**Appendix Table D6. Methods for reactivity assessment (used for outcome ascertainment)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author****Year****PMID****Country****Study name** | **Test name** | **Device category (e.g., light transmission aggregometry, turbidoaggregometry)** | **Device name and model information** | **Manufacturer, location** | **Sample collection and procurement**  | **Anticoagulant used** | **Agonist used**\* | **Interval between clopidogrel dose and blood sampling [in days]****and which came first** | **Interval between sampling and testing****[in days]** |
| Fontana, 2008{Fontana, 2008 182 /id}17681590Switzerland | VASP assay (platelet reactivity index) | VASP phosphorylation after ADP stimulation measured by flow cytometry | Platelet VASP/ P2Y12 assay using FACStrack flow cytometer | Assay: Biocytex, Marseille, France; flow cytometer: Becton Dickinson, Meylan, France | Samples were obtained 15 days after discharge (hospitalization for PCI) | Citrated blood | ADP | 15 days post discharge (i.e. post-PCI hospitalization) | NR |
| Giusti, 2007{Giusti, 2007 190 /id}18004210ItalyNR | Turbidimetric aggregometry to determine platelet aggregation | Light transmission aggregometry (turbidimetric method) | APACT 4 | Labor Biomedical Technologies GmbH, Ahrensburg, Germany | Venous blood samples were collected 24 h after PCI intervention; for patients receiving both clopidogrel and IIb/IIIa inhibitors samples were obtained after 6 d | Citrated blood | ADP 2 μmol/L and  | Samples were obtained 24 h after PCI intervention; for patients receiving both clopidogrel and IIb/IIIa inhibitors samples were obtained after 6 d | NR |
|  |  |  |  |  |  |  | ADP 10 μmol/L |  |  |
| Giusti, 2009{Giusti, 2009 134 /id}19268736ItalyRECLOSE study(Low Responsiveness to Clopidogrel and Sirolimus- or Paclitaxel-Eluting Stent Thrombosis) | Platelet aggregation | Turbidimetric aggregometry | APACT4 (4 channel aggregometer) | Helena Laboratories (Milan, Italy) | Venous blood was obtained | Citrated blood | ADP (10 μM) | Venous blood was obtained 12-18 h from clopidogrel loading; for patients administered IIb/IIIa inhibitors blood was obtained 6 d after catheterization | NR |
| Gladding, 2009{Gladding, 2009 248 /id}19926050New ZealandNR | VerifyNow | Agglutination plus light transmittance | point-of-care rapid platelet function analyzer (RPFA) and its P2Y12 cartridge | Accumetrics Ltd., San Diego, California | Venous blood; collection tubes were inverted 4 times to mix the anticoagulant and left for 10 min at ambient temperature (24°C) before testing | 3.2% citrate | ADP, 20 umol/l | Platelet function was tested at baseline and at 7 days | 10 min |
| Jinnai, 2009{Jinnai, 2009 120 /id}19531897JapanPartly industry funded | Inhibition of platelet aggregation (IPA) | Optical aggregometry | NR | NR | Platelet-rich plasma was obtained at different timepoints | NR | ADP 2 μmol/L | obtained at baseline, 4h, 24h, 48h and the 14th and 28th post-treatment days | NR |
| Shuldiner, 2009{Shuldiner, 2009 116 /id}19706858USASinai Hospital of Baltimore Study | ADP-stimulated reactivity | Light-transmission aggregometry (lumi-aggregometry) | Chronolog Lumi-Aggregometer (Model 490-4D) | Chronolog; Havertown, PA | Samples were obtained at baseline (for 143 patients not receiving clopidogrel) and post-clopidogrel (188 patients) | Citrated blood | ADP 20 μmol/L or arachidonic acid 2 mmol/L | Platelet function was measured on the day of discharge for patients not receiving eptifibatide and 5 d or more after discharge for patients receiving eptifibatide | NR |
| Sibbing, 2010{Sibbing, 2010 95 /id}20083681GermanyPart of a prospective study of the Multiplate analyzer | Multiplate analyzer | Whole-blood electrode platelet aggregometry | Multiplate analyzer (no model information) | Dynabyte, Munich, Germany | Arterial blood samples were collected “directly before PCI” | lepirudin | ADP (6.4 μmol/L) | All patients received a clopidogrel loading dose with a recommended pre-treatment interval of 2h; blood was sampled directly before PCI.The median clopidogrel loading interval was 3.5h for \*1/\*1; 3.5 h for \*17/\*1; and 5.3 h for \*17/\*17. | NR |
