

CLINICAL TERMINOLOGY FOR CAMs

ABDOMINAL AORTIC ANEURYSM (AAA): A localized dilatation (ballooning) of the abdominal aorta exceeding the normal diameter by more than 50 percent, and is the most common form of aortic aneurysm.

ABRUPT CLOSURE: Sudden occlusion of the target or adjacent segment of a vessel during or after PTCA. Usually occurs while the patient is still in the cath lab or up to 6 hours post procedure.

ACTIVATED CLOTTING TIME (ACT): Blood test measuring the clotting ability of the blood; determines whether patient has an adequate dose of heparin to prevent clotting of interventional equipment.

ACUTE CORONARY SYNDROME (ACS): Refers to any group of symptoms attributed to obstruction of the coronary arteries

ACUTE GAIN: The difference in lumen diameter before and immediately after intervention is due to plaque removal and/or arterial expansion.

ACUTE INFARCT: Time when heart muscle is being starved for blood and patient is experiencing pain and symptoms; acute (short, sudden course) is opposite to chronic.

ACUTE MARGINAL BRANCH: A coronary artery that branches off the right coronary artery.

ACUTE MYOCARDIAL INFARCTION (AMI): Myocardial infarction occurs when myocardial ischemia, a diminished blood supply to the heart, exceeds a critical threshold and overwhelms myocardial cellular repair mechanisms designed to maintain normal operating function and homeostasis. Ischemia at this critical threshold level for an extended period results in irreversible myocardial cell damage or death. The event is called "acute" if it is sudden and serious.

ADENOSINE: A cardiac depressant and vasodilator. Used as an antiarrhythmic and as an adjunct in myocardial perfusion imaging in patients incapable of exercising adequately to undergo an exercise stress test.

ADJUNCTIVE: A treatment that is used in addition to another treatment; each could be a stand alone procedure.

ADVENTITIA: Outermost layer of arteries, arterioles, veins, and venules.

AMERICAN COLLEGE OF CARDIOLOGY (ACC): A 43,000-member nonprofit medical society, is dedicated to enhancing the lives of cardiovascular patients through continuous quality improvement, patientcentered care, payment innovation and professionalism. Comprised of physicians, nurses, nurse practitioners, physician assistants, pharmacists and practice managers.



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AMERICAN HEART ASSOCIATION (AHA): A non-profit organization in the United States that fosters appropriate cardiac care in an effort to reduce disability and deaths caused by cardiovascular disease and stroke.

ANASTOMOSIS: Surgical term referring to interconnections between vessels such as arteries that allow blood to flow directly from one vessel to another; provide alternative pathways for blood flow in case of vessel blockage.

ANEMIA: A decrease in number of red blood cells (RBCs) or less than the normal quantity of hemoglobin in the blood. Anemia may also be diagnosed where there is decreased oxygen-binding ability of each hemoglobin molecule due to deformity or lack in numerical development as in some other types of hemoglobin deficiency. Of the two major approaches to diagnosis, the "kinetic" approach involves evaluating production, destruction and loss, and the "morphologic" approach groups anemia by red blood cell size.

ANEURYSM: Thinning of the wall or lining; often seen as "bulges".

ANGINA: Chest pain associated with ischemic heart disease, usually brought on by exercise or stress.

ANGINA PECTORIS: Symptoms experienced by patient when heart muscle is receiving inadequate blood supply; symptoms vary between patients, can include chest, arm, chin or back pain, shortness of breath, anxiety, etc.

ANGIOGRAM: The film or image of the blood vessels found in an x-ray examination of the heart and arteries using a radiopaque dye injected into the bloodstream.

ANGIOGRAPHIC RESTENOSIS A: Binary restenosis Restenosis is defined as a dichotomous event (i.e. either present or absent). The most common definition is diameter stenosis greater than 50% at followup, which was based on early studies showing impaired coronary flow reserve in such lesions. Another common definition is a post -intervention residual stenosis less than 50% that increases to greater than 50% at follow-up; this definition does not necessarily correlate with clinical restenosis, but is often used to compare different treatments or devices.

ANGIOGRAPHIC RESTENOSIS B: Continuous outcomes: Restenosis occurs to a variable extent in virtually all lesions, with changes in lumen diameter following a Gaussian distribution. By expressing lumen diameter and diameter stenosis as a cumulative distribution curve, restenosis rates can be determined for any dichotomous definition of restenosis.

ANGIOGRAPHY: A medical imaging technique used to visualize the inside, or lumen, of blood vessels and organs of the body, with particular interest in the arteries, veins and the heart chambers. This is traditionally done by injecting a radio-opaque contrast agent into the blood vessel and imaging using Xray based techniques such as fluoroscopy.



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ANGIOPLASTY: Plastic repair of blood vessels or lymphatic channels.

ANGULATION: The formation of an angle during x-ray examination and angiogram to achieve specific selective views.

ANKLE BRACHIAL INDEX: The ratio of the blood pressure in the lower legs to the blood pressure in the arms. The ABI is calculated by dividing the systolic blood pressure at the ankle by the systolic blood pressures in the arm.

ANTEGRADE: Forward motion or flow. Opposite: Retrograde.

ANTERIOR: Medical term which means in front (of body) (Opposite: Posterior).

ANTICOAGULANT: A drug which delays blood clotting.

ANTIHYPERTENSIVES: A class of drugs that are used to treat hypertension. Antihypertensive therapy seeks to prevent the complications of high blood pressure, such as stroke and myocardial infarction

AORTA: The major artery in the body that transports blood from the left ventricle to all portions of the body; the main trunk of the systemic circulatory system.

AORTIC INSUFFICIENCY: A back-flow of blood from the aorta to the left ventricle due to improper closing of the aortic valve.

AORTIC ROOT: The portion of the ascending aorta beginning at the aortic annulus and extending to the sinotubular junction.

AORTIC STENOSIS: Narrowing of the aortic valve.

