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IVUS Imaging Collections

Intravascular Ultrasound

Editor

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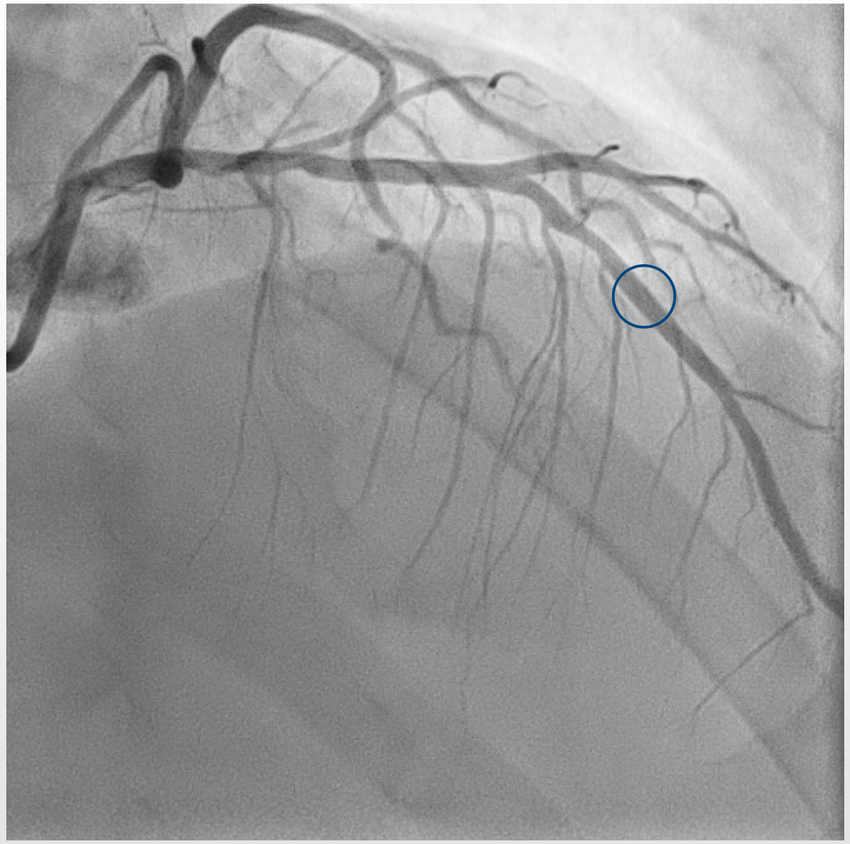
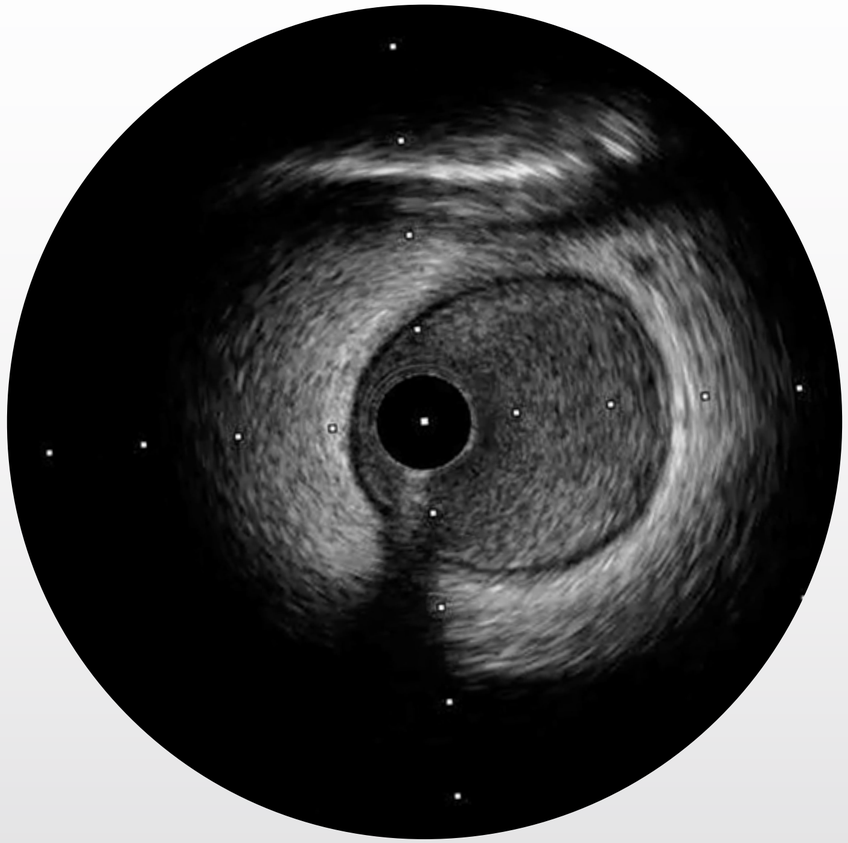
Case List

1 Normal Coronary Artery





TRACE

ON

VIDEO

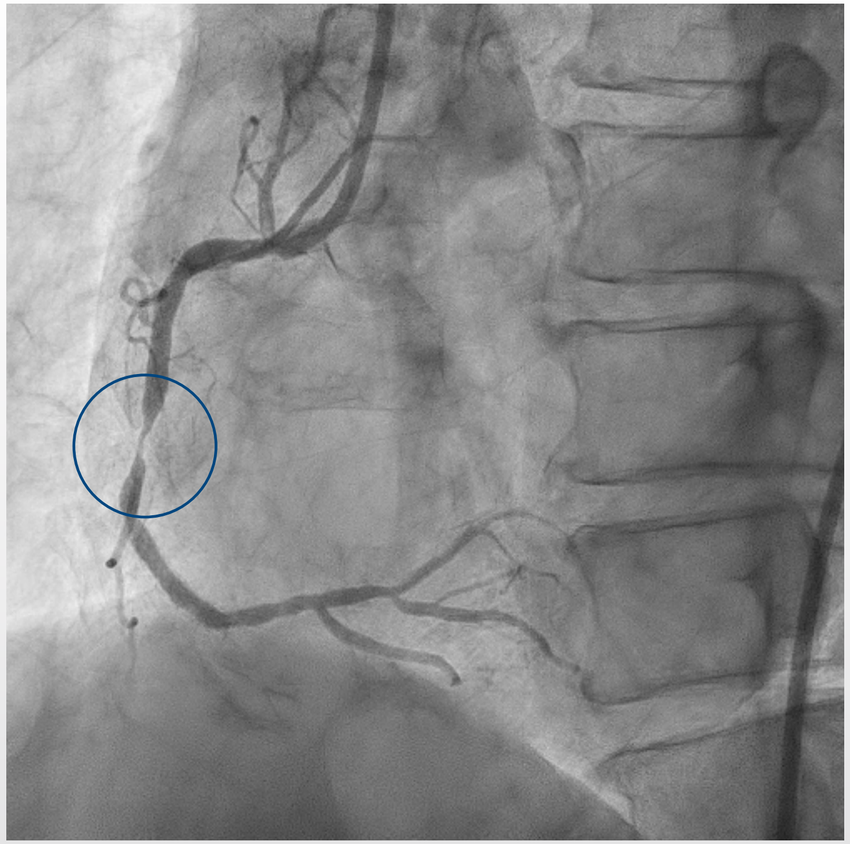
Angio

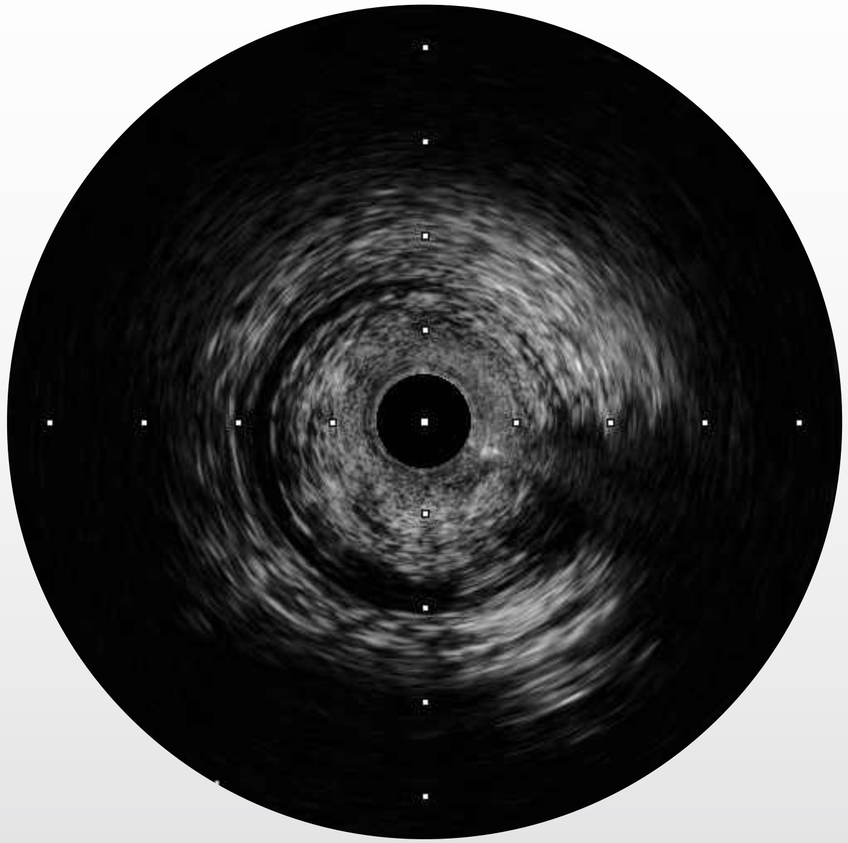
IVUS

An intravascular ultrasound (IVUS) image is a cross-sectional view of a blood vessel, looking from the proximal towards the distal end. Differences in acoustic impedance are represented by echogenic shadows that depict intravascular structures.
The normal coronary artery wall consists of three major layers, from inside the vessel, the intima, the media, and the adventitia. There is a thin layer called internal elastic membrane (IEM) in between the intima and the media, which is depicted as a hyperechoic layer. And there is another thin layer called external elastic membrane (EEM) in between the media and the adventitia, which is also depicted as a hyperechoic layer. The intima is the most inner layer of the vessel wall. It is dense and appears as a white layer between the media and lumen. The media is rendered as a hypoechoic and about 0.1 mm wide band surrounding the IEM. The adventitia and the surrounding tissue are depicted as a continuous hyperechoic region.
This IVUS image is rotated, and the epicardium is positioned at 12 o'clock. The hyperechoic region at 6 o'clock and subsequent shadow are guidewire artifacts.

Case List

2 Fibrous Plaque





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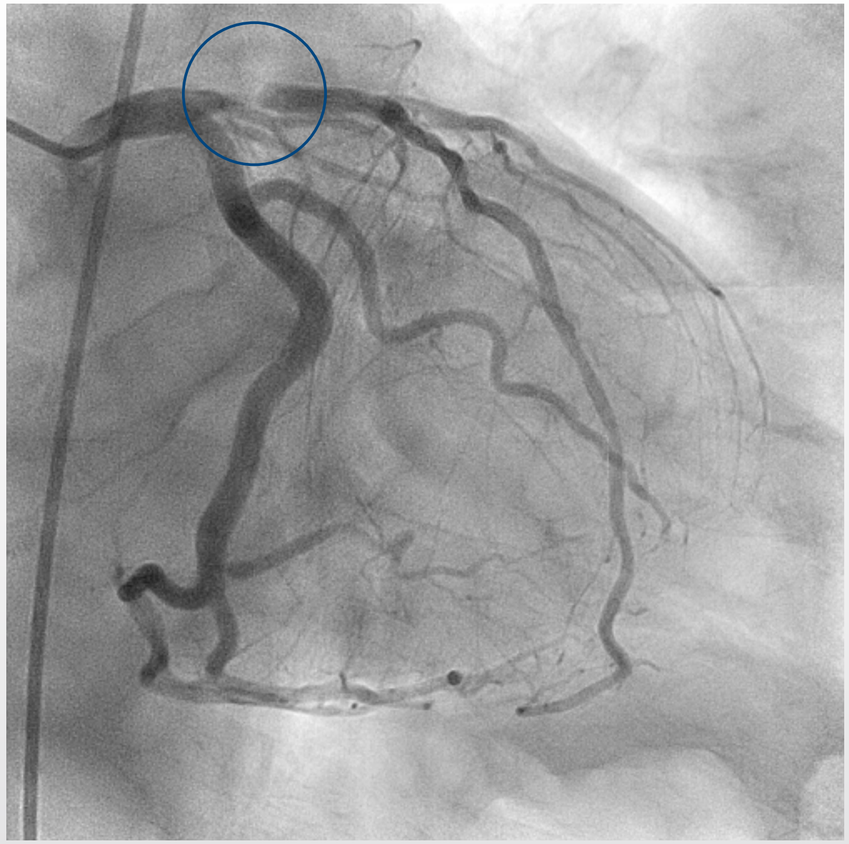
Angio

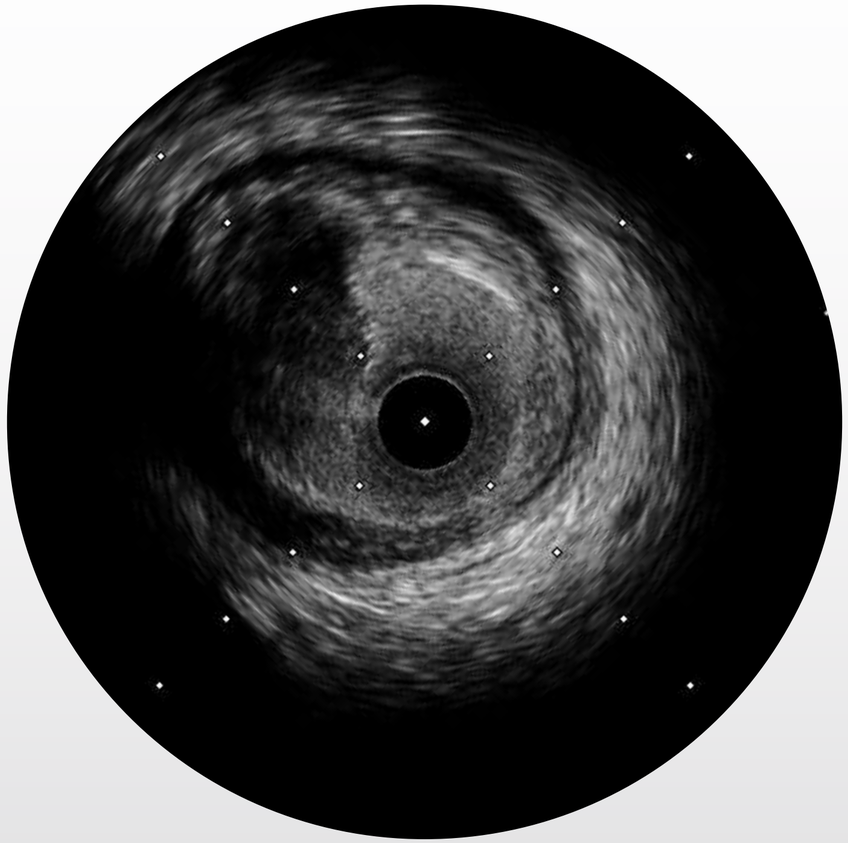
IVUS

The image shows an uneven circumferential fibrous plaque which is as echogenic as the adventitia.
The lumen looks homogenous and relatively hyperechoic due to reflected ultrasound by red blood cells with the stagnant blood flow.