| Varenhorst, 2009{Varenhorst, 2009 122 /id}19429918SwedenGenetic sub-study | VASP PRI assay with flow cytometry | VASP assay with flow cytometry | Platelet VASP kit  | Biocytex, Marseille, France | NR | Citrated blood | ADP ± PGE1, concentration not reported | Samples were collected at baseline, 2 h and 24 h post-loading dose; also at day 14 ±3 and day 29 ±3, both before that day’s maintenance dose | NR |
|  | VerifyNow P2Y12 assay | Whole blood LTA, point-of-care test | VerifyNow VN-P2Y12 assay | Accumetrics, San Diego, CA | Whole-blood, point-of-care assay | NR | ADP (with fibrinogen-coated beads), concentration not reported | The assay was performed on day 1 at baseline (pre-dose), 2, and 24±4 h post-loading dose; also on day 14 ±3 and day 29 ±3, both before that day’s maintenance dose | NR |
| Frere, 2008{Frere, 2008 176 /id}18394438FranceNONE | VASP phosphorylation assay | Flow cytometry with and without ADP stimulation (along with PGE1 for all measurements) | Platelet VASP assay with flow cytometry(EPICS XL-MCL flow cytometer) | For the VASP assay = Diagnostica Stago [Biocytex], Asnieres, FranceFor the flow cytometer =  | Blood was drawn in the catheterization laboratory, before coronary angiography | Citrated blood | ADP 10 μmol/L | Patients received 600 mg loading dose of clopidogrel and 250 mg aspirin ≥12 hours before coronary angiography | Samples were sent “immediately” to the hemostasis laboratory |
|  | ADP-induced aggregation | Light-transmission aggregometry | PAP4 Aggregometer | Biodata Corporation, Wellcome, Paris, France | Blood was drawn in the catheterization laboratory, before coronary angiography | Citrated blood | ADP 10 μmol/L | Patients received 600 mg loading dose of clopidogrel and 250 mg aspirin ≥12 hours before coronary angiography | Samples were sent “immediately” to the hemostasis laboratory |
|  | ADP-induced P-selectin expression | P-selectin expression using flow cytometry with or without ADP | EPICS XL-MCL flow cytometer | For the flow cytometer = Biodata Corporation, Wellcome, Paris, France | Blood was drawn in the catheterization laboratory, before coronary angiography | Citrated blood | ADP 10 μmol/L final concentration | Patients received 600 mg loading dose of clopidogrel and 250 mg aspirin ≥12 hours before coronary angiography | Samples were sent “immediately” to the hemostasis laboratory |
| Frere, 2009{Frere, 2009 117 /id}19496924FrancePart of larger observational study | VASP phosphorylation assay | VASP phosphorylation assay by flow cytometry | NR | NR | Samples for platelet aggregation testing were obtained after the administration of 600 mg clopidogrel loading dose. | NR | NR (presumably ADP as in other publications from the same group) | NR | NR |
|  | ADP-induced platelet aggregation | NR | NR | NR | Samples for platelet aggregation testing were obtained after the administration of 600 mg clopidogrel loading dose. | NR | ADP 10 μM  | NR | NR |
| Bonello-Palot{Bonello-Palot, 2009 107 /id} 200919932784FranceNR | VASP phosphorylation | VASP phosphorylation | platelet VASP kits | Diagnostica Stago, Asnières,France | VASP analysis done within24 hours of blood collection | 3.8% trisodium citrate | prostaglandin E1, and ADP is adenosine diphosphate | >0.25 to <0.5 days (>6 to < 12 hours); Clopidogrel came first | <1 day |
| Harmsze 2010{Harmsze, 2010 102 /id}19934793NetherlandsNR | LTA | light transmission aggregometry | APACT 4004 four-channel light transmissionaggregometer | LABiTec, Ahrensburg, Germany | Before the coronary stent implantation procedure & heparinization | 3.2% citrate  | 5 and 20 μmol/l ADP | 1 day; clopidogrel came first | 0.083 days (2 hours) |
|  | VerifyNow  | light transmissionaggregometry | VerifyNow P2Y12 test cartridge system | Accumetrics, San Diego, CA, USA (company name obtained from Ref 21) | Before the coronary stent implantation procedure & heparinization | 3.2% citrate  | ADP and PGE1 | 1 day; clopidogrel came first | 0.083 days (2 hours) |
| Trenk 2008{Trenk, 2008 171 /id}18482659GermanyEXCELSIOR (Impact of Extent of Clopidogrel- Induced Platelet Inhibition During Elective Stent Implantationon Clinical Event Rate) | 4-channel Bio/Data PAP4 aggregometer | light transmission aggregometry | 4-channel Bio/Data PAP4 aggregometer | Mölab, Langenfeld, Germany, | At baseline beforeclopidogrel and at cardiac catheterization | 3.8% sodium-citrate | ADP at final concentrations of 5and 20 μmol/l. | 1 day and clopidogrel came first | 1 hour |
