Lesion length >20 mm• Instent restenosis• Insulin dependent diabetes mellitus• Acute coronary syndrome | ND |
| Kawata 1997 | ND | • Patients with angina pectoris• Age 44 to 79 years | • Coronary artery diameter <2.0 mm• Chronic total occlusion |
| Mueller 2002 | ND | • Diabetic, consecutive patients | ND |
| Gaster 2003 | ND | • Male• With stable angina pectoris• With de novo lesions in native coronary arteries, needed PCI• Patient of the Odense University Hospital • One or two coronary artery lesions by > 50%. | • AMI < 3 mo before scheduled PCI• Unstable angina within a month before the procedure• Left bundle branch block• Atrial fibrillation• Increased serum creatinine concentration (> 200 mmol/l), • A total occlusion that could not be crossed with a guide wire• No IVUS pullback.  |
| Gill 2007 | ND | • Stable angina pectoris• Aged 18-70 years• 1 or 2 de novo vessel disease• Vessel reference diameter >2.75mm• Lesion length up to 25mm. | • Recent myocardial infarction or unstable angina• Large calcifications seen on angiography• Large (>2mm in diameter) side branch in segment to be stented• Chronic total occlusion |
| **Prospective**  | **Cohort** |   |   |
| Blasini 1998 | 1994 -1995  | • Patients with symptomatic ischemic heart disease in whom coronary stents were successfully placed after PTCA.• Patients with indications for stent placement as coronary artery dissections, complete vessel closure, and residual stenosis of 30% or more of the vessel diameter after PTCA. | • Patients with acute myocardial infarction |
| Sakamoto 1999 | 1994 - 1997 | Consecutive patients with in-stent restenosis after prior Palmaz-Schatz stent identified by coronary angiography and underwent repeat PTCA. The first 20 consecutive patients were treated by balloon angioplasty without IVUS (22 lesions; quantitative coronary angiography [QCA] group). The subsequent 20 consecutive patients were treated by balloon angioplasty with IVUS (21 lesions; IVUS group). | • Patients with coronary occlusion due to acute or subacute coronary thrombosis with 1 mo after stent implantation• Patients with multiple stent implantation |
| Fitzgerald 2000 | 1996 - 1997 | • Patients with symptomatic ischemic heart disease.• Patients with new or restenotic lesions of the native coronary circulation.• Planned stent implantation with up to 2 stents deployed per patient. | • Patient requiring revascularization of lesions other than the stented lesion.• Patients in whom use of aspirin, ticlopidine, or cumarin was contraindicated.• Patients with the presence of a left main coronary artery lesion.• Those having MI within the past 7 days.• Patients with occurrence of a stroke/transient ischemic neurological attack within the past 3 months. |
| Gerber 2009 | 2007 - 2008 | • Complex lesions. IVUS guided lesions were matched according to diabetes, vessel type, reference vessel diameter, minimum lumen diameter, and lesion length with a group of angio treated lesions. All IVUS optimized lesions matched 1:1 with angiographic optimized lesions from another institution. Matching was blinded to the final QCA results in both groups. | • No lesions were excluded. |
| Ozaki 2007 | ND | Included patients had:• Unstable or stable angina, • A single target lesion in a native coronary artery with a vessel diameter <4 mm• Planned stent implantation with up to 2 stents and agreement to follow-up angiography. | • Contraindication to anticoagulation and antiplatelet therapy• Graft disease• Left main coronary artery disease. |
| Orford 2004 | ND | Patients undergoing stent implantation who consented for a follow-up angiography initially, followed by any patients without prerequisite for angio or IVUS. Some IVUS patients were enrolled at the discretion of operator. | Initial exclusion who did not undergo followup angiography. |
| **Retrospective** | **Cohort** |   |   |
| Albiero 1997 | 1993 - 1995  | Had angiographic followup with a QCA. Matched IVUS group (in Italy) with angio only group (in germany). For the IVUS group, IVUS cannot be used before stenting. Matching was based on (1) sex, (2) history of diabetes, (3) previous PTCA at the same site, (4) vessel treated, (5) reference diameter ±0.3 mm, (6) baseline MLD ±0.1 mm, and (7) number ±0.5 of stents deployed. | ND |