Case List

3 Lipid Plaque





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VIDEO

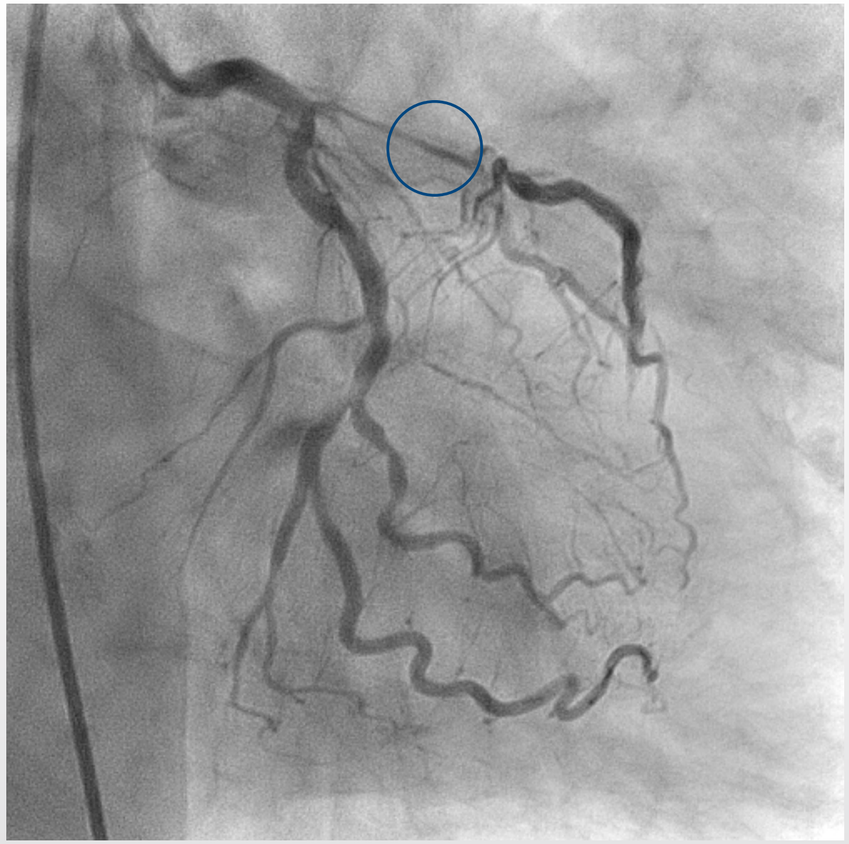
Angio

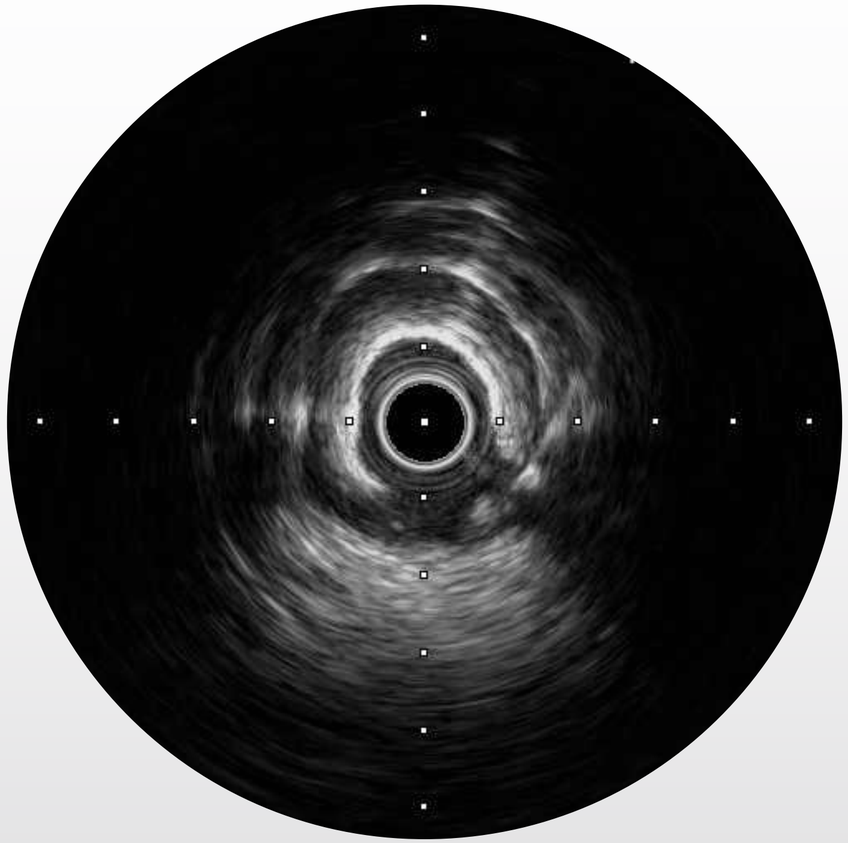
IVUS

The IVUS image is rotated to position the epicardium at 12 o'clock. The stenosis is located at the proximal LAD with RAO caudal view by angiogram. On the IVUS image, a hypoechoic area is observed from 9 to 12 o'clock, which looks dark (attenuated echo).
The area is considered as a lipid pool and presumed to be lipid rich. A lipid pool can be mistaken as a thrombus, and it is sometimes difficult to distinguish them.

Case List

4 Superficial Calcified Plaque





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VIDEO

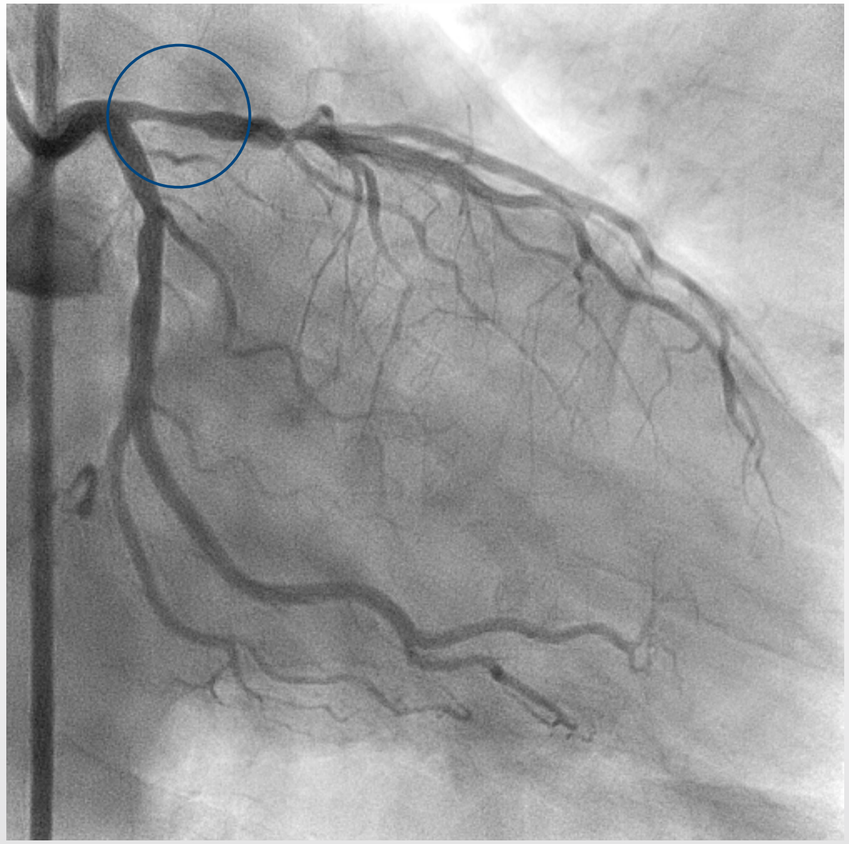
Angio

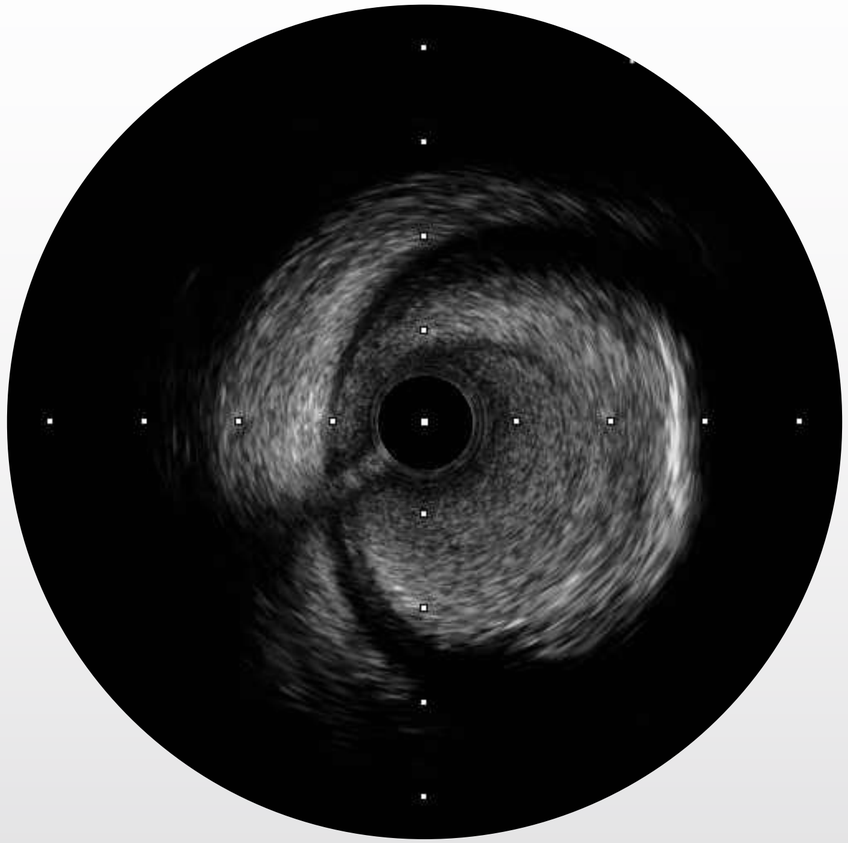
IVUS

There is a 270-degree arch of bright hyperechoic band from 7 to 4 o'clock clockwise, which represents superficial calcified plaque with dark area behind it, which is called acoustic shadows.
Multiple reflections of ultrasound waves between the IVUS catheter and the calcified plaque create equally spaced hyperechoic areas called reverberation.

Case List

5 Deep Calcified Plaque





TRACE

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VIDEO

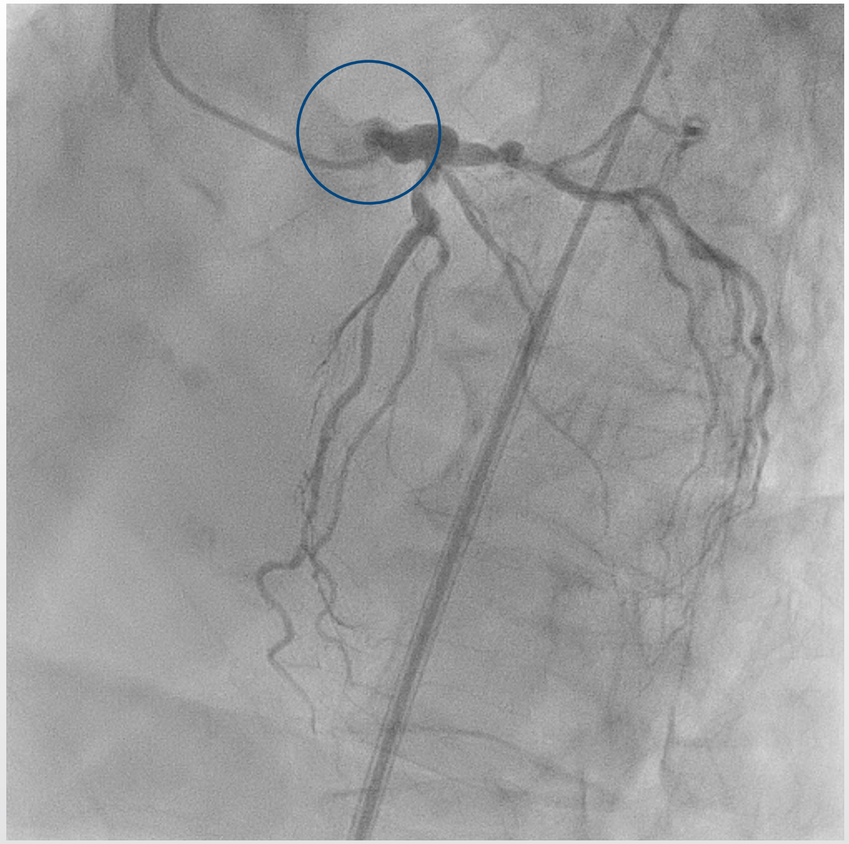
Angio

IVUS

The image is rotated to position the epicardium at 12 o'clock.
The hyperechoic area from 2 to 4 o'clock clockwise with acoustic shadow behind it is defined as deep calcified plaque.
The plaque inside the deep calcified plaque is as bright as the adventitia therefore it is considered as fibrous plaque.