| Tantry 2010{Tantry, 2010 39 /id}21079055Multicountry - North America and EuropeGenetic substtudy of ONSET/OFFSET and RESPOND | NR | light transmittance aggregometry | Chronolog Optical Aggregometer (Model 490-4D) | NR | Blood was collected from the antecubital vein. After discarding the first 2 to 3 mL of free-flowing blood, the tubes were filled to capacity and gently inverted 3 to 5 times to ensure complete mixing of the anticoagulant. | 3.2% trisodium citrate | 5 and 20 umol/L ADP | platelet function measurements performed at predose, 8 hours after the loading dose on day 1, and 8 hours after the last maintenance dose | NR |
|  | NR | VASP | VASP-FCM kit | Biocytex, Inc; Marseille, France |  | 3.2% trisodium citrate | NR |  | NR |
|  | VerifyNow | NR | NR | NR |  | 3.2% sodium citrate | NR |  | NR |
| Hochholzer, 2010{Hochholzer, 2010 76 /id}20510210GermanyEXCELSIOR | Platelet function assay | Light transmission aggregometry  | 4-channel Bio/Data PAP4 aggregometer | Mölab, Langenfeld, Germany | Blood samples for plateletfunction testing were drawn before discharge at day 1 afterloading with clopidogrel, 2 to 4 h after intake of the firstmaintenance dose (in the vast majority of patients between16 and 24 h after loading dose). | Samples were drawn intotubes containing 3.8% sodium-citrate (Sarstedt, Nuembrecht,Germany) | ADP | Blood samples for plateletfunction testing were drawn before discharge at day 1 afterloading with clopidogrel, 2 to 4 h after intake of the firstmaintenance dose (in the vast majority of patients between16 and 24 h after loading dose). | Within 1 hour |
| Jeong 2010{Jeong, 2010 70 /id}20650435KoreaACCEL-DOUBLE | Platelet function assays | Light transmittance aggregometry | an AggRAM aggregometer  | Helena Laboratories Corporation,Beaumont, Texas | Within 2 to 4 h after the last intakeof regimen, blood samples were collected using the double syringetechnique, and the first 2 to 4 ml of blood wasdiscarded to avoid the bias of spontaneous platelet activation.Platelet reactivity was simultaneously measured <1 hafter venipuncture by light transmittance aggregometry andthe VerifyNow P2Y12 assay | containing0.5 ml of 3.2% sodium citrate  | ADP | With 2-4 hours | <60 mins |
|  | Platelet function assays | VerifyNow P2Y12 assay | Ultegra rapid platelet functionassay,  | Accumetrics Inc., San Diego, California | Blood was drawn into a GreinerBio-One Vacuette tube  | 3.2% citrate | ADP | With 2-4 hours | NR |
| Barker, 2010{Barker, 2010 52 /id}20965456USANR | Platelet function measurement | Verify-Now P2Y12 assay  | Verify-Now P2Y12 assay | Accumetrics, Inc., San Diego, California  | NR | NR | NR | NR | NR |
| Bonello, 2010{Bonello, 2010 45 /id}20708365FranceNR | VASP index | Platelet VASP kits (Diagnostica Stago,Asnières, France) | Analyses were performedon an EPICS XL-MCL flow cytometer  | BeckmanCoultronics, Margency, France | Blood samples for VASP index analysis were drawn byatraumatic venipuncture of the antecubital vein between 6and 12 h after each clopidogrel LD. | blood was collected into a Vacutainercontaining 3.8% trisodium citrate and filled to capacity.. | ADP 10 umol/l | Blood samples for VASP index analysis were drawn byatraumatic venipuncture of the antecubital vein between 6and 12 h after each clopidogrel LD. | VASP index phosphorylation analysis was performedwithin 24 h of blood collection. |
| Gurbel 2011{Gurbel, 2011 24 /id}21392617USANR | Platelet aggregation  | Aggregation was assessed using a Chronolog Lumi-Aggregometer |  Chronolog Lumi-Aggregometer (Model 490-4D) with the AGGRO/LINK control software | Chronolog, Havertown, PA | Blood samples were collected by venipuncture in vacutainertubes (Becton-Dickinson, Franklin Lakes, NJ)  | 3.8%trisodium citrate. | ADP 5 and 20 uM | NR | Within 2 hours |
| Hwang 2011{Hwang, 2011 35 /id}21075428South KoreaNR | LTA | light transmittance aggregometry (LTA)  | AggRAM aggregometer  | HelenaLaboratories Corp., Beaumont, Texas, USA | blood samples were drawn into Vacutainer tubes (Becton-Dickinson, SanJose, CA, USA) | containing 0.5 mL of sodium citrate 3.2% | ADP 5 and 20 um | All patients received a 300-mg loading dose (LD) of clopidogreland aspirin at least 12 hours before PCI, followed by 200 mg/daymaintenance dose of aspirin and 75 mg/day of clopidogrel thereafter.Immediately after insertion of the arterial sheath in the catheterizationlaboratory, blood samples were obtained. | Within 60 minutes  |
