The SYNTAX Score: an angiographic tool grading the complexity of coronary artery disease

Lesions adverse characteristic scoring

Diameter reduction*
- Total occlusion   x5
- Significant lesion (50-99%)   x2

Total occlusion (TO)
- Age >3months or unknown   +1
- Blunt stump   +1
- Bridging   +1
- First segment visible beyond TO   +1/ per non-visible segment
- Side branch (SB) - Yes, SB <1.5mm**   +1
                - Yes, both SB < & ≥ 1.5mm   +1

Trifurcations
- 1 diseased segment   +3
- 2 diseased segments   +4
- 3 diseased segments   +5
- 4 diseased segments   +6

Bifurcations
- Type A, B, C   +1
- Type D, E, F, G   +2
- Angulation <70°   +1

Aorto ostial stenosis   **+1**
Severe tortuosity   **+2**
Length > 20mm   **+1**
Heavy calcification   **+2**
Thrombus   **+1**
"Diffuse disease"/small vessels   **+1/ per segment number**

* In the SYNTAX algorithm there is no question for % luminal diameter reduction. The lesions are considered as significant (50-99% luminal diameter reduction) or occlusive.
** If all the side branches are 1.5mm in diameter, no points are added since the lesion is considered as a bifurcation and it will be scored as such.

The SYNTAX score algorithm
1. Dominance
2. Number of lesions
3. Segments involved per lesion
Lesion Characteristics
4. Total occlusion
i. Number of segments involved
ii. Age of the total occlusion (>3 months)
iii. Blunt Stump
iv. Bridging collaterals
v. First segment beyond the occlusion visible by antegrade or retrograde filling
vi. Side branch involvement
5. Trifurcation
i. Number of segments diseased
6. Bifurcation
i. Type
ii. Angulation between distal main vessel and side branch <70°
7. Aorto-ostial lesion
8. Severe tortuosity
9. Length >20mm
10. Heavy calcification
11. Thrombus
12. Diffuse disease/small vessels
i. Number of segments with diffuse disease/small vessels

a) An example of a bifurcation lesion with a wide angle (>70 degrees) between the side branch and the distal main vessel. Although technical challenging sometimes, the stent can fully cover both the proximal and distal rims of the side branch ostium.
b) An example of a bifurcation with a steep angle (<70 degrees) between the side branch and the distal main vessel. Side branch stenting might be technically less challenging compared to the previous anatomy but when the stent is placed to cover the distal rim of the ostium the proximal rim will remain uncovered (red line with arrows). If the stent is placed to cover the proximal rim it will protrude into the main vessel distally. mv denotes main vessel, sb denotes side branch.
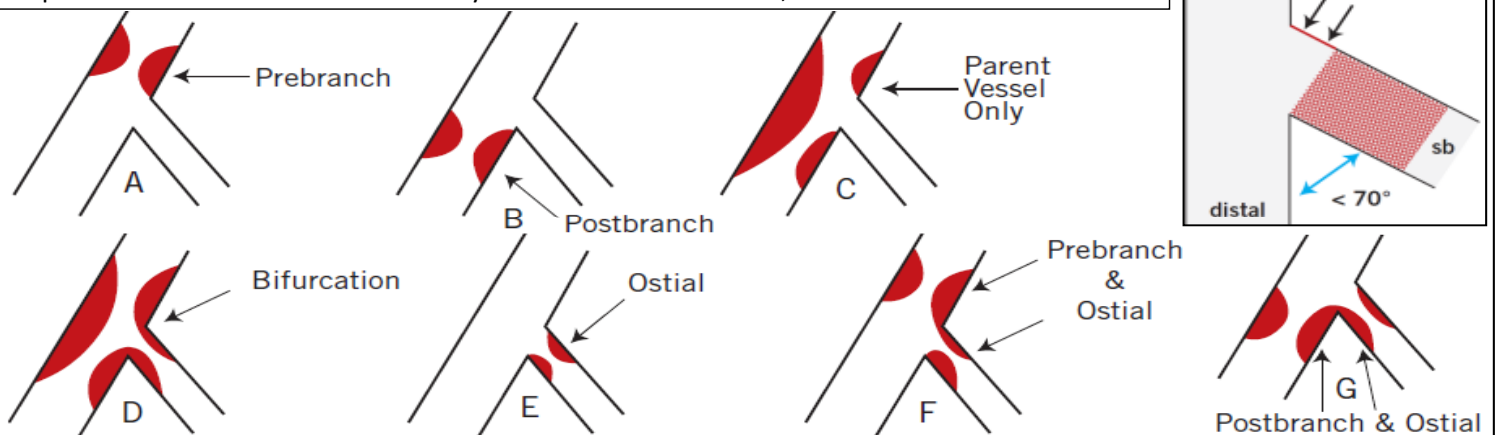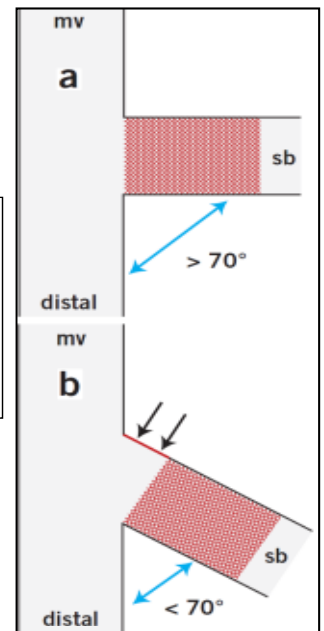
Bifurcation classification (modified from Duke and ICPS classifications systems)
Type A: Pre-branch stenosis not involving the ostium of the side branch.
Type B: Post side branch stenosis of the main vessel not involving the origin of the side branch.
Type C: Stenosis encompassing the side branch but not involving its ostium.
Type D: Stenosis involving the main vessel and ostium of the side branch.
Type E: Stenosis involving only the ostium of the side branch
Type F: Stenosis directly involving the main vessel (pre-side branch) and the ostium of the side branch.
Type G: Stenosis directly involving the main vessel (post-side branch) and the ostium of the side branch.
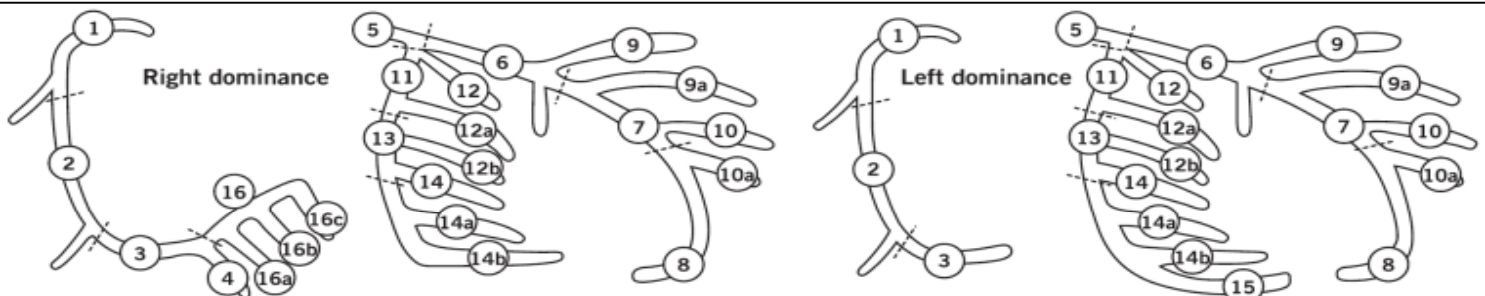
Definition of coronary tree segments & weighing