Case List

6 Calcified Nodule



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VIDEO

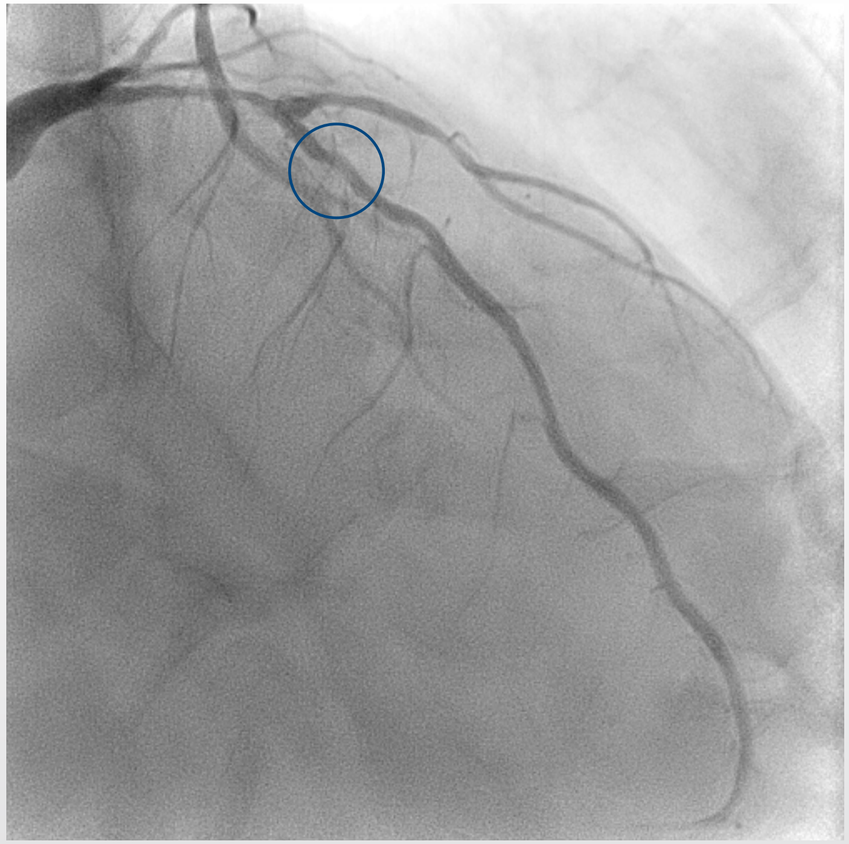
Angio

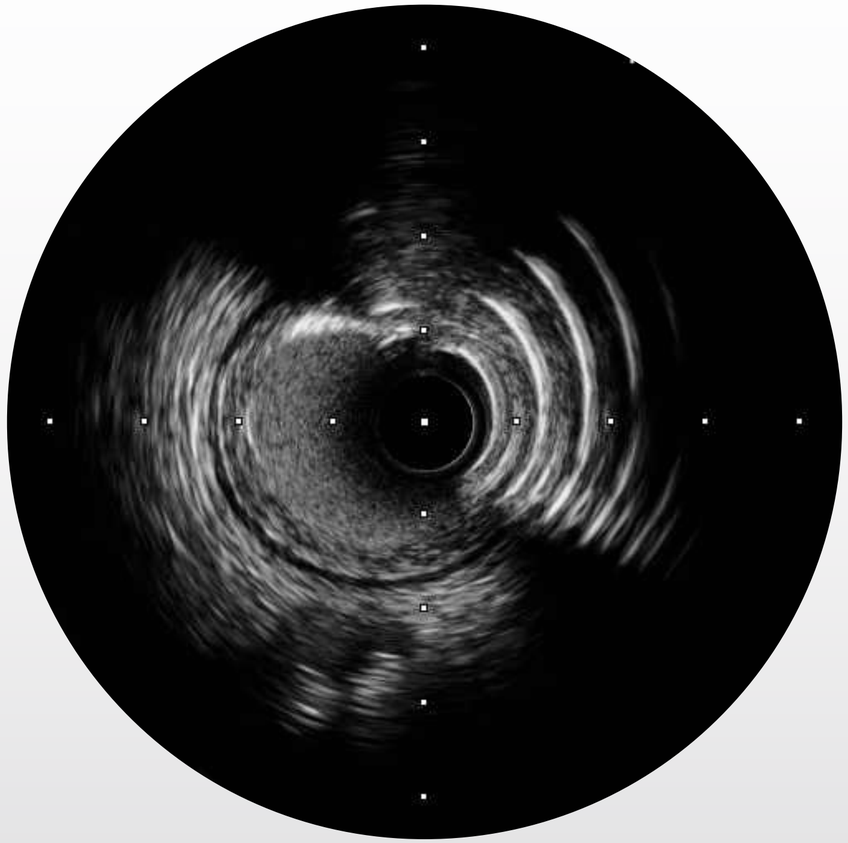
IVUS

A distorted hyperechoic area is observed with an acoustic shadow protruding at the 12 o'clock position in the left main trunk (LMT). It is found to be protruding into the lumen and is thus considered to be a calcified nodule. Calcified nodules have irregular surface and sometimes have coral-like shape. On the IVUS image, the LMT is not significantly stenosed.

Case List

7 Reverberation





TRACE

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VIDEO

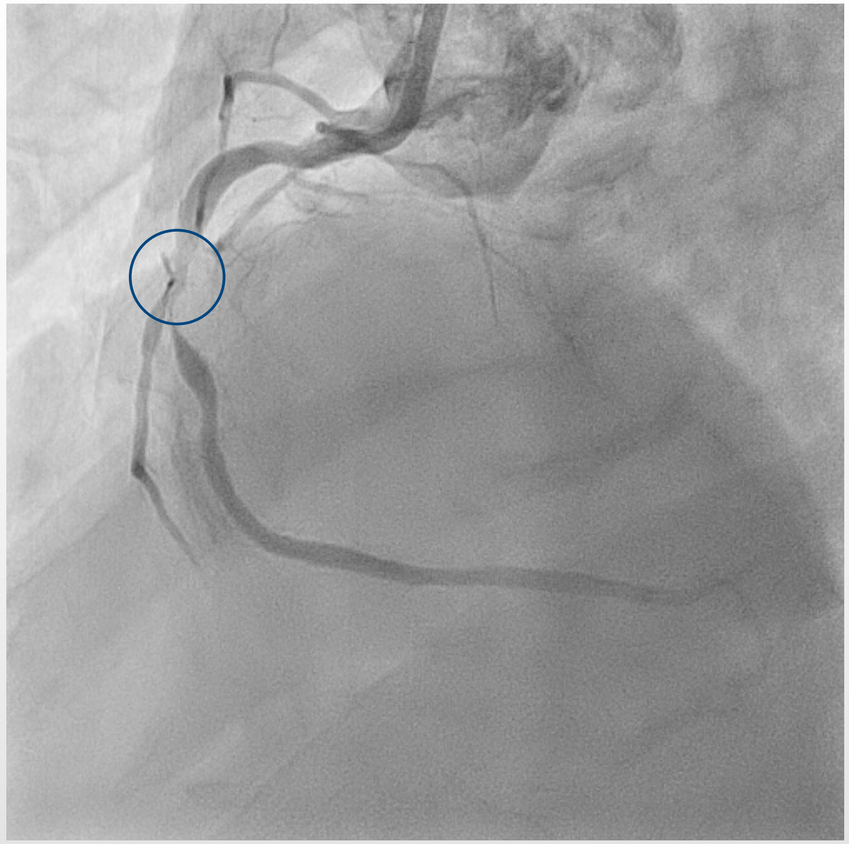
Angio

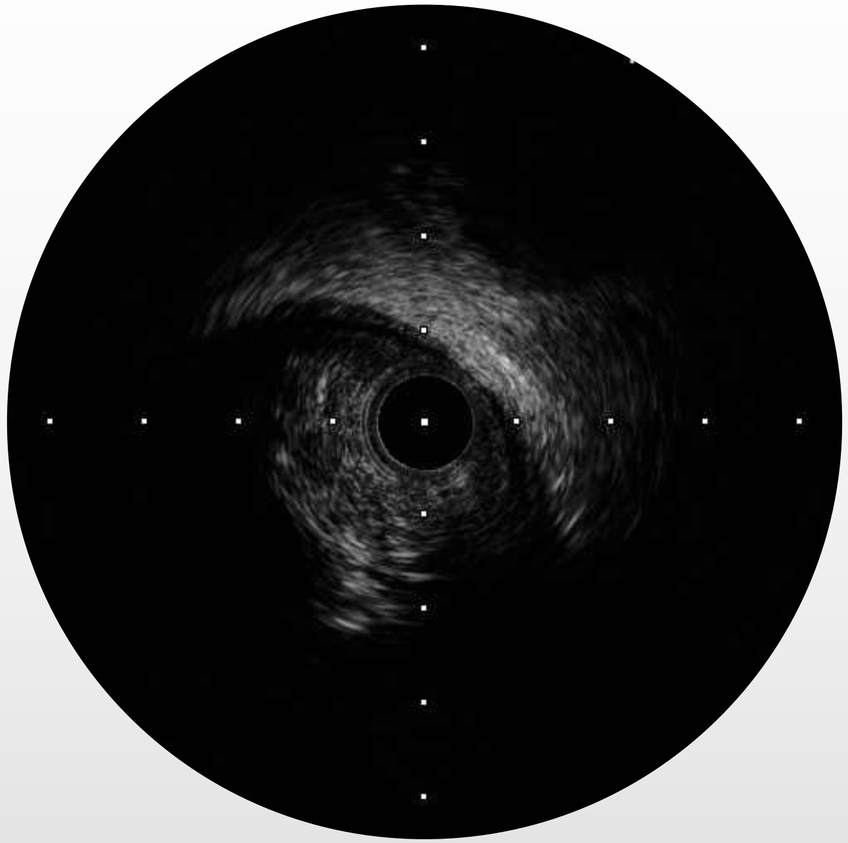
IVUS

Equally spaced hyperechoic arches, which are observed concentrically from 2 to 4 o'clock clockwise, are called reverberations of calcified plaque.
Multiple reflections of ultrasound beam between the ultrasound transducer and the calcified surface are depicted.
The space between the hyperechoic arches represents the distance between the transducer and the calcified plaque.

Case List

8 Attenuated Plaque





TRACE

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VIDEO

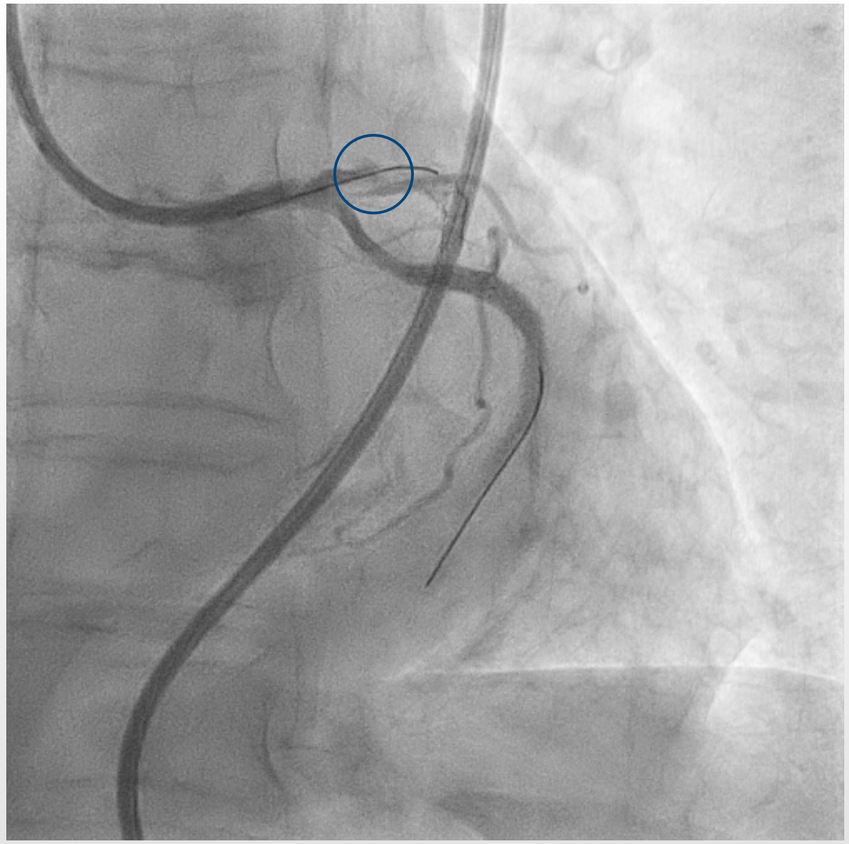
Angio

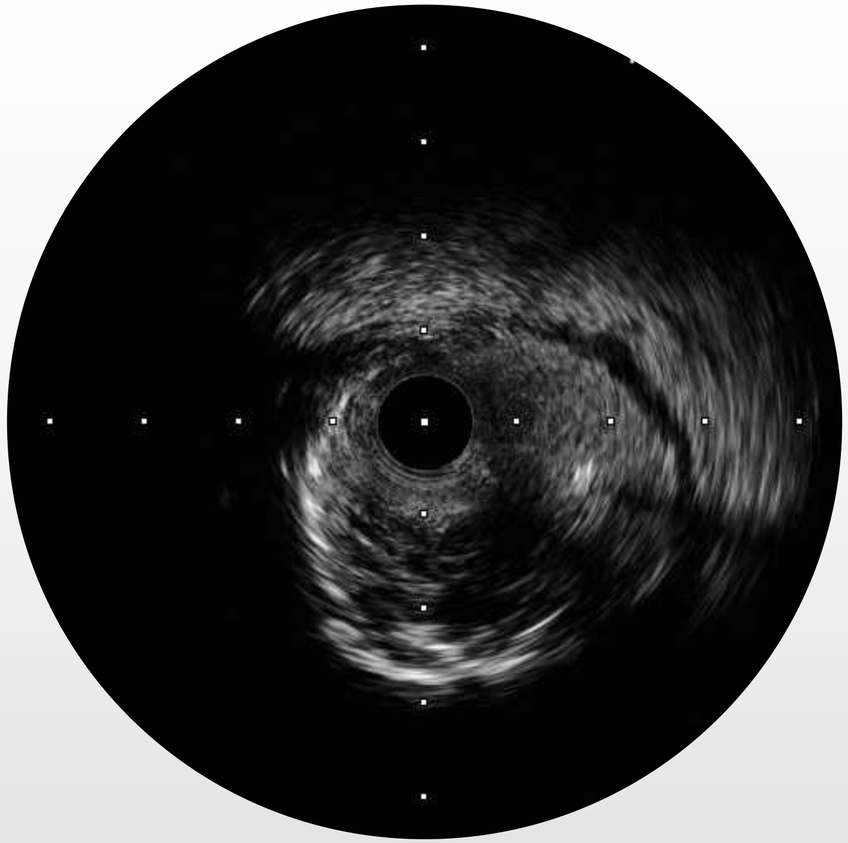
IVUS

The far field is not well depicted due to the scattering and absorption of the ultrasound waves by plaque. This is attenuated plaque. Microcalcifications and/or cholesterol crystals within the plaque cause poor signal reflection behind them. The attenuated plaque is considered to contain a large necrotic core, which may cause slow flow, no re-flow and/or distal embolization after balloon and/or stent dilation.