|  |  |  VerifyNowP2Y12 assay  | Ultegra rapid platelet function assay; Accumetrics Inc., | San Diego, CA, USA | whole-blood was drawn into vacutainertube(Greiner Bio-One, Frickenhausen, Germany). | a Greiner Bio-One 3.2% citrate vacutainertube  | ADP 20uM |  | NR |
| Kang, 2010{Kang, 2010 40 /id}20724801KoreaNR | Light transmittance aggregometry (LTA) | Light transmittance aggregometry (LTA) | AggRAM aggregometer  | (Helena Laboratories Corp., Beaumont, Texas, USA) | Blood samples were drawn into Vacutainer tubes.Blood samples were obtained Immediately after insertion of the arterial sheath in the catheterization lab.  | with 0.5ml sodium citrate 3.2% | 5 or 20 uM ADP | A 300-mg LD of clopidogrel and aspirin was administrated 12 to 24 hours before scheduled PCI, followed by 200 mg maintenance dose of aspirin and 75 mg/day clopidogrel thereafter. Blood samples were obtained Immediately after insertion of the arterial sheath in the catheterization lab.  | Within 2 hours |
|  | Verifynow P2Y12 assay  | NR | VerifyNow P2Y12 assay (Ultegrarapid platelet function assay, Accumetrics Inc., San Diego, CA, USA)  | NR | NR | NR | 20uM ADP | NR | NR |
| Liu 2010{Liu, 2010 38 /id}21163112ChinaNR | Light transmittance aggregometry | Chrono-Log Lume-Aggregometer (model 700) and the Aggro/Link software package | Chrono-Log Lume-Aggregometer (model 700) | Chrono-Log Corporation, Havertown, Pennsylvania, USA | Blood samples were collected in evacuated container tubes which were filled to capacity and then inverted 3 to 5 times for gentle mixing.  | 3.8% sodium citrate | 5 umol/LADP | Blood sample were collected before clopidogrel administration, and at least 24 hours after the first 300 mg clopidogrel dose to make sure maximum platelet inhibition has been achieved.  | NR |
| Maeda, 2010{Maeda, 2011 30 /id}21178986JapanNR | Residual platelet aggregation  | a light-transmittance aggregometer  | multichannelplatelet-aggregation analyzer model PAT-2M | Mebanix, Tokyo,Japan | Venous blood samples werecollected from each participant between 12:00 and 15:00 | 3.13% sodium citrate | 5 or 20 umol/lADP | NR | NR |
| Yamamoto 2011{Yamamoto, 2011 25 /id}21168310JapanNR | Platelet aggregation | Light transmission aggregometer  | MCM HEMA TRACER 313; PAM12C | LMS inc., Japan |  platelet aggregation testwas done in 69 patients at <7 days and 54 patients at >7days. | 0.38% sodium citrate  | 20 uMol/LADP | Test was performed at least 24 h after clopidogrel loading.  | NR |
| Park 2011{Park, 2011 21 /id}21345843KoreaCILON-T | VerifyNow assay | The VerifyNow assay  | The VerifyNow assay  | Accumetrics, Inc., San Diego, California,USA | NR | NR | ADP | NR | NR |
| Sibbing, 2010{Sibbing, 2010 48 /id}20492469GermanyNR | Multiple electrode platelet aggregometry (MEA) | Multiplateanalyzer  | NR | (Dynabyte) | For all patients, peripheral venous blood samples were drawndirectly at hospital admission, after the daily dose of 75 mg ofclopidogrel had been taken and before any in-hospital drugadministration, with a loose tourniquet through a shortvenous catheter inserted into a forearm vein. | EDTA  | ADP | peripheral venous blood samples were drawndirectly at hospital admission, after the daily dose of 75 mg of clopidogrel had been taken and before any in-hospital drugadministration. | NR |
| Bouman 2011{Bouman, 2011 9 /id}21628721NetherlandsGenetic substudy of the Popular study | NR |  LTA | IMPACT-R | Matis Medical Inc, Beersel, Belgium | Whole blood samples were drawn from the femoral or radial artery sheath | 3.2% citrate | 5 and 20 umol/l ADP (n = 1005 and n=1006, respectively) | NRClopidogrel given before and after stenting so most likely dosing came first.  | 2 hours after blood collection. |
|  | NR | NR | PlateletWorks assay | Helena Laboratories, Beaumont, Texas |  | K3-EDTA or diphenylalanyl-L-prolyl-L-arginine chloromethyl ketone (PPACK [50 µmol/L]) | N=511 |  |  |
|  | NR | NR | VerifyNow P2Y12 assay | Accumetrics, San Diego, CA |  | Greiner tubes | N=1010 |  |  |
| Campo 2011{Campo, 2011 13 /id}21679849ItalyNR | VerifyNow P2Y12 | NR | NR | Accumetrics, San Diego CA | NR | NR | NR | Blood samples were drawn at baseline (just before PCI and administration of interventional therapy) and at 1 and 6 months after PCI.Clopidogrel dosing came first (at least 12 hours before PCI) | NR |