AORTIC (SEMILUNAR) VALVE: Valve located between the left ventricle and the aorta.

APEX: Lower portion of the heart, tip of the ventricles - the apex points leftward, downward and forward.

APICAL: Pertaining to the bottom of the two ventricles.

APPROPRIATE USE CRITERIA (AUC): Specify when it is appropriate to use a procedure.

ARREST: Any cessation of activity often applying to the heart itself and specifically applying to cessation of the heart's electrical and mechanical activity.

ARRHYTHMIA: Abnormal heart rate or rhythm.



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ARTERIAL BLOOD PRESSURE (ABP): The force exerted by blood on arterial walls.

ARTERY (A.): Vessels which carry oxygenated blood from the heart to the body. Plural: Arteries (Aa.).

ARTERIAL REMODELING: Changes in the vessel wall leading to vessel expansion or vessel contraction, which can enlarge or constrict the lumen, respectively. Common after DCA and PTCA. The ability of stents to virtually eliminate late arterial remodeling is an important factor in the ability of stents to reduce restenosis.

ARTERIOLES: Smaller arteries that conduct blood away from major arteries to the capillary bed.

ARTERIOSCLEROSIS: A thickening and hardening of arterial walls.

ARTERIOVENOUS FISTULA (AV FISTULA): An abnormal connection or passageway between an artery and a vein.

ARTIFACT: A mark made by a stylus of an ECG strip; also electrical interference or disruption of any monitoring lines caused by outside source.

ASYSTOLE: Period in which the heart does not contract; standstill.

ATHEROMA: An abnormal mass of fatty or lipid material with a fibrous covering, existing as discrete raised plaque within the intima of an artery.

ATHEROSCLEROSIS: Highly prevalent disease characterized by gradual accumulation of fibrous and fatty plaque on the walls of arteries, leading to progressive narrowing of the arterial lumen.

ATMOS: Atmosphere, which equal 14.7 pounds per square inch (psi) at sea level.

ATRIA: The upper chambers of the heart. (Singular: atrium)

ATRIAL FIBRILLATION (AF/AFIB): The most common cardiac arrhythmia (irregular heart beat). The normal regular electrical impulses generated by the sinoatrial node are overwhelmed by disorganized electrical impulses usually originating in the roots of the pulmonary veins, leading to irregular conduction of ventricles impulses which generate the heartbeat.

ATRIAL SEPTAL DEFECT (ASD): A form of congenital heart defect that enables blood flow between two compartments of the heart called the left and right atria.

ATRIOVENTRICULAR (A -V) NODE: A part of the electrical control system of the heart that coordinates the top of the heart. It electrically connects atrial and ventricular chambers.



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ATRIOVENTRICULAR VALVES: Set of valves located between the atria and ventricles

BALLOON PRESSURE: Pressure generated by the fluid within the angioplasty balloon.

BALLOON AORTIC VALVULOPLASTY (BAV): The repair of a stenotic aortic valve using a balloon catheter inside the valve. The balloon is placed into the aortic valve that has become stiff from calcium buildup. The balloon is then inflated in an effort to increase the opening size of the valve and improve blood flow.

BALLOON-TO-ARTERY RATIO: Ratio of diameter size of the balloon to arterial diameter.

BARE METAL STENT (BMS): A vascular stent without a coating (as used in drug-eluting stents). It is a mesh-like tube of thin wire.

BASAL STENOSIS RESISTANCE (BSR): A novel adenosine-free index with a diagnostic accuracy for myocardial ischemia on perfusion scintigraphy mirroring fractional flow reserve (FFR).

BIFURCATION: Place where blood a single vessel branches into two.

BIOABSORBABLE SCAFFOLD (BAS): Small scaffolds very similar to bare-metal and drug-eluting stents. BAS are made from polylactic acid, which is designed to be fully absorbed and slowly metabolized by the coronary artery.

BOLUS: A large volume of fluid given intravenously and rapidly for immediate response.

BRACHIAL: Pertaining to the arm.

BRADY: Slow; bradycardia = slow heart rate.

BRADYCARDIA: Heart rate less than 60 bpm.

C-arm FLUOROSCOPIC IMAGE INTENSIFIER (C-arm): An imaging component which converts x-rays into a visible image. C-arm is commonly used for studies requiring the maximum positional flexibility such as: Angiography studies, Therapeutic studies, Cardiac studies (PTCA), Orthopedic procedures - generally using a portable C-arm maximum flexibility in positional use.

CALCIFICATION: Deposits of mineral calcium are present in tissue; can happen in chronic total occlusions that have been forming over long periods of time.

CANNULATE: To insert a tube (intubate), such as a catheter into an artery.



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CAPILLARIES: Smallest blood vessel; site for exchange of nutrients and metabolic end products between the blood and cells of body tissues.

CARDIAC: Pertaining to the heart.

CARDIAC ARREST: Cessation of ventricular activity; lack of heartbeat or peripheral pulse.

CARDIAC CATHETERIZATION: Examination of the heart by means of a thin catheter inserted into a vein or artery.

CARDIAC CYCLE: Rhythmic cycles of contraction and relaxation of the heart chambers.

CARDIAC OUTPUT (CO): The volume of blood being pumped by the heart, in particular by a left or right ventricle in the time interval of one minute. CO may be measured in many ways, for example dm^3/min (1 dm^3 equals 1 litre). Q is furthermore the combined sum of output from the right ventricle and the output from the left ventricle during the phase of systole of the heart. An average resting cardiac output would be 5.6 L/min for a human male and 4.9 L/min for a female.

CARDIAC RUPTURE: Perforation of the myocardium; almost always fatal.

CARDIAC RHYTHM MANAGEMENT (CRM): Any of a group of conditions in which the electrical activity of the heart is irregular or is faster or slower than normal. Cardiac rhythm management depends firstly on whether or not the affected person is stable or unstable. Treatments may include physical maneuvers, medications, electricity conversion, or electro or cryo cautery.