| Yoshitomi 1999 | 1996 - 1997 | • Stable angina pectoris or previous MI or acute MI. Two groups were patients of different time periods. Like historical controls. | • Chronic total coronary artery occlusion. |
| Choi 2001 | 1997 - 1998 | • Patients with symptomatic coronary artery disease who underwent elective and emergency coronary artery stenting of a single native coronary vessel. | • Patients receiving stent implantations of saphenous vein grafts or multiple vessels  |
| Faulknier 2004 | 2001 | • Randomly selected cases undergone PCI in a single community hospital center. | ND |
| Agostoni 2005 | 2002 - 2003 | • Unprotected left main disease for elective drug eluting stent | • Acute MI or cardiogenic shock undergoing emergency PCI or LMCA CABG |
| Fujimoto 2008 | 2004 - 2006 | • Patients who had sirolimus-eluting stent implantation | ND |
| Park 2001 | ND | • Symptomatic LMCA disease, OR• Documented myocardial ischemia and angiographic ≥50% diameter stenosis. | • Contraindication to antiplatelets or anticoagulation therapy• LVEF <40%. |
| Youn 2011 | 2003-2008 | •Patients with ST-elevated myocardial infarction (STEMI) | •Patients who died first hospitalization |
| Nasu 2004 | 1992-1997 | • Patients who had undergone successful stand-alone directional coronary atherectomy and had short-term follow-up angiography | • Patients who had died, or had any target vessel revascularization |
| Seo 1996 | 1992-1994 | •Patients with angina pectoris who had undergone percutaneous coronary angioplasty | • Diameter of the distal coronary artery 1.5 mm or less and impossible to advance the IVUS catheter; possibility of ischemia due to a catheter insertion |
| **Registry** |   |   |   |
| Ahmed 2011 | 2006-2010 | •Patients with AMI and had PCI | • Cardiogenic shock, rescue PCI after IV thrombolysis |
| Biondi-Zocccai 2011 | 2002-2006 | • Consecutive patients undergoing PCI at a bifurcation lesion of a major epicardial vessel | No specific exclusion criteria |
| Claessen 2011 | 2004-2006 | • Diagnosed with single- or multivessel coronary artery disease, undergoing PCI with at least 1 stent placement, de novo or restenotic (including in-stent restenosis and coronary brachytherapy failure) lesions needing stent | • Allergic to aspirin, clopidogrel or ticlopidine, heparin, bivalirudin |
| Park 2009 | 2000 - 2006 | • Elective PCI for unprotected LMCA stenosis | • Prior CABG• Concomitant valvular or aortic surgery, presented with cardiogenic shock or MI. |
| Roy 2008 | 2003 - 2006 | Registry of consecutive patients in Washington Hospital Center had drug-eluting stents (DES) implantation. Sample of patients with IVUS and a sample of propensity score-matched patients with angiographic guidance only were analyzed. Score was matched for clinical and angiographic characteristics. | ND |
| Maluenda 2011 | 2003 - 2007 | • Patients surviving the hospitalization | • Patients with cardiogenic shock and rescue PCI after intravenous thrombolysis |
| Kim 2011 | 2004 - 2006  | • Main vessel (MV) diameter ≥2.5 mm and side branch (SB) diameter ≥2.0 mm• Sample of patients with IVUS guidance and a sample of propensity score-matched patients with angiographic guidance were analyzed. | • Cardiogenic shock• ST-segment elevation acute myocardial infarction within the previous 48 hours• Life expectancy <1 yr• Left main bifurcation |
| **Cross-Sectional** |  |   |   |
| Talley 1996 | ND | • Patients going through elective standard balloon angioplasty. Note: group assignment was based on patients’ clinical characteristics. | • Multiple vessel coronary angioplasty |
| **FFR Versus IVUS** |  |  |  |
| Nam 2010 | 2006-2008 | • 40-70% stenosis by visual impairment; single lesion in the proximal/mid part of a major epicardial artery with reference vessel diameter >2.5 mm; no documented evidence of ischemia | • Had primary or emergent PCI for ACS; had CABG; multiple lesions in the same artery; left main disease, primary myocardial disease, or a major life threatening illness; contraindications to adenosine, ASA or clopidogrel |