| Fernando 2011{Fernando, 2011 233 /id}21696537AustraliaNR | NR | Light transmittance aggregometry (LTA) | AggRAM light transmittance aggregometer | Helena l aboratories, Melbourne, A ustralia | Platelet-rich and platelet-poor plasma were obtained b y centrifuging whole blood | 3 .8% citrate | 20 uM ADP over 10 min | NR, except noted to be at baseline, after treatment (first or second period), and after washout | Within 30 min |
|  | VerifyNow | Light transmittance | VerifyNow P2Y12 cartridge | Accumetrics , Sa n Diego, CA | Whole blood | 3.8% citrate | ADP | NR, except noted to be at baseline, after treatment (first or second period), and after washout | Between 10 and 30 m in after |
| Geisler 2008{Geisler, 2008 161 /id}18781853GermanyNR | NR | Turbidometry | Chronolog Lumi aggregometer with Aggro-link software | NR | Blood samples were centrifuged at 1000 rpm for 10 min to obtain platelet-rich plasma and for another 10 minutes to recover platelet-poor plasma | 3.8% citrate | 20 umol/L ADP | Platelet aggregation measured after first 600-mg dose of clopidogrel (at least 6 hours after) | RPA was measured at 5 min after ADP added (median, 21 hours; IQR, 5.1-285.0) |
| Gladding 2008{Gladding, 2008 149 /id}19463375New ZealandPRINC (Plavix Response in Coronary Intervention) Trial | VerifyNow | Agglutination plus light transmittance | point-of-care rapid platelet function analyzer (RPFA) and its P2Y12 cartridge | Accumetrics Ltd., San Diego, California | Arterial blood was sampled through a 6-F femoral sheath and transferred immediately; collection tubes were inverted 4 times to mix the anticoagulant and left at ambient temperature (24°C) | 3.2% citrate | ADP, 20 umol/l | Platelet function was tested at baseline, 2, 4, and 7 h fromthe ﬁrst clopidogrel loadingdose; and at 7 days. | 10 min |
| Gurbel 2010{Gurbel, 2010 91 /id}19817997USANR | NR | LTA | Chronolog Optical Aggregometer (Model 490-4D) with Aggrolink software () | Chronolog, Havertown, PA | Blood was collected from the antecubital vein with an 18-gauge needle. | 3.2% trisodium citrate | 5 and 20 uM ADP, propriet ary anticoag ulant CT 921- 78 (f actor Xa Inhibitor), or 10 uM ADP and 4 mg/ml collagen | At screening (before dosing) and at 12– 16 h after the previous day’s clopidogrel dose; then at 4 h , 6 h, 24 h, and 7 –10 days after dosing with elinogrel | NR |
|  | NR | VASP | Platelet VASP; Diagnostica Stago | Biocytex, Asnieres, France |  | NR | NR |  |  |
|  | TEG PlateletMapping | Thrombelastography | TEG Hemostasis Analyzer with PlateletMapping assay | Haemoscope Corporation, Niles, IL |  | Lithium heparin | ADP |  |  |
|  | VerifyNow | Turbidimetric-based optical detection | NR | NR |  | .2% sodi um citr ate | NR |  |  |
| Kim 2011{Kim, 2011 18 /id}21511217South KoreaCCELAMI2C19 | NR | Light transmittance aggregometry | AggRAM Aggregometer | Helena Laboratories Corp., Beaumont, Texas | Blood samples were collected using the double-syringe technique, in which the ﬁrst 2 to 4 ml of blood were discarded to avoid spontaneous platelet activation. | 0.5 ml of 3.2% sodium citrate | 5 and 20 umol/l ADP | Platelet reactivity measured pre-discharge (either at least 3 days after PCI in patients not treated with tiroﬁban or at least 5 days after procedure in patients treated with tiroﬁban) and at 30 day followup (At 30-day follow-up, peripheral venous blood was drawn from an antecubital vein within 2 to 4 h after the last intake of clopidogrel dose.) | within 2 h |
|  | VerifyNow P2Y12 assay | NR | NR | Accumetrics Inc, San Diego, CA | SAME AS ABOVE | 3.2% citrate | 20 umol/l ADP | SAME AS ABOVE | SAME AS ABOVE |
| Lee 2011{Lee, 2011 4 /id}21786436South KoreaNR | VerifyNow | LTA | P2Y12 assay | Accumetrics, San Diego, CA | Venous whole blood | NR | NR |  | within 10 to 15 min |
| Malek 2008{Malek, 2008 167 /id}18577829PolandNR | NR | Closure time (CADP-CT) | PFA-100  | Dade Behring, German | blood from the peripheral vein.Results are reported as the closure time (CADP-CT) in seconds. The test stops automatically after 300 s, which is considered a maximal response to the agonist | 3.2% buffered citrate | Collagen, ADP | after a median of 6 days of antiplatelet treatment (interquartile range (IQR) 5–7) | analyzed within 2 h of sampling |