CARDIOGENIC SHOCK: Progressive deterioration of cardiac function characterized by an increase in ventricular filling and a significant decrease in blood pressure.

CARDIOMYOPATHY: The measurable deterioration of the function of the myocardium (the heart muscle) for any reason, usually leading to heart failure; common symptoms are dyspnea (breathlessness) and peripheral edema (swelling of the legs).

CARDIOVASCULAR: Refers to the heart and blood vessels, seen as a total system.

CATHETER: Tubular structure intended for insertion into a blood vessel, duct, or passage.

CAUDAL: A projection angle of fluoroscopy when the view is tipped towards the patient's feet (Opposite: Cranial).

CEREBROVASCULAR ACCIDENT (CVA): Cerebral cell death usually due to ischemia or a result of cerebral embolism.



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CHRONIC: Long duration.

CHRONIC OBSTRUCTIVE AIRWAY DISEASE (COAD) Also known as Chronic Obstructive Pulmonary Disease (COPD): is the occurrence of chronic bronchitis or emphysema, a pair of commonly co-existing diseases of the lungs in which the airways narrow over time. This limits airflow to and from the lungs, causing shortness of breath (dyspnea).

CHRONIC TOTAL OCCLUSION (CTO): A complete blockage of a vessel.

CLOT: Fibrous network produced as the end product of blood coagulation; consists primarily of fibrin, an insoluble protein.

COAGULATION: Process whereby blood thickens to solid state, as in formation of a clot.

COLLATERAL VESSELS: Vessels that develop as alternate routes for perfusion of myocardial tissue in ischemic environments.

COLLATERAL CIRCULATION: Adaptation of smaller vessels to handle increased blood passage when major vessels are restricted.

COLLATERAL FLOW: An area of muscle fed by more than one artery so occlusion of one does not cause injury.

COMMON FEMORAL ARTERY (CFA): A large artery in the thigh. It is a continuation of the external iliac artery and begins at the inguinal ligament.

CT ANGIOGRAPHY (CTA): A computerized tomography (CT) coronary angiogram is an imaging test to look at the arteries that supply your heart muscle with blood. Unlike a traditional coronary angiogram, CT angiograms don't use a catheter threaded through your blood vessels to your heart. Instead, a coronary CT angiogram relies on a powerful X-ray machine to produce images of your heart and heart vessels.

CONCENTRIC: Blockage or treatment that is equal in all directions from a center point.

CONDUCTIVITY: The ability of heart tissue to propagate electrical activity.

CONGESTIVE HEART FAILURE (CHF): A type of heart failure that occurs as a result of impaired pumping, causing blood to back up and accumulate in the venous system or lungs.

CONTRACTILITY: The ability of a muscle to contract, or the extent to which the muscle contracts.

CORONARY ARTERIES: The blood vessels that surround the heart like a crown and are responsible for maintaining adequate blood flow to myocardium.



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CORONARY ARTERY BYPASS GRAFT (CABG): An invasive medical procedure in which a section of an artery from another portion of the body is used to bypass a blockage in a coronary artery to improve blood flow to the heart.

CORONARY ARTERY DISEASE (CAD): Progressive occlusion of coronary arteries; also known as ischemic heart disease.

CORONARY ARTERY SPASM: The abnormal contraction of one or several segments of a coronary artery; it may be brief or prolonged.

CORONARY FLOW RESERVE (CFR): The maximum increase in blood flow through the coronary arteries above the normal resting volume. The measurement is often used in medicine to assist in the treatment of conditions affecting the coronary arteries and to determine the efficacy of treatments used.

CORONARY SINUS: Located in the posterior portion of the right atrium, and anterior coronary veins. The route by which most venous blood is returned from coronary capillaries to the right atrium.

COUMADIN: An oral anticoagulant used to treat/prevent thrombus in patients with atrial fibrillation, venous thrombosis, MI. May still be used in some institutions for anticoagulation therapy post stenting.

CRANIAL VIEW: A projection angle of fluoroscopy when the view is tipped towards the patient's head (Opposite: Caudal).

CROSS SECTIONAL AREA (CSA): The area of the cross section of an object perpendicular to its longitudinal dimension generally at its largest point.

DE NOVO LESION: A blockage that has never been treated before by any invasive or less invasive procedures.

DEPOLARIZATION: A positive-going change in a cell's membrane potential, making it more positive or less negative.

DIAGNOSTIC CATHETER: Hollow tubes that are inserted into the patient's cardiovascular system and advanced to a target location using fluoroscopy to monitor progress. Radiopaque dye is injected to diagnose blockages and cardiac function.

DIAGONAL BRANCH: Artery branches of the LAD (left anterior descending artery); feeds the left lateral free wall; number and size of diagonal branches varies between patients.

DIASTOLE: The relaxation or period of relaxation of the heart, especially of the ventricles. Opposite: Systole.

DIASTOLIC BLOOD PRESSURE: The minimum arterial blood pressure measurable during relaxation of the ventricles (diastole).



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DILATED AORTIC ROOT: Proximal portion of the ascending aorta that has a larger diameter than normal.

DIRECTIONAL CORONARY ATHERECTOMY (DCA): Directional (ability exists to steer treatment towards a selected wall side of occlusion) coronary (heart) atherectomy (removal of tissue from artery lumen); refers to using Simpson Atherocath to cut occluding tissue from artery segment to attain a larger lumen, smooth inner surface and better blood flow.

DISSECTION: A longitudinal splitting of the arterial wall between layers; angioplasty causes “controlled” dissection which optimally leads to appropriate healing response and maintained lumen; “uncontrolled” dissection can lead to a false lumen, flaps, and/or total occlusion.

DISTAL: Farthest away from the sight of origin (Opposite: Proximal).