Case List

9 Thrombus





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VIDEO

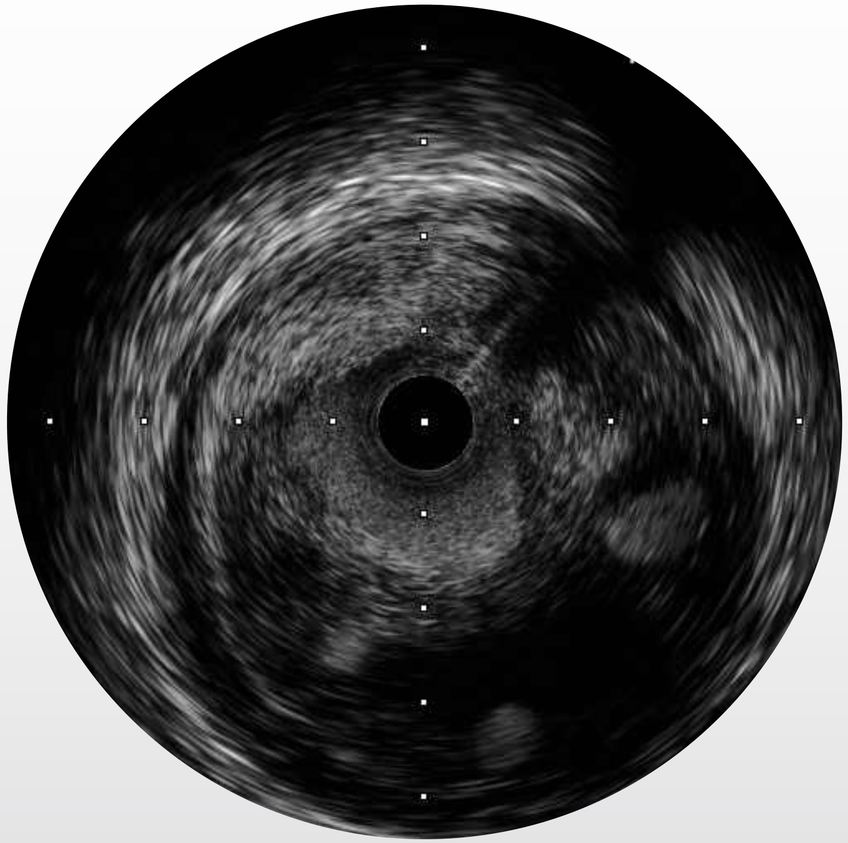
Angio

IVUS

This IVUS image was captured after wire crossing in an acute coronary syndrome (ACS) case. An intramural low echogenic mass with attenuation is observed. In case of ACS, any echolucent (hypoechoic) areas are presumed to represent thrombi. A thrombus becomes hyperechoic as it become organized, then it demonstrates various image patterns. A thrombus can be identified considering clinical presentation.

Case List

10 Honeycomb-like Thrombus



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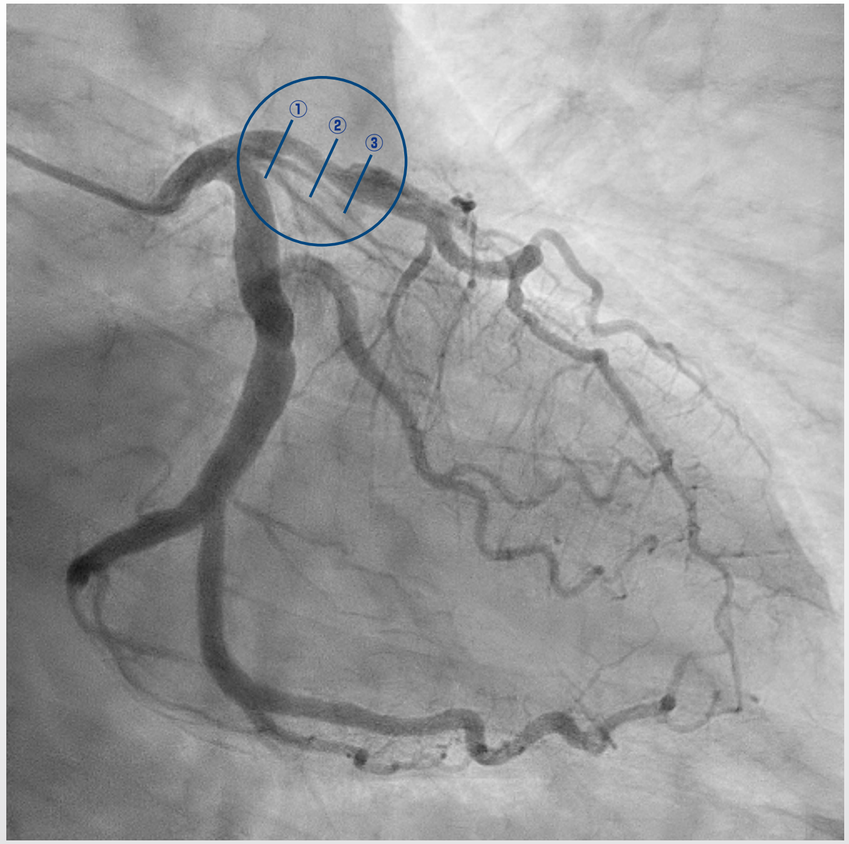
Angio

IVUS

The IVUS image shows multiple cavities generated inside the thrombus. The angiogram is not able to visualize them.

Case List

11 Negative Remodeling



Proximal
Image 1

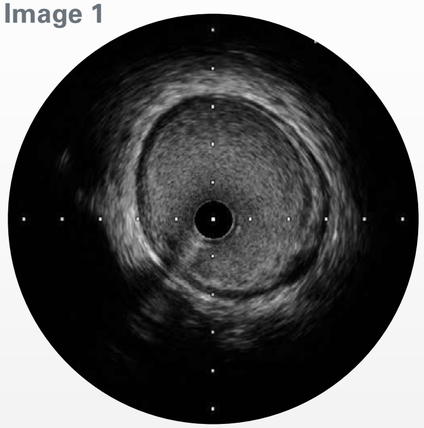
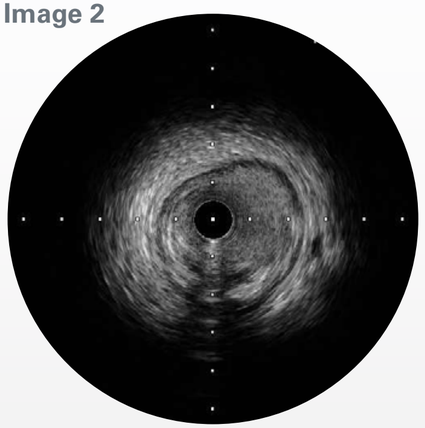
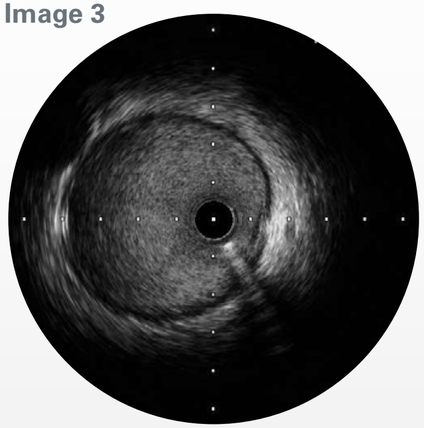
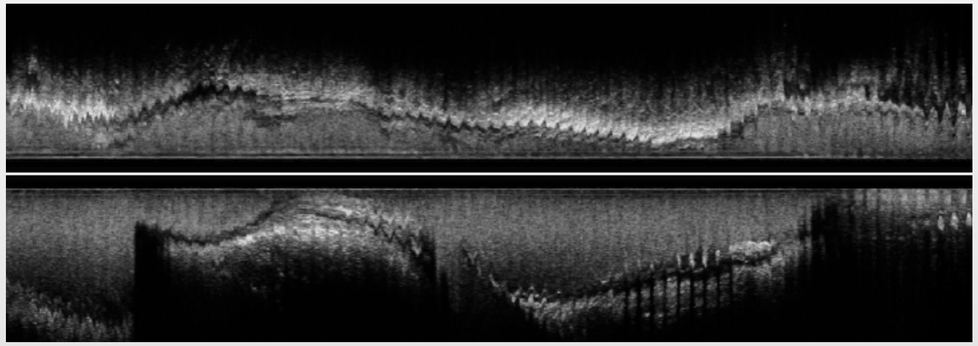


Image 2



Distal
Image 3





① ② ③

The vessel cross sectional area in image 2 appears smaller than the distal vessel in image 3. Blood vessels normally taper from the proximal to the distal end, but the vessel diameter in image 2 is smaller than that of the distal side. This is called negative remodeling.

TRACE

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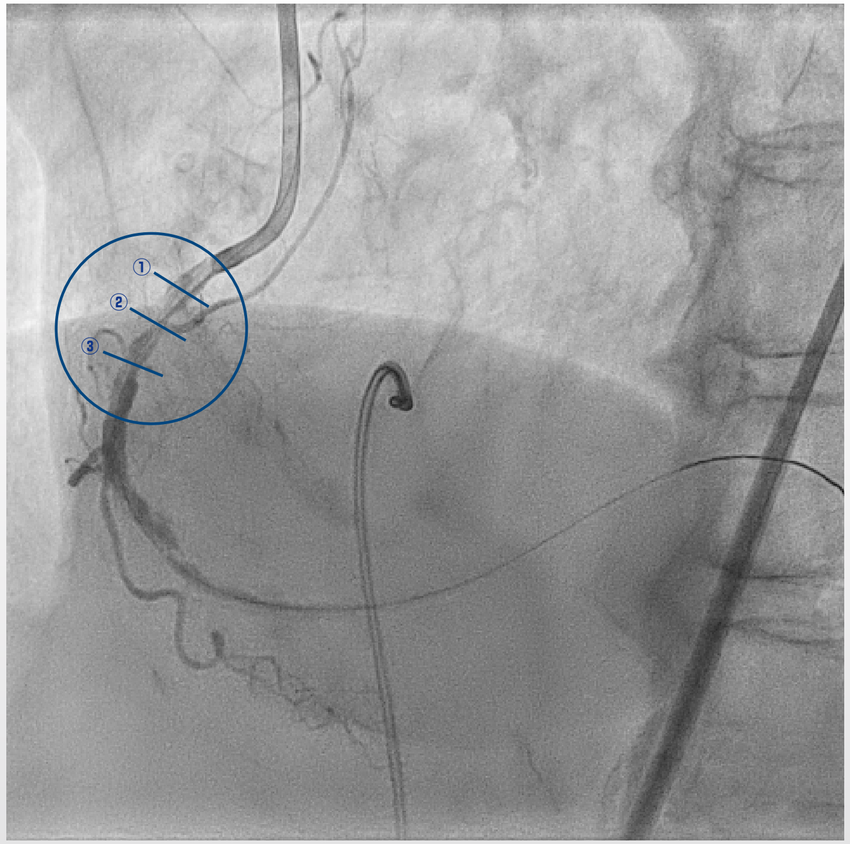
VIDEO

Angio

IVUS

Case List

12 Positive Remodeling



Proximal
Image 1

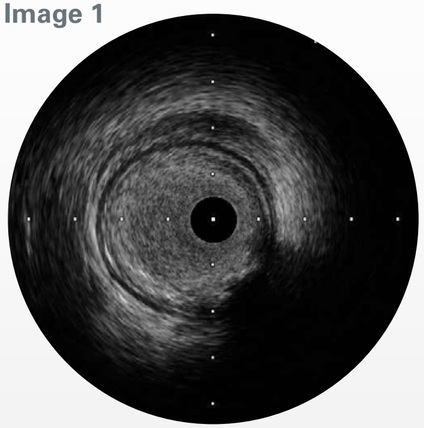
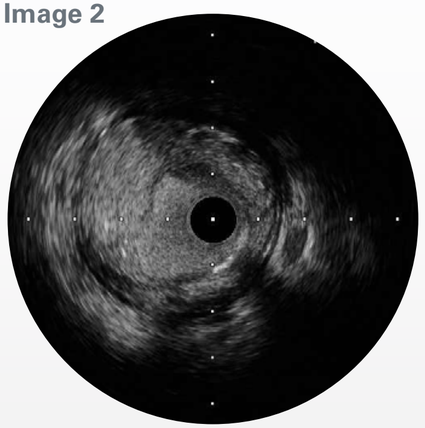
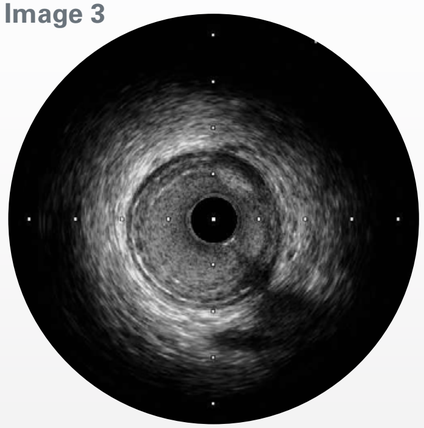
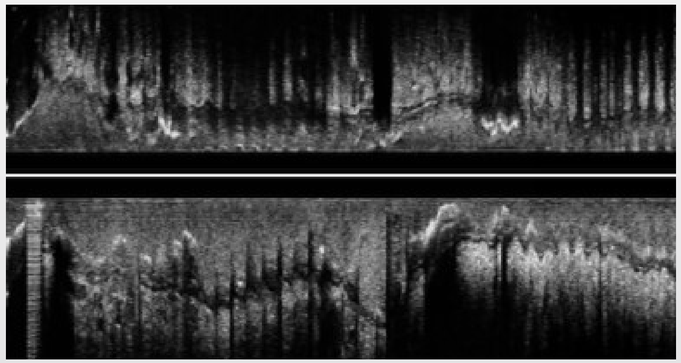


Image 2



Distal
Image 3





① ② ③

The vessel cross sectional area in image 2 is larger than that of image 1 (which is proximal to image 2) and image 3 (which is the distal reference to the same), and this is called positive remodeling. Plaque rupture is visualized at 9 o'clock in image 2.