| Pettersen 2011{Pettersen, 2011 228 /id}21426546NorwayAspirin and Clopidogrel non-responsiveness clinical Endpoint Trial (ASCET) | NR | VASP | PLT VASP/P2Y12 assay | Biocytex, France | Blood samples drawn between 8 and 10:30 am in a fasting condition  | Citrated blood(0.129 mM in dilution 1:10) | NR | 1 month after randomization, 24 hours after the last intake of medication | within 48 hours |
|  | VerifyNow | LTA | NR | Accumetrics, San Diego, CA |  | Vacuette tubes (Grüner Bio-One, Austria, 0.109 mM in dilution 1: 10) | ADP |  |  |
| Sibbing 2011{Sibbing, 2011 2 /id}21527445GermanyNR | NR | Multiple electrode aggregometry (MEA) | Multiplate analyzer | NR | Blood for genomic DNA extraction and genotyping was taken from the arterial sheath of all patients directly prior to PCI. Whole blood was obtained from the arterial sheath of all patients directly before PCI and prior to the administration of any anticoagulant/antithrombotic treatment in the cath lab.  | lepirudin (25 mg/mL, Reﬂudan, Dynabyte, Munich, Germany) | ADP (6.4 uM) | NR | NR |
| Cuisset, 2011{Cuisset, 2011 18195 /id}21803320FranceNR | VASP | VASP | Platelet VASP | Diagnostica Stago (Biocytex), Asnières,France | Blood samples for testing clopidogrel response weredrawn ≥12 hours after the loading dose of clopidogrel andat 1-month follow-up.  | ADP or PGE1 | NR | ≥12 hours after clopidogrel loading dose.clopidogrel first  | immediately  |
| Gajos, 2012{Gajos, 2012 18197 /id}22623230PolandOMEGA-PCI | LTA- ADP | light transmittance aggregometry  | chrono-log Model 700,  | Chrono-log corp, Haverton, USA | blood was collected before initiation of clopidogrel, 12-14 h after clopidogrel, 3-5 days after PCI, 30 days | 5 and 20 uM ADP | citrate | 0.5 or 3-5, or 30 daysblood sample first | NR |
| Tello-Montoliu 2012{Tello-Montoliu, 2012 18200 /id}22116003Spainstudy one of the paper | LTA-ADP | light transmittance aggregometry | Aggrecorder II,  | Menarini Diagnostics,Florence, Italy | blood samples were collected when patients were taking daily dural antiplatelet therapy  | 3.2% trisodium-citrate | ADP, TRAP | NRclopidogrel first  | within 3 h |
| Tello-Montoliu 2012{Tello-Montoliu, 2012 18200 /id}22116003Spainstudy two of the paper | VASP | vasodilator-stimulated phosphoprotein(VASP) phosphorylation P2Y12 | Platelet VASP,Diagnostica Stago,  |  Biocytex Inc, Marseille, France | blood samples were collected when patients were taking daily dural antiplatelet therapy  | 3.2% trisodium-citrate | ADP, PGE1 | NRclopidogrel first  | NR |
| Price, 2012{Price, 2012 18227 /id}22624833USGIFT (Genotype Information and Functional Testing) Study—a prespeciﬁed genetic substudy of GRAVITAS (Gauging Responsiveness with A VerifyNow assay–Impact on Thrombosis And Safety) trial | VerifyNow P2Y12 | NR | NR | Accumetrics, San Diego CA | NR | NR | NR | NR but clopidogrel came first—sampling done 12-24 hr after PCI | NR |
| Gremmel, 2012{Gremmel, 2012 18228 /id}22154242AustriaNR | LTA | LTA | APACT 4S Plus aggregomete) | LABiTec, Ahrensburg, Germany | Blood sampled from antecubital vein 24 hr after PCI, after overnight fast and no smoking for 12 hr | EDTA and 3.8% sodium citrate | ADP (10 μM) | 24 hr between PCI and sampling | 1-3 hr |
|  | VASP phosphorylantion | NR | NR | NR |  | EDTA and 3.8% sodium citrate |  ADP |  | 1-3 hr |
|  | VerifyNow P2Y12 | NR | NR | Accumetrics, San Diego CA |  | 3.8% sodium citrate | ADP |  | 1-3 hr |
|  | MEA | Impedence aggregometry | NR | Dynabyte, Munich, Germany |  | 18 IU/ml lithium heparin | ADP (6.4 μM) |  | 1-2 hr |
|  | Impact-R | NR | Impact-R ADP response test | DiaMed, Cressier, Switzerland |  | 18 IU/ml lithium heparin | NR |  | 1-3 hr |
| Harmsze, 2012{Harmsze, 2012 18224 /id}22228204NetherlandsPOPular substudy | LTA | NR | NR | NR | Whole blood | 3.2% citrate | ADP 20 μmol/L | NR but dose came first | Within 2 hr |
|  | VerifyNow P2Y12 | NR | NR | Accumetrics, San Diego CA | Whole blood | Heparin | NR | NR but dose came first  | Within 2 hr |
| Kreutz, 2012{Kreutz, 2012 18223 /id}22427735USNR | LTA | NR | Optical Lumi-Aggregometer (Model 700 with AGGRO/LINK 8 software) | Chrono-Log Corporation, Havertown, PA) | Whole blood | 3.2% sodium citrate | ADP 5, 10, and 20 µmol/L | 4 and 16-24 hr after previous dose | Within 2 hr |
|  | VerifyNow P2Y12 | NR | NR | Accumetrics, San Diego CA | Whole blood | NR | NR | 4 and 16-24 hr after previous dose | Within 2 hr |