DRUG ELUTING STENT (DES): A peripheral or coronary stent (a scaffold) placed into narrowed, diseased peripheral or coronary arteries that slowly release a drug to block cell proliferation.

DYE: Fluid that can be injected into patient’s arteries that can be radiopaque (does not allow x -rays to penetrate) and therefore creates a shadow of the internal lumen of the artery.

DYSPNEA: The sensation of shortness of breath.

EAGLE EYE PLATINUM (EEP): A phased array IVUS Catheter designed for use in the evaluation of vascular morphology in blood vessels of the coronary and peripheral vasculature by providing a crosssectional image of such vessels and also designed for use as an adjunct to conventional angiographic procedures to provide an image of the vessel lumen and wall structures. Soft, tapered tip with very low entry profile, Smooth, almost transition less scanner edges, Fits through all 5F guides, Lubricious GlyDx™ hydrophilic coating, Significantly less force to cross and pull back through a simulated lesion.

EAGLE EYE PLATINUM SHORT TIP (EEP ST): A phased array IVUS Catheter designed for use in the evaluation of vascular morphology in blood vessels of the coronary and peripheral vasculature by providing a cross-sectional image of such vessels and also designed for use as an adjunct to conventional angiographic procedures to provide an image of the vessel lumen and wall structures. The Short Tip has a 2.5 mm tip-to-imaging distance, with Plug-and-Play Simplicity, Radiopaque Markers, GlyDx® Hydrophilic Coating, Radial Access-Appropriate: Fits through all 5F Guides, Coronary and Peripheral indications.

ECCENTRIC: Blockage or treatment that is not equal in all directions from a center point.

ECHOCARDIOGRAM (ECHO): A sonogram of the heart.

EDEMA: The accumulation of fluid in peripheral tissues or in the lungs.



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EJECTION FRACTION (EF): A ratio that is calculated by comparing the volume of blood in the left ventricle at full relaxation and at full contraction; shows efficiency of pumping action. In a healthy 70kilogram (150 lb) man, the SV is approximately 70 mL and the left ventricular EDV is 120 mL, giving an ejection fraction of $70/120$, or 0.58 (58%).

ELASTIC RECOIL: The difference between inflated balloon diameter and minimal lumen diameter upon balloon deflation. The degree of elastic recoil depends on plastic changes in the atherosclerotic plaque and elastic characteristics of the arterial wall.

ELECTROCARDIOGRAM (ECG or EKG): A graphic tracing of the variations in electrical potential caused by the excitation of the heart muscle and detected at the body surface.

EMBOLUS: Air, debris, clot, etc. carried by the blood from one vessel and forced into another, smaller vessel potentially causing ischemic damage.

ENDOTHELIZATION: Proliferation of the endothelium (cells that line the blood and lymphatic vessels, the heart and various other body cavities).

ENZYMES: Proteins that facilitate numerous metabolic reactions.

EPICARDIUM: The outermost layer of the heart.

EPINEPHRINE: A neurotransmitter secreted by the adrenal gland in response to stimulation by acetylcholine; induces increased heart rate and increased cardiac contractility.

EXERTIONAL ANGINA: Symptom of ischemic heart disease characterized by strangling tightness or pressure in the chest occurring after exertion.

FIBRILLATION: Extremely fast, chaotic heart contraction, also described as quivering; a life-threatening arrhythmia.

FIBROMUSCULAR DYSPLASIA (FD): A condition that causes narrowing (stenosis) and enlargement (aneurysm) of the medium-sized arteries in your body. The areas of narrowing and bulging occur next to each other and can cause the artery to narrow so much that organs that receive blood from the artery are damaged.

FLUOROSCOPY: X-ray equipment used in catheterization lab to visualize body parts that are either radiopaque intrinsically (bones) or can accommodate fluid that is radiopaque (arteries, ventricles); can be used for diagnosis and for treatment with equipment that have radiopaque markers. Common procedures using fluoroscopy include angiography of the leg, heart and cerebral vessels.

FOCAL ACOUSTIC COMPUTED TOMOGRAPHY (FACT): The FACT Program is an IVUS catheter and system utilizing a PMUT (Piezoelectric Micro machined Ultrasound Technology) transducer for capture of the IVUS



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images and comprises of the following components: Software – SW v.4.0, System – CORE Mobile, Disposable – Zuum Catheter, PIM – FACT PIM for the Zuum Catheter, Imaging Board –PACE (ACE board for Zuum catheter only) imaging card specific to the FACT technology. FACT technology provides axial resolution sub 50 microns with depth of penetration similar to current IVUS technology. This level of visualization is designed to allow clinicians greater clarity in plaque identification when utilizing IVUS imaging.

FOOD AND DRUG ADMINISTRATION (FDA): An agency of the United States Department of Health and Human Services, one of the United States federal executive departments. The FDA is responsible for protecting and promoting public health through the regulation and supervision of food safety, tobacco products, dietary supplements, prescription and over-the-counter pharmaceutical drugs (medications), vaccines, biopharmaceuticals, blood transfusions, medical devices, electromagnetic radiation emitting devices (ERED), and veterinary products.

FORESHORTENING: Stent shortening that occurs when the stent is expanded.

FRACTIONAL FLOW RESERVE (FFR): A technique used in coronary catheterization to measure pressure differences across a coronary artery stenosis (narrowing, usually due to atherosclerosis) to determine the likelihood that the stenosis impedes oxygen delivery to the heart muscle (myocardial ischemia). For FFR measurement, hyperemia is pharmacologically induced, typically using the potent vasodilator adenosine or, less frequently, papaverine, to achieve this state of constant and minimal coronary resistance.

FUNCTIONAL MEASUREMENT (FM): Functional Management (FM) is a guide wire based technology that analyzes pressure and flow parameters from inside of the vessel. These wires produce a simple, reproducible measurement, and are used in conjunction with angiography. The measurement provides physicians with specific clinical guidance to aid appropriate treatment.