		Dominance: Right	Left
1.	RCA prox: From ostium to one half distance to acute marginal.	1	0
2.	RCA mid: From end of first segment to acute margin.	1	0
3.	RCA distal: From acute margin to the origin of the PDA.	1	0
4.	PDA: Running in the posterior interventricular groove.	1	n.a.
16.	Posterolateral branch from RCA: Posterolateral branch originating from the distal coronary artery distal to the crux.	0.5	n.a.
16a.	Posterolateral branch from RCA: First posterolateral branch from segment 16.	0.5	n.a.
16b.	Posterolateral branch from RCA: Second posterolateral branch from segment 16.	0.5	n.a.
16c.	Posterolateral branch from RCA: Third posterolateral branch from segment 16.	0.5	n.a.
5.	LM: From LCA ostium through bifurcation into LAD & left Cx branches.	5	6
6.	LAD prox: Proximal to and including first major septal branch.	3.5	3.5
7.	LAD mid: LAD immediately distal to origin of first septal branch and extending to the point where LAD forms an angle (RAO view). If this angle is not identifiable this segment ends at one half the distance from the first septal to the apex of the heart.	2.5	2.5
8.	LAD apical: Terminal portion of LAD, beginning at the end of previous segment and extending to or beyond the apex.	1	1
9.	D1: The first diagonal originating from segment 6 or 7.	1	1
9a.	D1 a: Additional D1 originating from segment 6 or 7, before segment 8.	1	1
10.	D2: Originating from segment 8 or transition between segment 7 & 8.	0.5	0.5
10a.	D2 a: Additional D2 originating from segment 8.	0.5	0.5
11.	Prox Cx: Main stem of Cx from its origin of LM & including OM1 branch.	1.5	2.5
12.	Intermediate/anterolateral artery: Branch from trifurcating left main other than proximal LAD or LCX. It belongs to the circumflex territory.	1	1
12a.	OM a: First side branch of Cx running in general to area of OM.	1	1
12b.	OM b: Second additional branch of Cx running in same direction as 12.	1	1
13.	Distal Cx: The Cx stem distal to origin of most distal OM, running along the posterior left AV groove. Caliber may be small or artery absent.	0.5	1.5
14.	Left posterolateral: Running to the posterolateral surface of LV. May be absent or a division of OM.	0.5	1
14a.	Left posterolateral a: Distal from 14 and running in same direction.	0.5	1
14b.	Left posterolateral b: Distal from 14 & 14a, running in same direction.	0.5	1
15.	Posterior descending: Most distal part of dom left Cx, when present. Gives origin to septal branches. When present, segment 4 is usually absent.	n.a.	1

Total occlusion length assessment

☐ Patent segment

🟥 Occluded segment

🟧 Segment distal from the occlusion filled with collateral flow (visualised by contrast)

a) Total occlusion involving *segments 1 & 2.* Segments 2,3,4,16,16a, 16b,16c are filled by antegrade or retrograde collateral flow (visualised by contrast).

b) Total occlusion involving *segments 1, 2 & 3.* Segments 3,4,16,16a,16b, 16c are filled by antegrade or retrograde collateral flow (visualised by contrast).

c) Total occlusion involving *segments 1, 2, 3, 4, 16 & 16a* Segments 16,16b,16c are visualized by antegrade or retrograde collateral flow (visualised by contrast).

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