| Dai, 2012{Dai, 2012 18226 /id}22704413ChinaNR | LTA | Turbidoaggregometry | LBY-NJ4-channel platelet aggregation analyzer | Beijing Precil Instrument Co. Ltd. | Blood was collected after 10 days of clopidogrel | 3.8% sodium citrate | ADP 5 μmol/L | 10 days (dose came first) | NR |
| Ono, 2011{Ono, 2011 18202 /id}21862109JapanNR | LTA | NR | MCM HEMA TRACER313 M,  | MC Medical, Inc., Tokyo, Japan | blood was collected 24 h after clopidogrel loading dose | 3.2% sodium citrate | ADP | 24 hclopidogrel first | 1 h |
| Ono, 2011{Ono, 2011 18202 /id}21862109JapanNR | Verifynow | NR | Ultegra rapid platelet function assay;  | Accumetrics Inc., SanDiego, CA | blood was collected 24 h after clopidogrel loading dose | 3.2% sodium citrate | ADP | 24 hclopidogrel first | 1 h |
| Fontana 2011 {Fontana, 2011 18211 /id}21692977SwitzerlandADRIE | VASP | vasodilator-stimulated phosphoprotein | Platelet VASP/P2Y12;  | Biocytex, Marseille,France | blood | NR | NR | NR | NR |
| Fontana 2011 {Fontana, 2011 18211 /id}21692977SwitzerlandADRIE | LTA ADP | light transmission aggregometer | TA-8V; SDMedical,  | Heillecourt, France | blood | NR | ADP | NR | 3 h |
| Aleil, 2009{Aleil, 2009 18222 /id}19624462FranceVASP-02 [genetic reanalysis thereof] | VASP assay (platelet reactivity index) | VASP phosphorylation after ADP stimulation measured by flow cytometry | FACS Calibur spectrometer | Becton Dickinson (location NR) | Whole blood samples were obtained and shipped by truck to central lab, at room temperature | Sodium citrate, 0.129 mol/liter | PGE1 alone or with ADP | Before dosing, 10-12 hr after loading dose, and 2-4 weeks after start of maintenance dose | Within 36 hr |
| Kreutz, 2012{Kreutz, 2012 18218 /id}22385219USANR | VerifyNow P2Y12 assay | NR | NR | NR | Blood obtained on day 15 | 3.2% sodium citrate | ADP | 1 day (dose came first; blood sampling done 1 day after the last dose) | 10-30 min after sampling for VerifyNow |
|  | LTA | LTA | Optical Lumi-Aggregometer, model 700 with AggroLink 8 software | Chrono-Log Corp., Havertown PA |  |  | 20 uM ADP, with or without 22 or 88 nM PGE1 |  | within 2 hr after for LTA |
| Marcucci, 2012{Marcucci, 2012 18217 /id}22390861ItalyNR | LTA | LTA | APACT 4 aggregometer | Helena Laboratories, Milan, Italy | Venous blood samples | 0.109 M sodium citrate | 10 uM ADP | 1 day (dose came first) | Within 24 hr after loading dose or 6 days after (in patients receiving IIb/IIIa inhibitor; thus, during maintenance dosing) |
| Mega, 2011{Mega, 2011 18190 /id}22088980USAELEVATE-TIMI 56 | VASP | NR | NR | NR | “Ambient” blood samples sent to central lab | NR | NR | NR | NR |
|  | VerifyNow | NR | NR | Accumetrics (NR) | NR | NR | ADP | NR | NR |
| Park, 2012{Park, 2012 18216 /id}22507978KoreaACCEL-STATIN | LTA | LTA | AggRAM aggregometer | Helena Laboratories Corp., Beaumont TX | Blood | 0.5 ml sodium citrate 3.2% | 5 or 20 uM ADP | Sampling done at baseline and 2-6 hr after last dose of 15-day study period | NR |
|  | VerifyNow | Turbidoaggregometry | NR | Accumetrics, San Diego, CA | Blood | 3.2% citrate | 20 uM ADP |  |  |
| Yamane, 2012{Yamane, 2012 18229 /id}22472213JapanNR | LTA | 12-channel light transmission aggregometer | MCM HEMA TRACER 313;  | MC Medical, Tokyo, Japan | blood | 0.313% sodium citrate | 20umol/L ADP | blood sample done at >2 weeks follow up. Clopidogrel first | within 2 hours after blood sampling |
|  | Verifynow | the VerifyNow P2Y12 assay | Accumetrics,  | San Diego, CA, USA | blood | 0.313% sodium citrate | ADP | blood sample done at >2 weeks follow up. Clopidogrel first | NR  |
| Hsu, 2011{Hsu, 2011 18235 /id}21144850TaiwanNR | ADP-induced platelet aggregation | ADP-induced platelet aggregation | ADP; Bio/Data Corp | Horsham, PA | blood | NR | ADP | blood sample was collected on day 1 and 28.blood first | NR |
| Kim, 2012 {Kim, 2012 18236 /id}22007612KoreaACCEL-TRIPLE | LTA | LTA-ADP | AggRAM aggregometer  | Helena Laborotories Corporation, Beaumont, Texas | blood | 3.2% sodium citrate | 5uM ADP | blood samples were obtained 2-4 h after the last intake of triple antiplatelet therapyclopidogrel first | 2h |
|  | VerifyNow P2Y12 | VerifyNow P2Y12 | NR | NR | blood | 3.2% citrate Vacuette | 20uM ADP | blood samples were obtained 2-4 h after the last intake of triple antiplatelet therapyclopidogrel first | NR |