FUNCTIONAL PERCUTANEOUS CORONARY INTERVENTION (FPCI): A non-surgical procedure used to treat the stenotic (narrowed) coronary arteries of the heart found in coronary heart disease. These stenotic segments are due to the buildup of the cholesterol-laden plaques that form due to atherosclerosis. PCI is usually performed by an interventional cardiologist, though was developed and originally performed by interventional radiologists.

GUIDING CATHETERS: Large lumen tubular devices that are used to engage the coronary artery from an access point. The interventional catheter (balloon, DCA, laser, etc.) is then passed through the lumen and into the coronary artery and can also be used in periphery.

HEART RATE (HR): The number of heart beats or strokes per minute.

HEMODYNAMIC: Pertaining to the movements involved in the circulation of the blood.



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HEMODYNAMIC STENOSIS RESISTANCE (HSR): The mean pressure gradient across the valve divided by mean flow rate during systolic ejection, gives a better indication of hemodynamic obstruction.

HEMORRHAGE: Bleeding.

HEMOSTASIS: Complex processes that prevent excessive blood loss from the body; involves blood coagulation and ultimate formation of an insoluble fibrous network called a blood clot.

HEPARIN: An anticoagulant medication given to prevent clot formation; is used during catheterizations to prevent clot formation on equipment used internally.

HEPARIN-INDUCED THROMBOCYTOPENIA (HIT): The development of thrombocytopenia (a low platelet count), due to the administration of various forms of heparin, an anticoagulant. HIT is caused by the formation of abnormal antibodies that activate platelets.

HEALTH CARE PROVIDER (HCP): An individual or an institution that provides preventive, curative, promotional, or rehabilitative health care services in a systematic way to individuals, families or communities.

HEALTH INFORMATION PRIVACY PRACTICE ACT (HIPAA): The purpose of HIPAA is to legally protect a person's personal health information. The rule regulates how health care providers or other entities that have that information can give it to other people or entities.

HEMODYNAMIC STENOSIS RESISTANCE (HSR): As the mean pressure gradient across the valve divided by mean flow rate during systolic ejection.

HYPER: A prefix signifying above, beyond or excessive.

HYPEREMIC AGENT: A pharmacological compound, like adenosine or papaverine that induces hyperemia.

HYPEREMIA: The increase of blood flow to different tissues in the body. It is a physiology response, allowing change in blood supply to different tissues through vasodilation.

HYPERLIPIDEMIA: Involves abnormally elevated levels of any or all lipids and/or lipoproteins in the blood. It is the most common form of dyslipidemia (which includes any abnormal lipid levels).

HYPERTENSION: Sustained, elevated blood pressure.

HYPPO: A prefix signifying below or insufficient.

HYPOXIA: Insufficient oxygen delivery to tissues cf. anoxia total absence of oxygen delivery.



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iFR® Modality (instant wave-Free Ratio™): A technique for assessing a gradient across a lesion. It is similar to FFR (Fractional Flow Reserve) in that it consists of a ratio of pressure readings recorded distal and proximal to a lesion. As with FFR, in iFR the distal pressure readings (Pd) are obtained from a pressure measurement guide wire and the proximal (or aortic) pressure readings (Pa) are obtained from a transducer attached to the guide catheter. FFR is calculated over the entire cardiac cycle under hyperemia, typically induced by administering adenosine. iFR is calculated over a diastolic portion of the cardiac cycle when flow is naturally maximized, without inducing hyperemia.

IMAGE GUIDED THERAPY (IGT): Image Guided Therapy (IGT) techniques help improve therapeutic outcomes. By providing precise ways to "visualize" intra-procedural anatomical changes in real time, IGT helps clarify understanding of the patients' anatomy and enables minimally invasive procedures to be performed inside solid organs.

INFARCT: Area of heart muscle that was starved for blood (and nutrients it carries) and permanent damage has occurred; muscle tissue has turned into scar tissue.

INFARCTION: Cell death due to insufficient oxygen supply relative to demand.

INFERIOR: Relational term meaning below a reference point (Opposite: Superior).

INSTANT WAVE-FREE RATIO (iFR): The goal of iFR® Functionality is to provide a functional, lesion-specific assessment in seconds, without injecting a vasodilator drug to induce stress on the heart.

INTRA-ARTERIAL (IA): Within arteries or an artery.

INTRAVENOUS (IV): Within or administered into a vein.

INSTRUCTIONS FOR USE (IFU): A manual usually accompanying a technical device and explaining how to install or operate it.

INTERVENTION: Any measure whose purpose is to improve health or alter the course of disease.

INTERVENTIONAL CARDIOLOGY: A branch of cardiology that deals specifically with the catheter based treatment of structural heart diseases.

INTERVENTIONAL PROCEDURE: Procedure that involves treatment of disease in addition to diagnosis.

INTIMAL PROLIFERATION / INTIMAL THICKENING: Generalized response to vessel injury caused by PTCA and other devices. Activation of the coagulation cascade and inflammatory cells results in the production of chemotactic and growth factors, which lead to thrombus formation, intimal hyperplasia and accumulation of connective tissue matrix.



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INTIMA: Inner layer of a blood vessel wall.

INTRALUMINAL: Within the lumen of any tubular structure or organ.

INTRAVASCULAR IMAGING (IVI): A medical imaging methodology using a specially designed catheter with a miniaturized ultrasound probe attached to the distal end of the catheter.

INTRAVASCULAR ULTRASOUND (IVUS): A medical imaging methodology using a specially designed catheter with a miniaturized ultrasound probe attached to the distal end of the catheter.

ISCHEMIA: Oxygen-deprived condition. Heart muscle is starved for blood but if flow resumes, no permanent damage occurs.

LATE LOSS: synonymous with restenosis, and literally means loss of the lumen *after* a procedure intended to open the vessel. It measures either the percent (relative) or absolute change in minimum luminal diameter (MLD) over the months following a vascular procedure, such as the implantation of a stent-graft.