TRACE

ON

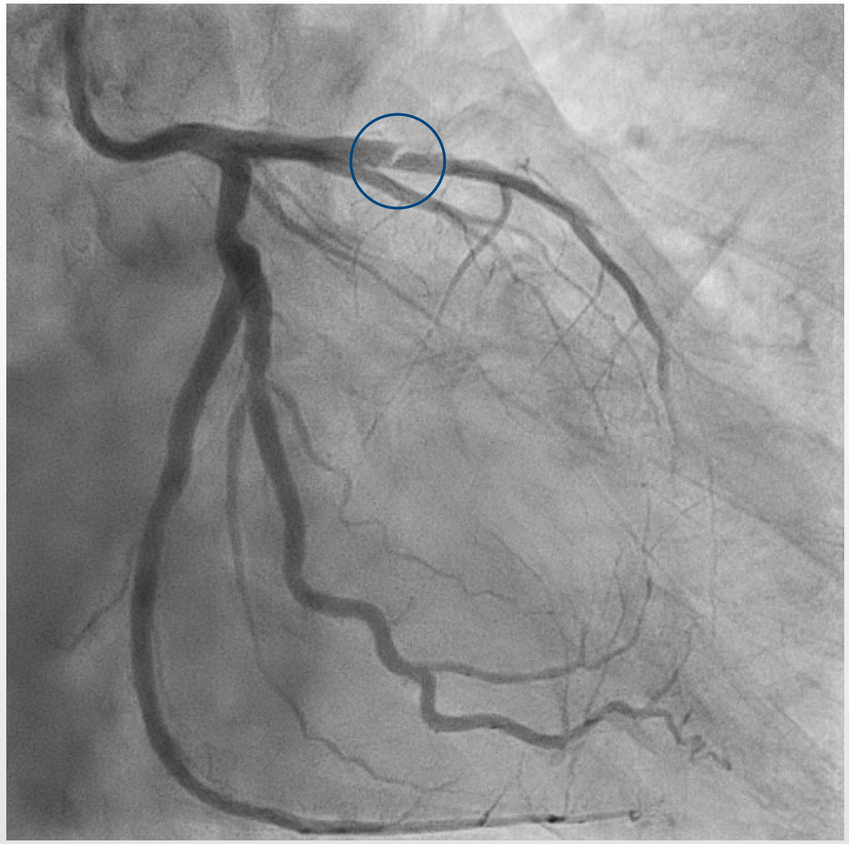
VIDEO

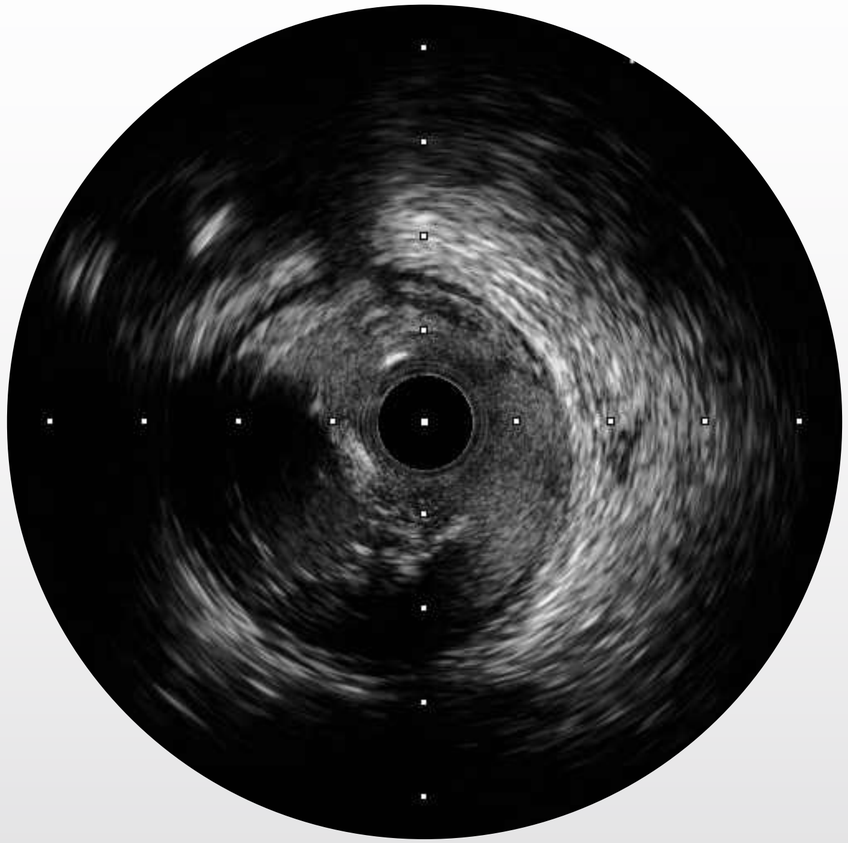
Angio

IVUS

Case List

13 Plaque Dissection





TRACE

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VIDEO

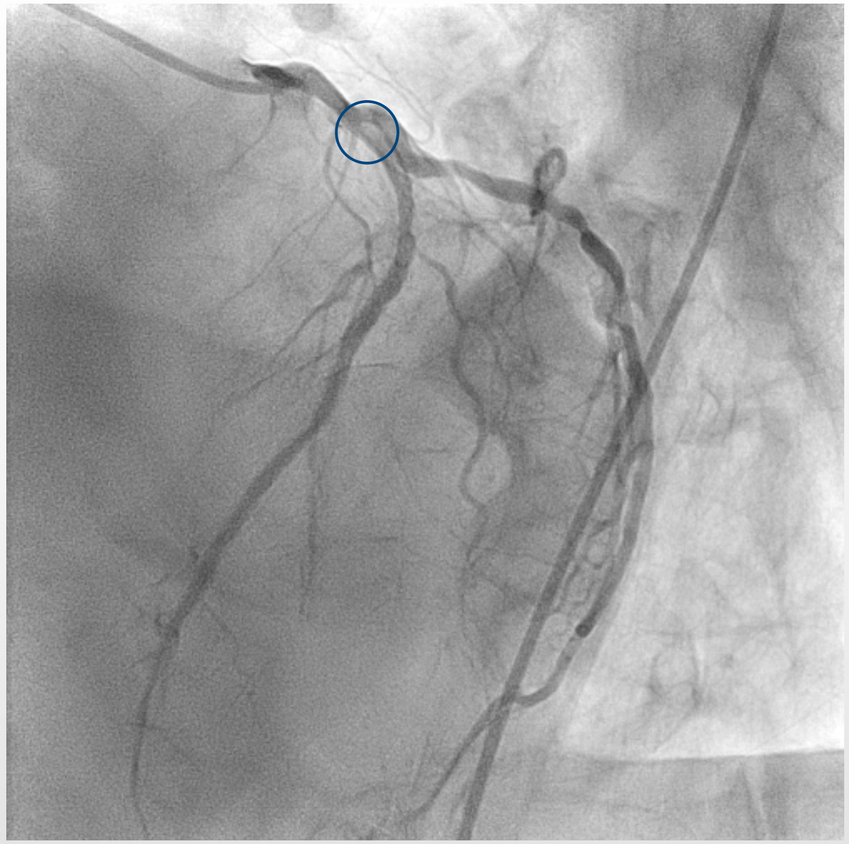
Angio

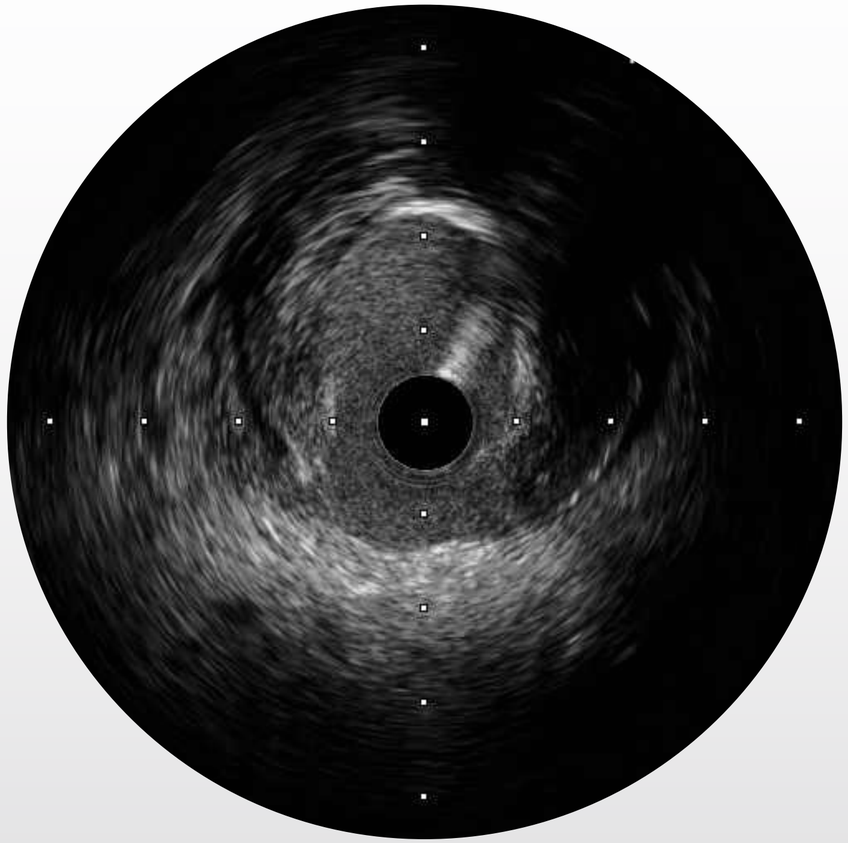
IVUS

An example of plaque dissection. Both the intima and the plaque are disrupted, and the disruption extends into the media. Where the ruptured end protrudes into the lumen and if it becomes thin and movable, it is called a flap.

Case List

14 Medial Dissection





TRACE

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VIDEO

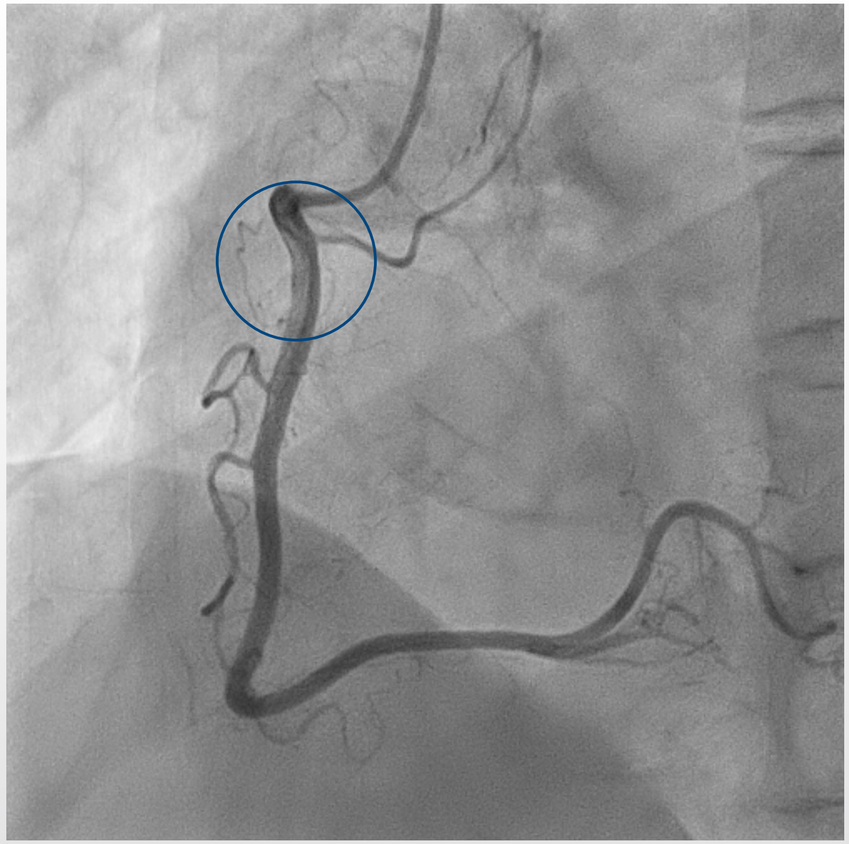
Angio

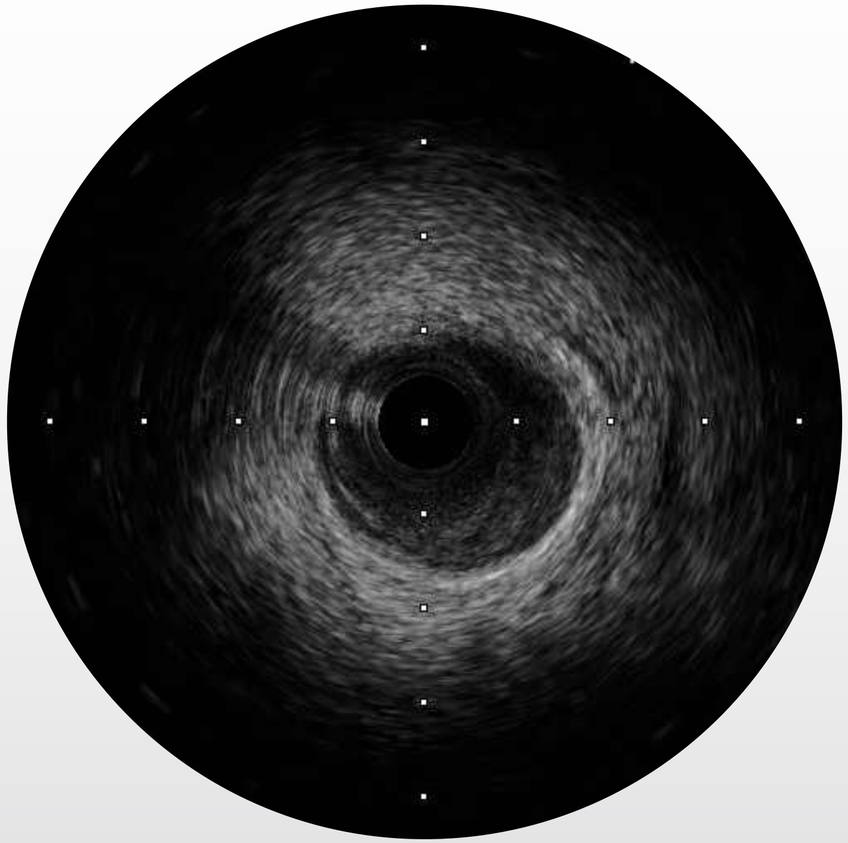
IVUS

Following the line of the vascular intima, it discontinues at approximately 6 o'clock , indicating that plaque dissection has occurred. The black band of the media has also disappeared, indicating that the dissection has reached the media.