| Siller-Matula, 2012{Siller-Matula, 2012 18177 /id}22260716AustriaPEGASUS-PCI | multipleelectrode aggregometry (MEA) | Impedence aggregometry | Multiplate Analyzer | Verum DiagnosticaGmbH, Munich, Germany | Blood collected after PCI | NR | ADP (6.4µM) and PGE1 (9.4 nM) | NR [clopidogrel first] | Immediately after sampling |
| Bonello, 2012{Bonello, 2012 18189 /id}22285300FranceNR | VASP | vasodilator-stimulated phosphoprotein(VASP) phosphorylation P2Y12 | Platelet VASP kits | Diagnostica Stago, Asnières, France | 6-12 hrs after clopidogrel LD & before PCI | 3.8% trisodium-citrate | NR | 0.25-0.5 days (6-12 hrs)clopidogrel first  | <1 (<24 hours) |
| Collet, 2011{Collet, 2011 18192 /id}21511218FranceCLOVIS-2 | LTA | LTA | Model 490-4D | Chrono-Log Corporation, Kordia, the Netherlands | Whole blood | 3.2% sodium citrate | 20 μmol/L ADP | 6 hr after LD of clopidogrel | NR |
|  | VerifyNow | Turbidoagggregometry | VerifyNow P2Y12 assay | Accumetrics Inc., San Diego, California, USA | Whole blood | 3.2% sodium citrate | ADP | 6 hr after LD of clopidogrel | NR |
| Hochholzer, 2011{Hochholzer, 2011 18208 /id}21884870NREXCELSIOR | LTA | LTA | Bio/Data PAP4 aggregometer | Bio/Data, Mölab, Germany | Whole blood | 3.2% sodium citrate | 5 and 20 μmol/L ADP | 24 hr after procedure [clopidogrel first] | NR |
| Kassimis, 2012{Kassimis, 2012 18209 /id}21831410GreeceNR | VerifyNow | Turbidoagggregometry | VerifyNow P2Y12 assay | Accumetrics Inc., San Diego, California, USA | Whole blood | 3.2% sodium citrate | ADP | 24 hr after procedure [clopidogrel first] | NR |
| Namazi, 2012{Namazi, 2012 18206 /id}22265638IranNR | LTA | LTA | PACKS-4 | Helena laboratories, Helena BioSciences Europe, Sunderland | Samples obtained before procedure, 2 h after taking LD600 mg clopidogrel, 24 h and later 30 days after stenting | 3.8% sodium citrate | ADP 5 or 20 µmol  | 30 days [clopidogrel first]  | 2-3 hrs |
| Rideg, 2011{Rideg, 2011 18210 /id}21806387HungaryDOSER | LTA | LTA | CARAT TX-4 4-channel aggregometer | Carat Diagnostics, Budapest, Hungary | Blood sample before procedure | 3.8% sodium citrate | ADP 5 µmol | 12-24 hrs [clopidogrel first]  | 2 hrs |
|  | VASP | vasodilator-stimulated phosphoprotein(VASP) phosphorylation P2Y12 | Platelet VASP,Diagnostica Stago,  |  Biocytex Inc, Marseille, France | Blood sample before procedure | 3.8% sodium citrate | ADP, PGE1 | 12-24 hrs [clopidogrel first]  | 2 hrs |
| Jeong, 2011{Jeong, 2011 18207 /id}22045970KoreaNR | LTA | LTA | AggRAM aggregometer. | Helena Laboratories Corp, Beaumont, TX | Whole blood | 3.2% sodium citrate | ADP | 2-6 hr after clopidogrel | NR |
|  | VerifyNow | Turbidoagggregometry | VerifyNow P2Y12 assay | Accumetrics Inc., San Diego, California, USA | Whole blood | 3.2% sodium citrate | ADP | 2-6 hr after clopidogrel | NR |
| Chan,2012{Chan, 2012 18212 /id}22462746SingaporeNR | VASP | vasodilator-stimulated phosphoprotein(VASP) phosphorylation P2Y12 | Platelet VASP,Diagnostica Stago,  |  Biocytex Inc, Marseille, France | Blood sample before procedure | sodium-citrate | ADP 10 µmol, PGE1 | 5-7 days [clopidogrel first]  | 48 hrs |
| Park, 2012{Park, 2012 18238 /id}22735685KoreaCROSS-VERIFY | VerifyNow | Turbidoagggregometry | VerifyNow P2Y12 assay | Accumetrics Inc., San Diego, California, USA | Whole blood | sodium citrate | ADP | 16-24 hr after clopidogrel | NR |
| Kreutz, 2012{Kreutz, 2012 18237 /id}22459907USANR | LTA | LTA | Optical Lumi-Aggregometer (Model 700 with AGGRO/LINK 8 software) | Chrono-Log Corporation, Havertown, PA | Whole blood | 3.2% sodium citrate | ADP 20 µmol/L and TRAP at 15 and 25 µmol conc | 16-24 hr after clopidogrel | Within 2 hr |
| Jeong, 2012{Jeong, 2012 18322 /id}22837373KoreaACCEL-DM | LTA- ADP | LTA | AggRAM aggregometer  | Helena Laboratories Corp., Beaumont, Texas | blood | NR | 5uM or 20uM ADP | blood collected immediately before elective PCI or at least 5 days after emergency PCI, and 2-6 hours after last dose at the 30-day follow-up | NR |
| Hulot, 2011{Hulot, 2011 18321 /id}21972404 FranceCLOVIS-2 | LTA-ADP | LTA | Model 490–4D | Chrono-Log Corporation, Kordia, The Netherlands | blood | NR | 20 μM ADP | 6 hrs | NR |
|  | VerifyNow | Turbidoagggregometry | VerifyNow P2Y12 assay | NR | Whole blood | NR | ADP | 6 hrs | NR |
| Roberts, 2012{Roberts, 2012 18260 /id}22464343CanadaRAPID GENE | VerifyNow | Turbidoagggregometry | VerifyNow P2Y12 assay | Accumetrics, San Diego, CA, USA | Whole blood | NR | ADP | NR | NR |