LATERAL: Relational term meaning to the side (either right or left) of a reference point (Opposite: Medial).

LEFT ANTERIOR DESCENDING (LAD): Left anterior descending artery; one of two major arteries in the left coronary artery system; LAD and its branches feed the left ventricle anterior wall, septum, left lateral free wall, and apex.

LEFT ANTERIOR OBLIQUE (LAO): A view of the chest showing the left lung field.

LEFT ATRIAL APPENDAGE (LAA): A muscular pouch connected to the left atrium of the heart.

LEFT CIRCUMFLEX ARTERY (LCX): A branch of the left main coronary artery.

LEFT MAIN CORONARY ARTERY (LM): The major coronary artery; it branches to supply the left side of the heart.

LEFT VENTRICULAR END DIASTOLIC PRESSURE (LVEDP): Measurement of preload.

LESION: A blockage in an artery (lesion = occlusion = blockage = stenosis = narrowing = plaque).

LESION MORPHOLOGY: Characteristics that classify the blockage as to size, length, severity, location, etc. (lesion = occlusion, = blockage = stenosis = narrowing = plaque).

LUMEN: The inside diameter of any conduit.



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MAJOR ADVERSE CARDIAC AND CEREBRAL EVENT (MACE/MACCE): A term used to describe the events that are monitored very closely post stent procedures which includes: death, Q/non Q wave MI, revascularization (i.e. CABG/PTCA).

MANIFOLD: Series of stopcocks that allow the medical staff to monitor blood pressure, inject contrast, inject heparinized saline and pull blood samples from one port on a catheter.

MEDIA: Middle layer of a blood vessel wall.

MEDIAL: Describe a position that is closer to the midline of the body (Opposite: Lateral).

MEDIASTINUM: Bony/cartilaginous space in the center of the chest between the lungs, starting at the lower margin of the throat and extending to the diaphragm.

MILLIMETERS OF MERCURY (mmHg): Unit of measurement for blood pressure by a mercury-filled gauge. (Example: bp)

MINIMALLY INVASIVE PROCEDURE: Treatment of disease that requires a hole in the patient's skin to access an artery but no surgery (PTCA, DCA, any treatment that used guiding catheters).

MORBIDITY: Pertaining to, affected with or inducing disease.

MORTALITY: Pertaining to, affected with or inducing death.

MULTIVESSEL DISEASE (MVD): Coronary artery disease involving two or more coronary arteries.

MURAL THROMBOSIS: The development of a clot on the wall of the ventricle; occurs frequently at the site of infarction.

MYOCARDIAL INFARCTION (MI): Death of cardiac tissue related to prolonged oxygen deprivation; often called "heart attack".

MYOCARDIAL INJURY: Inadequate blood flow to area of heart muscle but not as severe as ischemia; no permanent damage.

MYOCARDIUM: The muscular layer of the heart.

NECROSIS: Cell death.

NECROTIC CORE (NC): An area consisting of lipids, dead cells and calcification.



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NEOINTIMAL HYPERPLASIA: Manifestation of “healing” after vessel injury, characterized by proliferation of modified vascular smooth muscle cells. Common after all devices. Laser balloon angioplasty (thermal injury) and possibly DCA may lead to greater intimal hyperplasia than other devices.

NITROGLYCERIN: “Nitro”; medication that dilates arteries especially the coronary arteries and therefore increase blood flow; used in treatment of angina pectoris.

NON-INVASIVE PROCEDURE: Treatment of disease that requires no opening of the body (medication).

NON-Q- WAVE MYOCARDIAL INFARCTION (NQMI): A heart attack that does not cause changes known as “Q-waves” on the electrocardiogram (ECG).

NO RE-FLOW: Defined angiographically, no-re-flow manifests as an acute reduction in coronary flow (TIMI grade 0-1) in the absence of dissection, thrombus, spasm or high-grade residual stenosis at the original target lesion.

NON ST ELEVATION MYOCARDIAL INFARCTION (NSTEMI): A type of heart attack, which is defined as the development of heart muscle necrosis results from an acute interruption of blood supply to a part of the heart muscle that is demonstrated by an elevation of cardiac markers (CK-MB or Troponin) in the blood and the absence of persistent ST-segment elevation in electrocardiography.

O₂: Chemical symbol for oxygen.

OCCCLUSION: A blockage or obstruction; for example, of an artery.

OPTICAL COHERENCE TOMOGRAPHY (OCT): An optical signal acquisition and processing method. It captures micrometer-resolution, three-dimensional images from within optical scattering media (e.g., biological tissue).

OVERLAPPING VESSELS: On fluoroscopy, vessels filled with radiopaque fluid will appear in two dimensions to overlap but actually don’t in three dimensions; to diagnose a blockage, there must not be any overlapping vessel near the lesion site to obscure the view.

OVER THE WIRE (OTW): A type of “soft” catheter with an inflatable “balloon” at its tip which is used during a catheterization procedure to enlarge a narrow opening or passage within the body. The deflated balloon catheter is positioned, then inflated to perform the necessary procedure, and deflated again in order to be removed. Balloon catheters used in angioplasty are either of Over-the-Wire (OTW) or Rapid Exchange (Rx) design.

P WAVE: One of the waves on an EKG tracing signifying the depolarization of the ventricles; the muscle cells are stimulated to contract.



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PACING: The rate of the heart rhythm is controlled by the internal pacemaker of the heart, usually the sinoatrial node. Wire can be placed into the right ventricular wall and external stimulus applied to cause rhythmic heart contractions (external pacing).

PATENCY: The state or quality of being open, expanded, or unblocked.

PERCENT DIAMETER STENOSIS (%DS): Percent diameter restenosis (or just percent diameter stenosis) is a measure observed in individual patients and is typically calculated as the difference between the minimal (or minimum) luminal diameter (MLD) from the target reference vessel diameter (RVD), divided by the RVD, and multiplied by 100 to get the percentage of stenosis.