Case List

15 SCAD - Spontaneous Coronary Artery Dissection





TRACE

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VIDEO

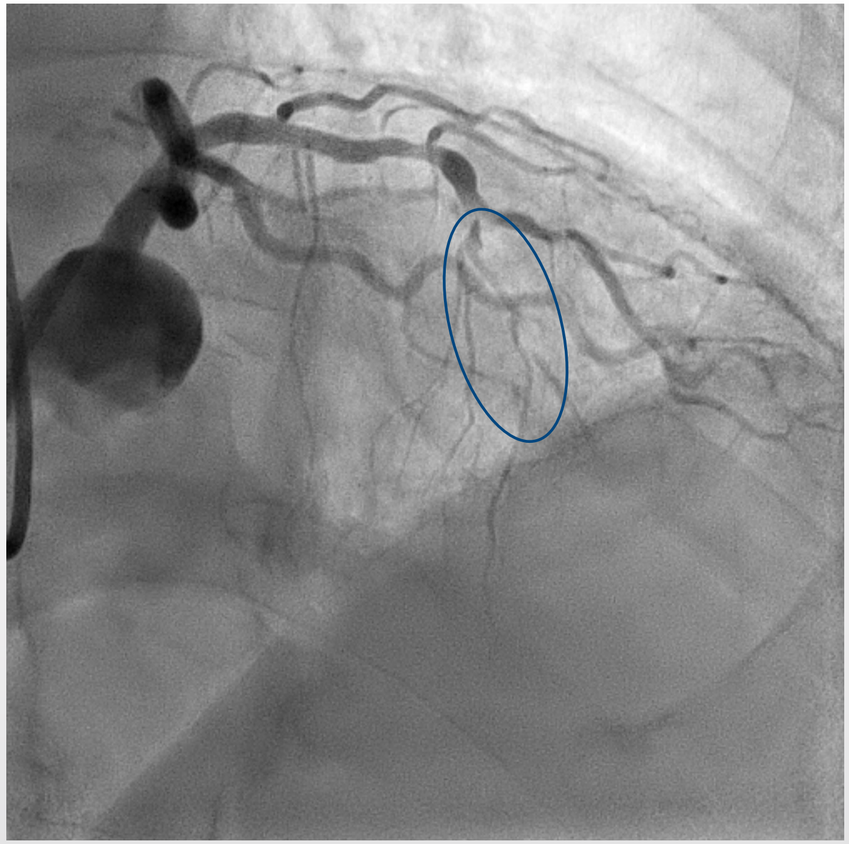
Angio

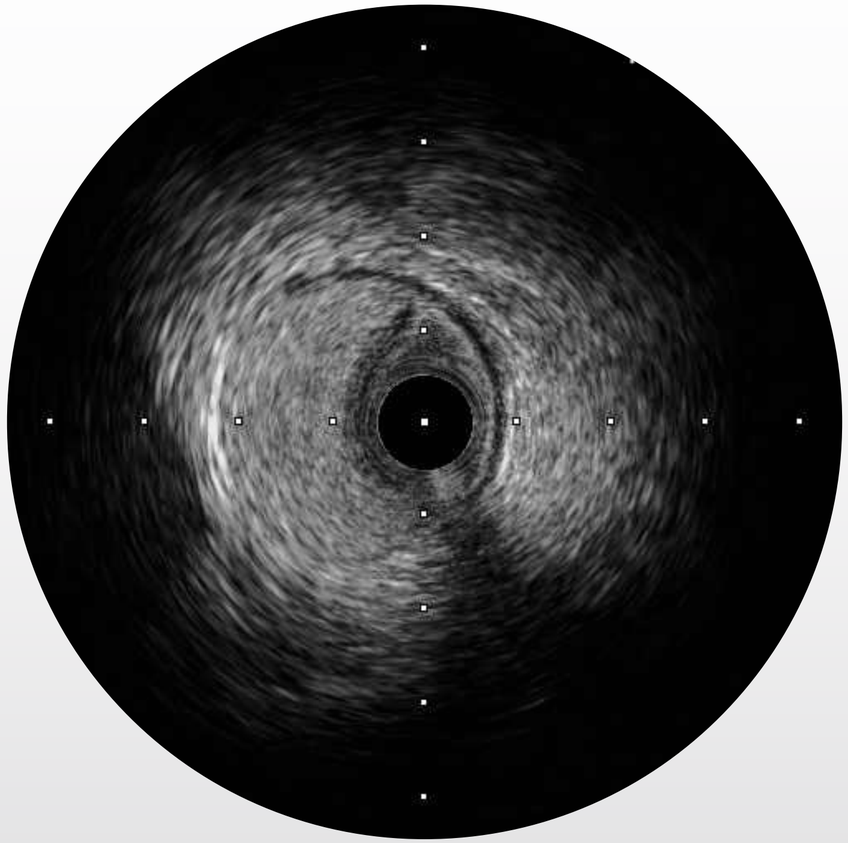
IVUS

Spontaneous coronary artery dissection (SCAD) is rarely associated with intimal thickening and mostly found in relatively young female population. The dissection extends into the boundary of the media and the adventitia. Three-layered circular structure is visualized around the IVUS catheter in the IVUS image. The inner small circle represents the true lumen which is compressed by the false lumen. The false lumen appears like a crescent which covers from 12 to 6 o'clock clockwise.

Case List

16 Hematoma





TRACE

ON

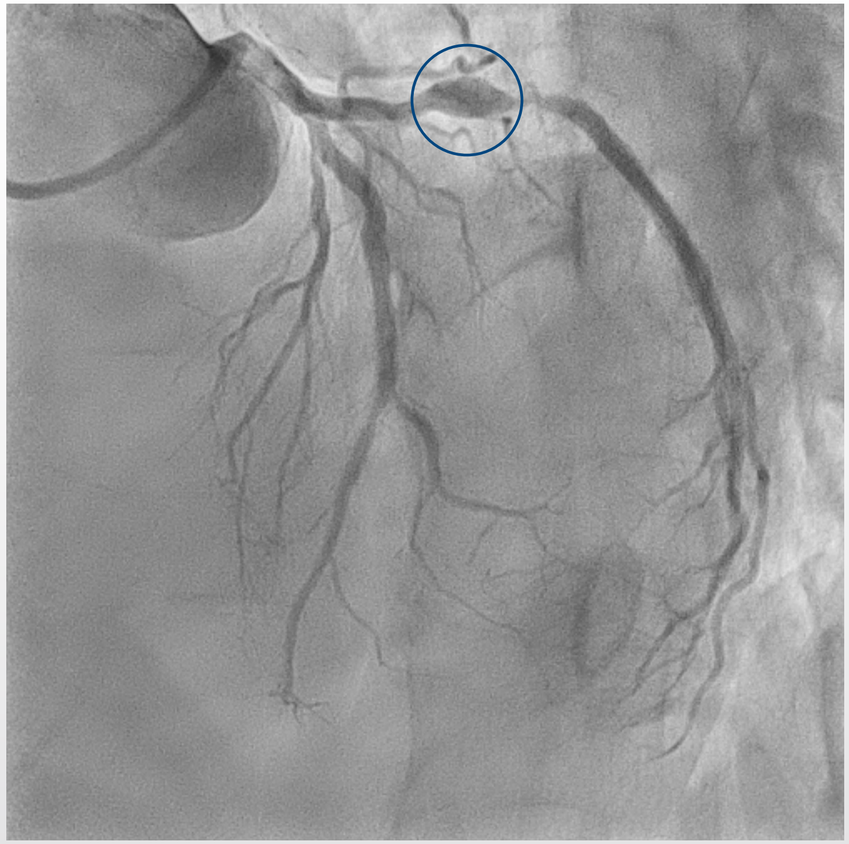
VIDEO

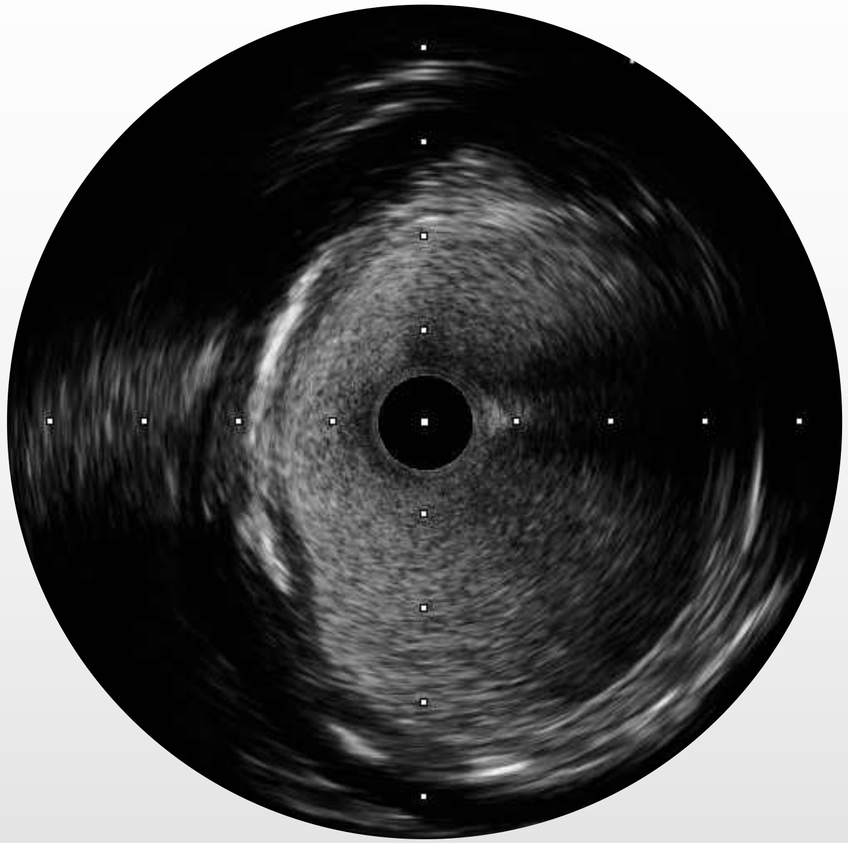
Angio

IVUS

A vast and homogenous hyperechoic region (hematoma) shaped like an inverted crescent covers from 6 to 12 o'clock clockwise. The true lumen around the IVUS catheter is compressed by the false lumen containing the hematoma. Hematoma and/or stagnant blood flow are normally visualized as homogenous hyperechoic blood speckle.

17 Aneurysm





TRACE

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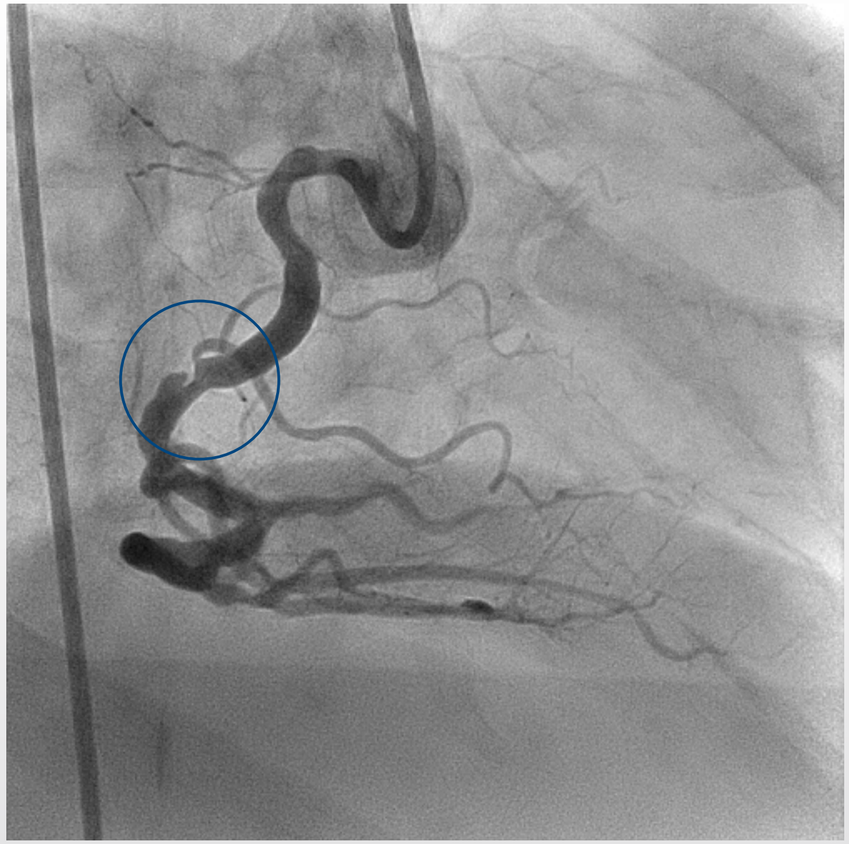
VIDEO

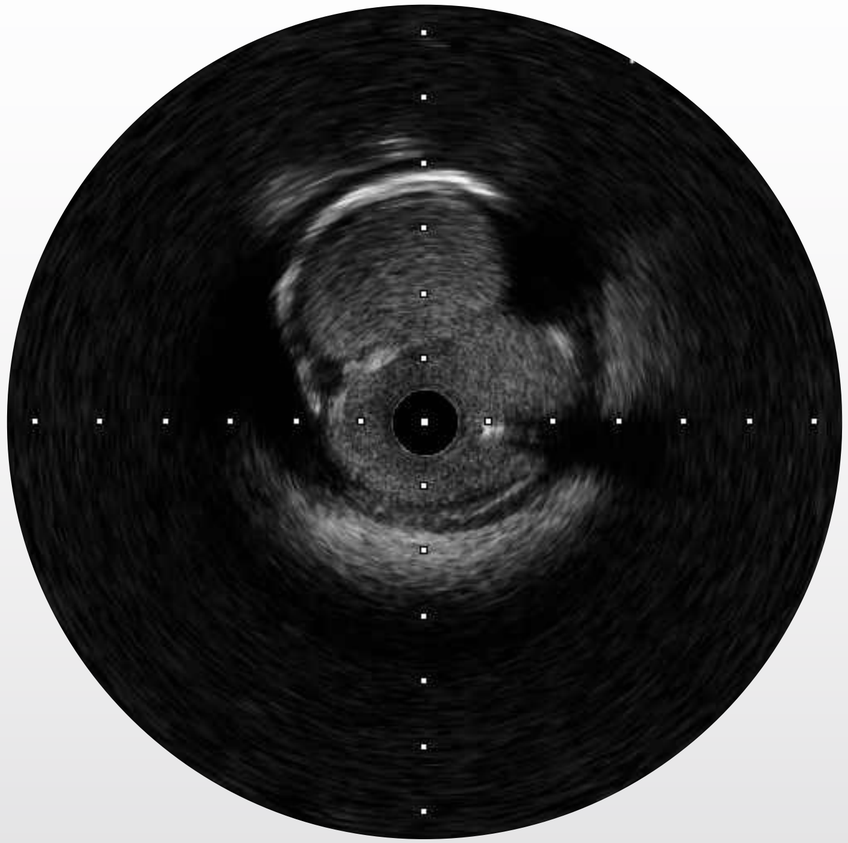
Angio

IVUS

Coronary artery aneurysm is defined as a blood vessel which has the diameter of 1.5 times or greater of the reference vessel diameter by angiogram.
IVUS is not capable of diagnosing an aneurysm, however the three-layered vessel structure in the aneurysm is visualized in the IVUS image.