PERCUTANEOUS: Effected through the skin. Example: introduction of an endocardial lead through a small puncture in the skin and into a vein.

PERCUTANEOUS CORONARY INTERVENTION (PCI): Commonly known as coronary angioplasty or simply angioplasty, is a non-surgical procedure used to treat the stenotic (narrowed) coronary arteries of the heart found in coronary heart disease.

PERCUTANEOUS TRANSLUMINAL CORONARY ANGIOPLASTY (PTCA): Percutaneous performed through the skin as opposed to open surgery), transluminal (applying the treatment from within the lumen of the artery), coronary (heart), angioplasty (remodeling of the artery lumen); refers to using balloon catheter to apply pressure to occlusion to attain a larger lumen and better blood flow.

PERFUSION: Continual and constant circulation of blood through tissues.

PERICARDIUM: The sac-like membrane surrounding the heart.

PLAIN OLD BALLOON ANGIOPLASTY (POBA): Where the lumen stenosis of an artery has been treated by balloon dilatation only, without applying a stent.

PLATELETS: Cell fragments in blood that play integral roles in blood clotting; sometimes call thrombocytes.

POST LUMINAL DIAMETER: Cross section measurement of artery inner lumen after a procedure has been done to open a blockage.

POSTERIOR: Relational term meaning behind a reference point (Opposite: Anterior).

POSTERIOR DESCENDING ARTERY (PDA): Branch of artery that feeds the posterior wall of the left ventricle; can originate from distal Left Circumflex Artery or Right Coronary Artery depending on whether the patient is left or right dependent, respectively (NOTE: in newborns, PDA is Patent Ductus Arteriosus which is a congenital abnormality).



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POSTERIOR DESCENDING BRANCH: A branch off the right coronary artery.

PROFILE: As used in interventional cardiology, the smallest diameter an interventional device can attain, therefore the smallest diameter lumen it can cross.

PROTECTED LEFT MAIN: The patient has had previous bypass surgery so there is another source of arterial blood to the left coronary system besides the left main coronary artery.

PROVISIONAL STENTING: Stenting that is performed after another modality has failed or did not result in optimal result.

PROXIMAL: Nearest the site of origin (Opposite: Distal).

PROXIMAL, MID, DISTAL: Relational terms that mean closer to (proximal), or further away from (distal) a reference point or somewhere in between (mid); in coronary arteries, reference point is origin of the artery.

Q WAVE: One of the waves on an EKG tracing signifying the depolarization of the ventricles; the muscle cells are stimulated to contract.

Q-WAVE M.I. (QMI): Myocardial infarction of increased severity; on the EKG tracing, the Q-wave is 2/3rd or greater the height of the R-wave.

QRS COMPLEX: That portion of an EKG which represents ventricular depolarization.

QUANTITATIVE CORONARY ANGIOGRAPHY (QCA): A procedure that determines the degree of blockage in arteries.

R100™ Pullback Device: This device is intended to be used with the Volcano family of digital intravascular imaging catheters to provide steady and precise withdrawal of the imaging catheter from the artery through the guide catheter. This device is capable of pullback lengths up to 13 cm.

R WAVE: One of the waves on an EKG tracing signifying the depolarization of the ventricles; the muscle cells are stimulated to contract.

RADIOPAQUE: Does not allow x-rays to penetrate.

RAPID EXCHANGE CATHETER (RX): a type of "soft" catheter with an inflatable "balloon" at its tip which is used during a catheterization procedure to enlarge a narrow opening or passage within the body. The deflated balloon catheter is positioned, then inflated to perform the necessary procedure, and deflated again in order to be removed. Balloon catheters used in angioplasty are either of Over-the- Wire(OTW) or Rapid Exchange(Rx) design.



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RECOIL (%): Used in reference to elastic recoil of a vessel. The amount of spring back a vessel experiences after it has been expanded post procedure.

REFERENCE DIAMETER: The diameter of the vessel being treated for PTCA/stent. Measurement may be proximal reference or distal reference diameter.

RENAL: Relating to or involving the kidneys.

RENAL ARTERY (RA): Carry a large portion of total blood flow to the kidneys. Up to a third of total cardiac output can pass through the renal arteries to be filtered by the kidneys.

RENAL ARTERY STENOSIS (RAS): The narrowing of the renal artery, most often caused by atherosclerosis or fibromuscular dysplasia. This narrowing of the renal artery can impede blood flow to the target kidney.

REPERFUSION: Restoration of blood flow to ischemic myocardium.

RESIDUAL STENOSIS: Stenosis that remains in the artery immediately after the interventional procedure (angioplasty, DCA, etc.) is performed.

RESTENOSIS: The recurrence of stenosis, a narrowing of a blood vessel, leading to restricted blood flow.

RETROGRADE FLOW: Backward filling.

Revolution® 45 MHZ Catheter – Intended for the intravascular ultrasound examination of coronary arteries. Intravascular ultrasound imaging is indicated in patients who are candidates for transluminal interventional procedures and designed for use as an adjunct to conventional angiographic procedures to provide an image of the vessel lumen and wall structures.

RIGHT ANTERIOR OBLIQUE (RAO): A view of the chest showing the right lung field.

RIGHT CORONARY ARTERY (RCA): The major coronary artery that supplies the right side of the heart.

S WAVE: One of the waves on an EKG tracing signifying the depolarization of the ventricles; the muscle cells are stimulated to contract.

SAPHENOUS VEIN: Also called great saphenous vein (GSV) and the long saphenous vein, is a large, subcutaneous, superficial vein of the leg. It is the longest vein in the body running along the length of the leg.

SEPTAL: Referring to the septum, which divides the two ventricles.

SEPTUM: The dividing wall between the chambers of the heart.



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SIDE BRANCH: Arteries that originate from larger arteries as all but the aorta do.

SpinVision® Pullback Device: The Volcano-Revo option kit is a required accessory to the Volcano system when using the Revolution® 45MHz Rotational Imaging Catheter for intravascular ultrasound imaging. This option consists of a Patient Interface Module (PIM) called SpinVision, (PIMr) which can be simply connected to the existing Volcano system PIM cable. SpinVision (PIMr) excites the catheter's transducer element to transmit ultrasonic energy to the surrounding tissue. It then amplifies and processes the resulting echo signals from the transducer and sends them to the system through the connection on the system's rear panel.

ST ELEVATION MYOCARDIAL INFARCTION (STEMI): The medical term for an event commonly known as a heart attack. It happens when blood stops flowing properly to part of the heart and the heart muscle is injured due to not receiving enough oxygen. Usually this is because one of the coronary arteries that supplies blood to the heart develops a blockage due to an unstable buildup of white blood cells, cholesterol and fat. The event is called "acute" if it is sudden and serious.

ST SEGMENT: On an EKG, an interval which begins at end of S-wave and ends at beginning of T-wave.

ST SEGMENT ELEVATION: The portion of the EKG tracing between the S wave and T wave does not return to baseline (normal) but instead is above baseline, indicating inadequate blood flow to heart muscle.

STENOSIS: An abnormal narrowing in a blood vessel or other tubular organ or structure.

STENOTIC LESION: An abnormal narrowing in the tissue of an organism, usually caused by disease or trauma.

STENT: A mesh 'tube' inserted into a natural passage/conduit in the body to prevent or counteract a disease-induced, localized flow constriction. The term may also refer to a tube used to temporarily hold such a natural conduit open to allow access for surgery.

STENT THROMBOSIS (ST): Stent thrombosis is a condition that occurs when a blood clot forms on the surface of a stent, raising the risk of blood flow in an artery being reduced or cut off.

SUB-ACUTE: Between acute and chronic, but with some acute features. After the patient is discharged from the cath lab but within the first 24 hours (used in reference to stent thrombosis).

SUDDEN DEATH: Abrupt, unexpected death usually due to catastrophic arrhythmia.

SUPERFICIAL: Describe structures that are closer to the surface of the body (Opposite: Deep).

SYNCOPE: A brief period of unconsciousness caused by an insufficient supply of blood to the brain. Dizziness.

SYSTOLE: The phase in the cardiac cycle in which the myocardium contracts and ejects blood.



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SYSTOLIC BLOOD PRESSURE: The maximum arterial blood pressure measured during ventricular contraction (systole).

T WAVE: One of the waves on an EKG tracing signifying the repolarization of the ventricles (the cells are readied for firing when the next stimulus comes).

“TAKE OFF”: The ostium of an artery; the place where it branches from the larger artery.

TACHYCARDIA: Quick, rapid heart rate, usually considered tachycardia if over 100bpm.

TANDEM LESIONS: Two stenotic areas in the same artery where the segment between is undiseased.

TARGET LESION REVASCULARIZATION (TLR): “Clinically-driven” (recurrent symptoms and a positive stress test) revascularization of the original target lesion. Repeat revascularization of a residual stenosis greater than 50% in the absence of objective evidence of ischemia is not considered restenosis by clinical criteria.

TARGET VESSEL REVASCULARIZATION (TVR): Revascularization needed when a patient experiences a recurrence of symptoms and the lesion is somewhere along the length of the previous vessel treated.

THORACIC AORTA: Artery and branches which supply the structures in the thoracic cavity with blood.

THROMBOSIS: The formation of a blood clot.

THROMBUS: Aggregation of plasma components (platelets and fibrin) that occludes a vessel at the site of its formation.

TIMI SCALE: Assesses the risk of death and ischemic events in patients experiencing unstable angina or a non-ST elevation myocardial infarction.

TORTUOSITY: Full of twists and turns; may be a characteristic vasculature.

TOTAL OCCLUSIONS: Blockages in arteries that will allow no blood flow to pass.

TRANSIENT ISCHEMIC ATTACK (TIA): Focal brain ischemia that causes sudden neurologic deficits and is not associated with permanent brain infarction.

TRANSMURAL INFARCT: Infarction that extends through the entire thickness of the heart wall.

TRANSESOPHAGEAL ECHOCARDIOGRAPHY (TEE): A test that produces pictures of your heart. TEE uses high-frequency sound waves (ultrasound) to make detailed pictures of your heart and the arteries that lead to and from it.



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UNSTABLE ANGINA: Angina that occurs at rest.

VALVE: Membranous fold in a canal or passage, which prevents the backflow of contents passing through it.

VASCULAR: Relating to the blood vessels.

VASCULAR REMODELING: Vessel shrinkage or expansion post PTCA/stent procedure. Usually one sees vessel shrinkage which also contributes to restenosis.

VASOCONSTRICTION: Narrowing of the blood vessels caused by contraction of the muscles of their walls.

VEIN: A vessel which returns non-oxygenated blood to the heart.

VENOUS HYPERTENSION: Increased venous pressure as a result of venous obstruction and incompetent venous valves.

VENTRICLE: One of the two lower chambers of the heart. Left ventricle pumps oxygenated blood through arteries to the body. Right ventricle pumps unoxygenated blood through the pulmonary artery to the lungs.

VENTRICULAR FIBRILLATION (VF or VFIB): Life-threatening arrhythmia characterized by disorderly spasmodic contraction of the ventricles.

VH (VH® IVUS): VH® IVUS is intended to be used in conjunction with imaging catheters during diagnostic ultrasound imaging of the peripheral and coronary vasculature. The Volcano VH® IVUS system is intended to semi-automatically visualize boundary features and perform spectral analysis of RF ultrasound signals of vascular features that the user may wish to examine more closely during routine diagnostic ultrasound imaging examinations.

WAVEFORM: The shape and form of a signal such as a wave moving in a physical medium or an abstract representation.



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