18 Ulcer





TRACE

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VIDEO

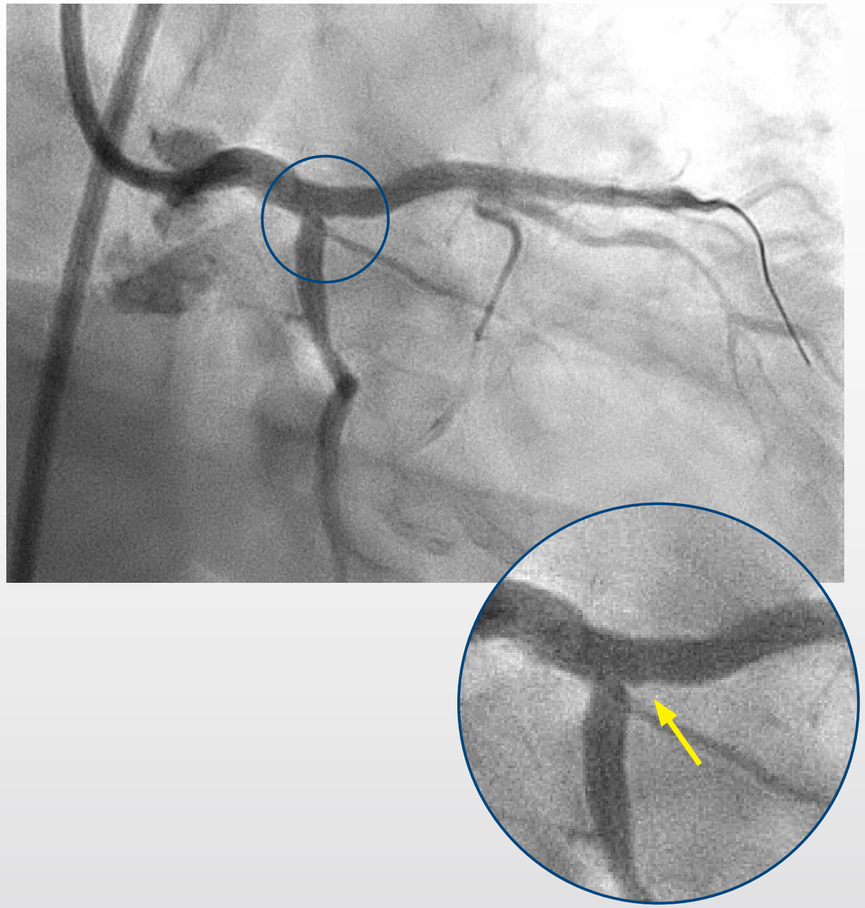
Angio

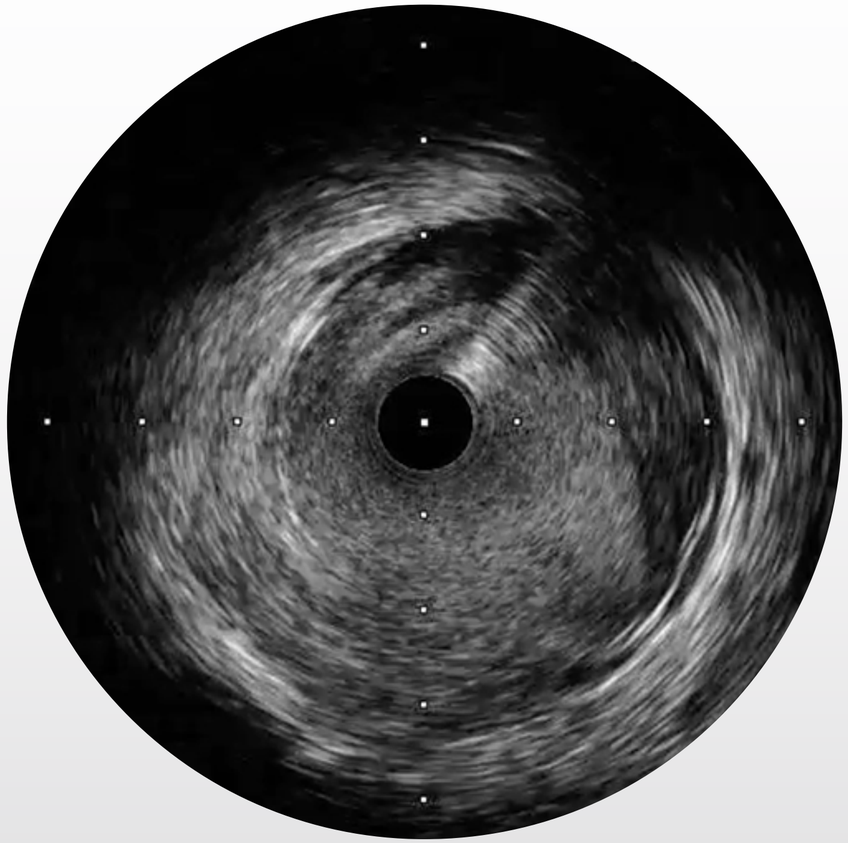
IVUS

The intima is disrupted in between 12 and 1 o'clock, and a cavity which is created by the ulcer extends to the upper part of the image. In this IVUS image, the plaque is presumed to have lost the endothelium on the surface and the accumulated cholesterol inside the plaque has dissolved to create the cavity.

Case List

19 Perforation





TRACE

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VIDEO

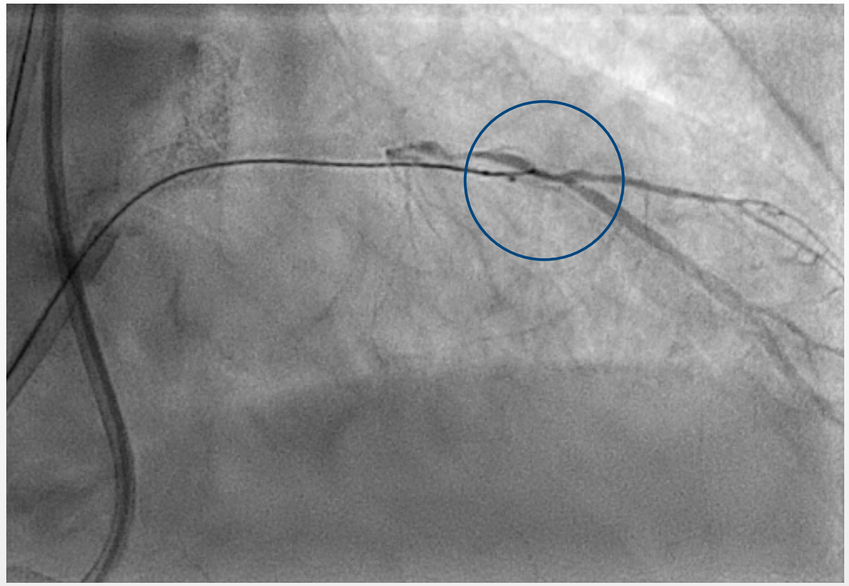
Angio

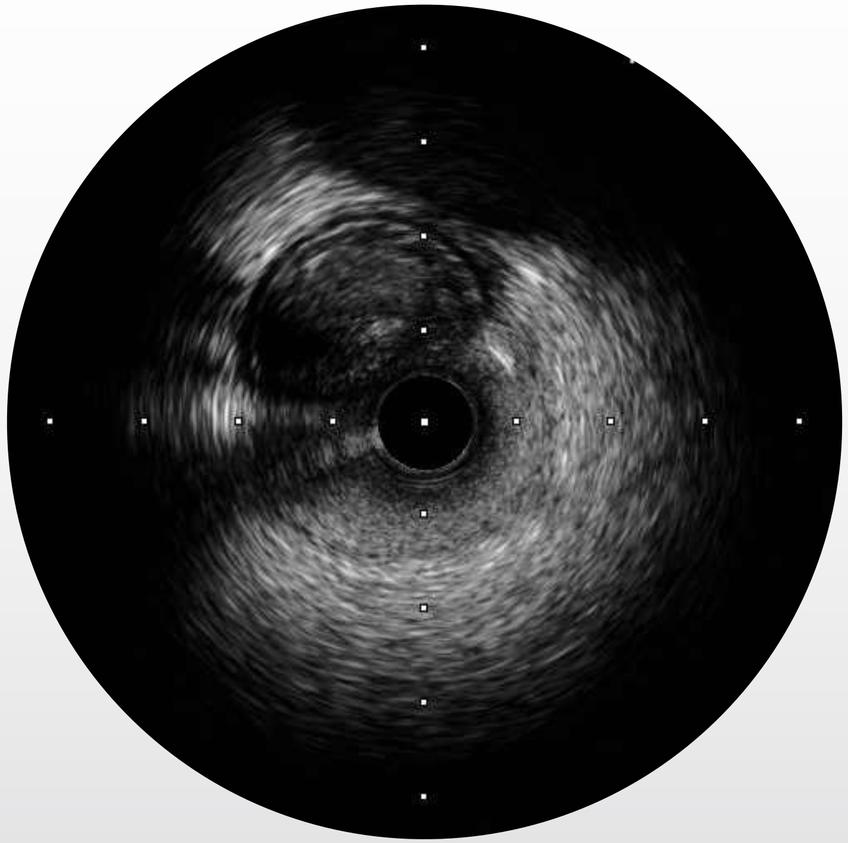
IVUS

Directional coronary atherectomy (DCA) was performed to remove the plaque located in between the left main trunk (LMT) and the left anterior descending artery (LAD). A protrusion is visualized at the point indicated by the arrow in the angiogram. The intima disappears from 5 to 7 o'clock and a crescent-shaped, hypoechoic space extends into the adventitia and the surrounding tissue, which represents hematoma.

Case List

20 CTO - False Lumen





TRACE

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VIDEO

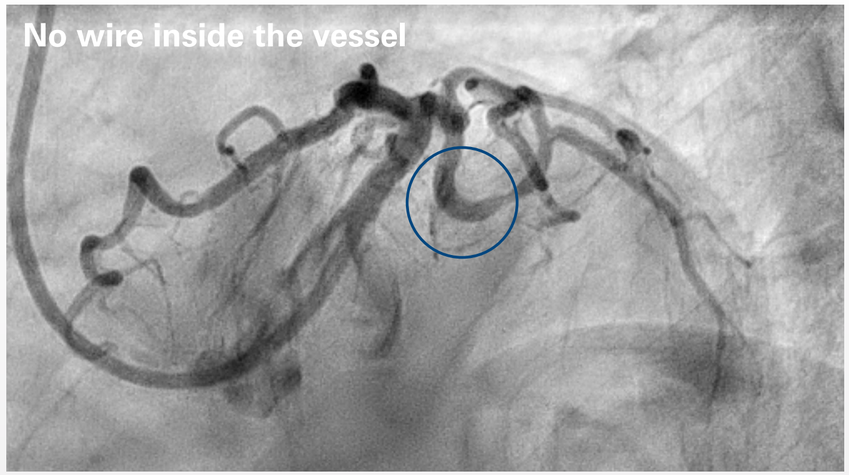
Angio

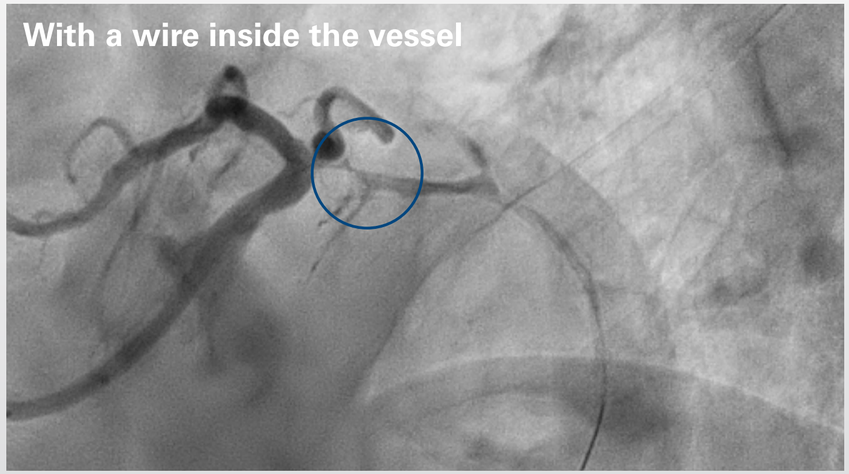
IVUS

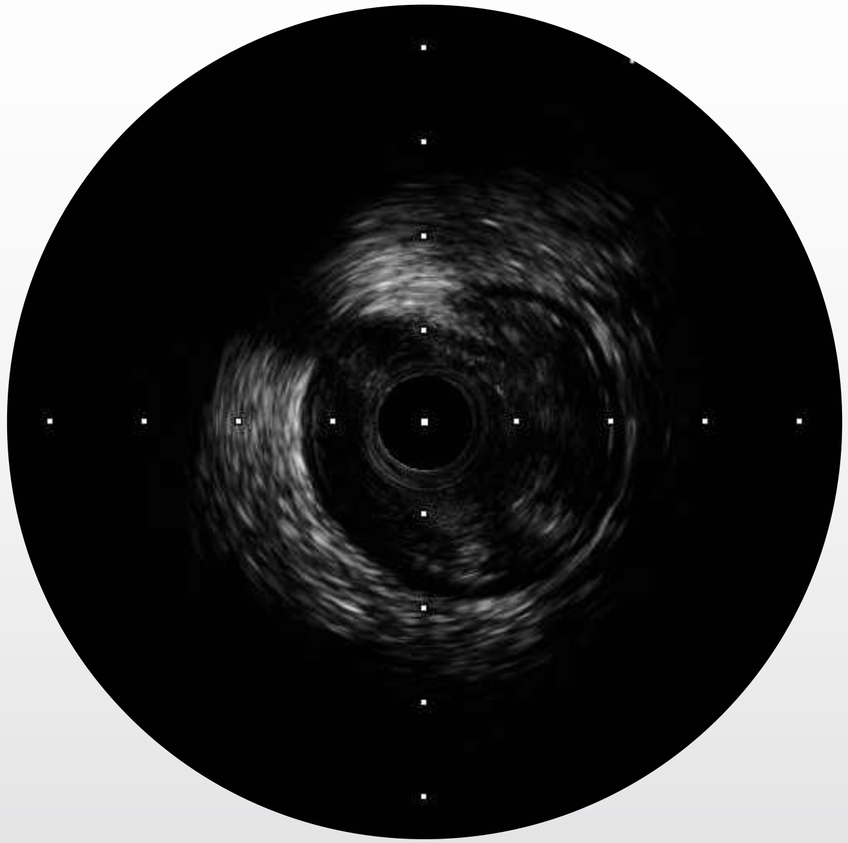
This image was taken during a case of CTO PCI using an antegrade dissection reentry (ADR) device. The IVUS catheter is inside the false lumen. The true lumen with the three-layered structure is observed at 11 o'clock. The false lumen is visualized by hyperechoic homogenous blood speckle due to the stagnant blood flow.

Case List

21 Accordion







TRACE

ON

VIDEO

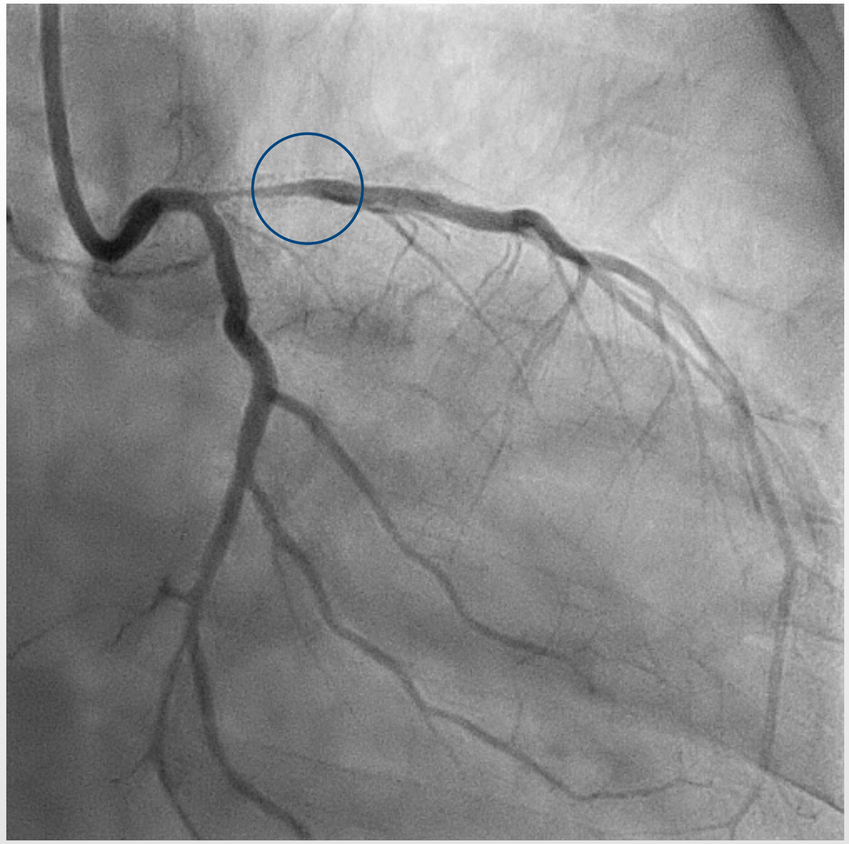
Angio

IVUS

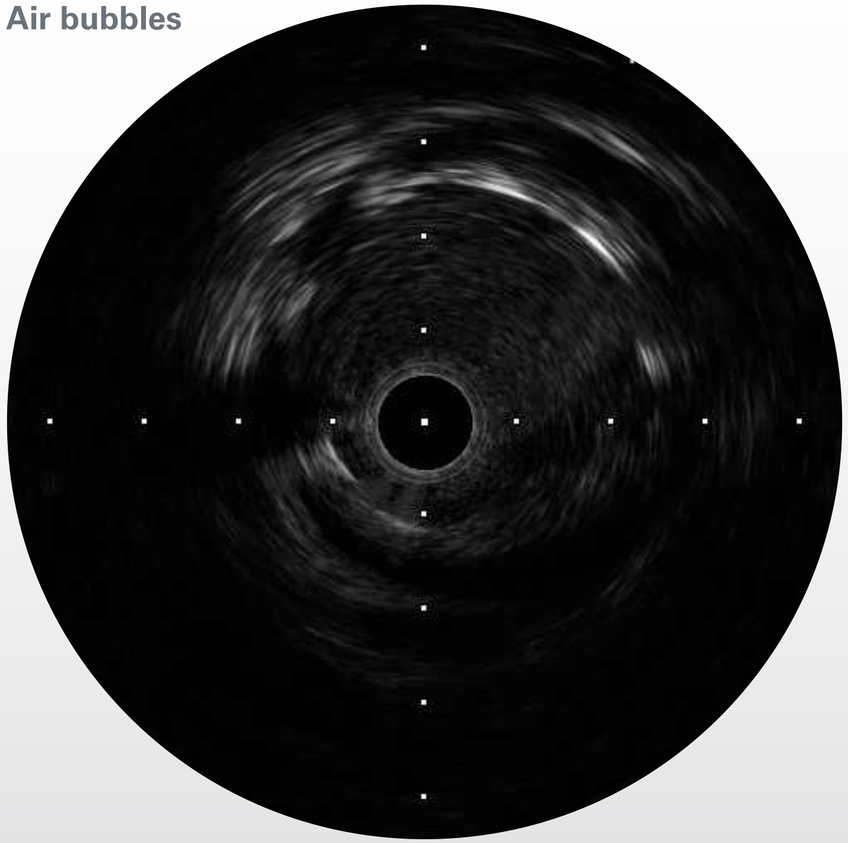
A vague crescent-shaped vessel structure is observed from 1 to 7 o'clock. The media is observed near the IVUS catheter, but another media is depicted from 2 to 5 o'clock. This image was created due to the accordioned vessel as two vessel structures are observed in one image. The accordion is observed when an IVUS catheter straightens a tortuous vessel.

Case List

22 Air Bubbles



Air bubbles



Normal

ON

VIDEO

Angio

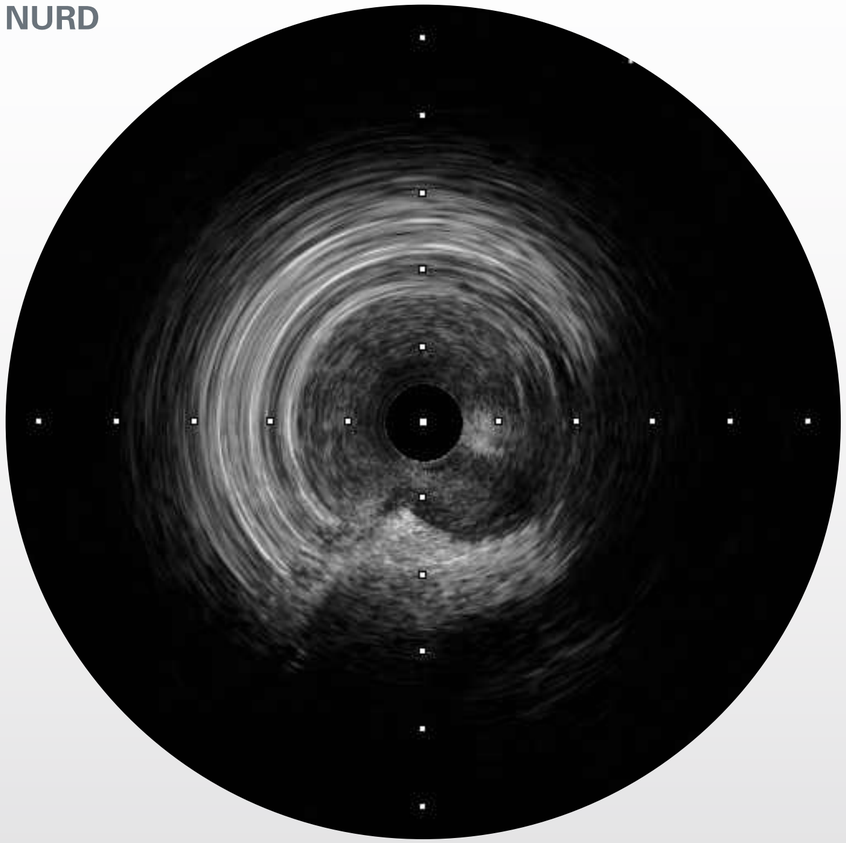
IVUS

Inadequate flushing of the IVUS catheter my result in residual micro air bubbles around the ultrasound transducer, which attenuates ultrasound to create unstable dark images. The image sometimes changes its brightness according to the cardiac cycle.
When this happens, the IVUS catheter should be taken out of the patient's body and fully flushed.
Flushing the IVUS catheter inside the vessel may result in air embolism and subsequent ST elevation.

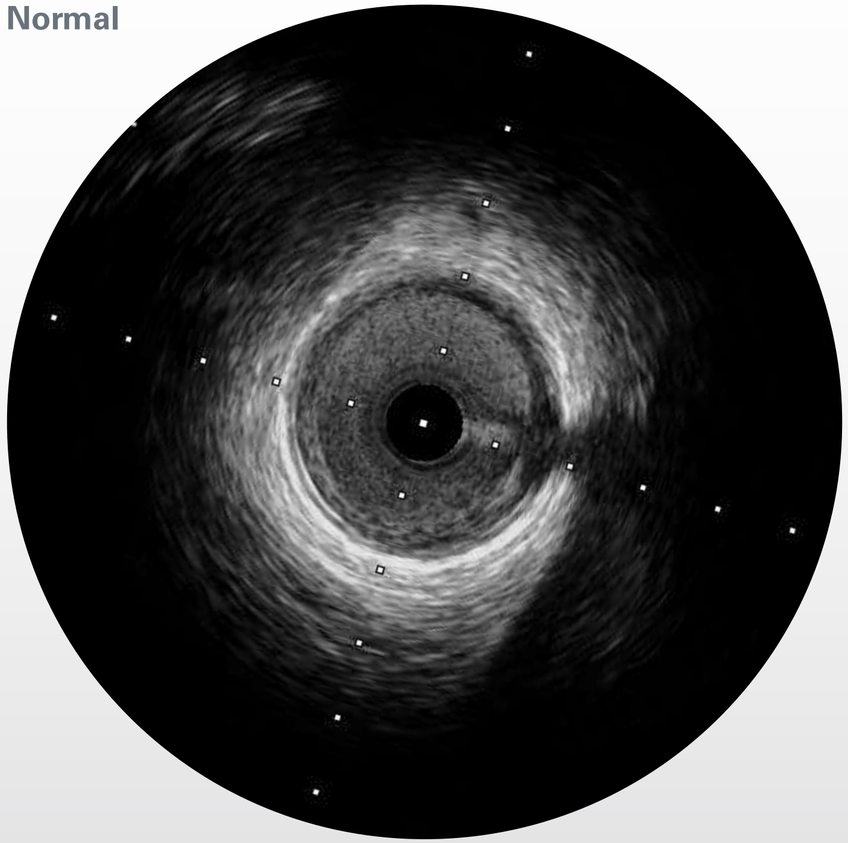
Case List

23 NURD - Non Uniform Rotational Distortion

NURD



Normal



TRACE

ON

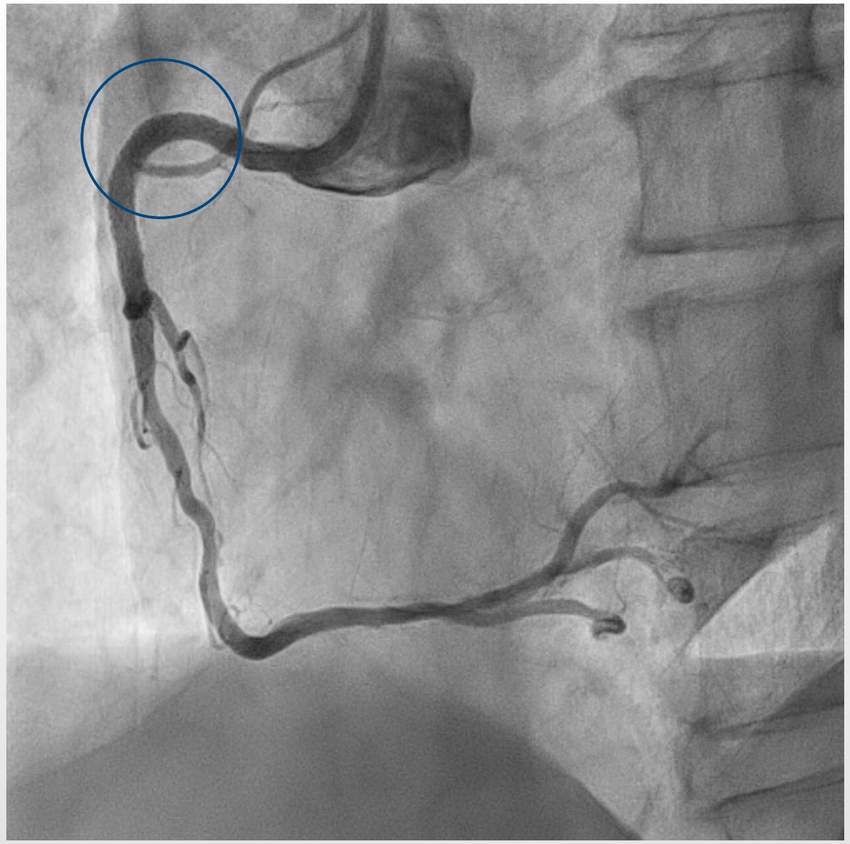
VIDEO

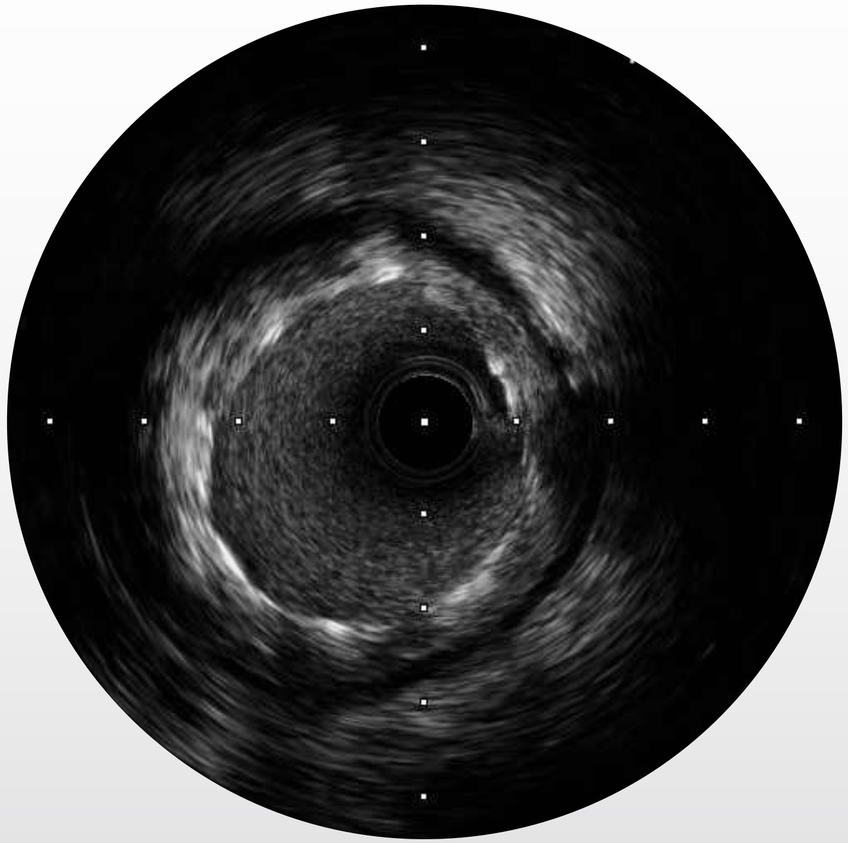
IVUS

Distortion of the image is observed from 7 to 2 o'clock and at 4 o'clock. Non uniform rotational distortion (NURD) may originate from uneven rotation of the ultrasound transducer induced by various factors, such as highly tortuous vessel, calcified lesion, etc. Meanwhile, a bent of the proximal shaft of the IVUS catheter outside the valve and the overtighten valve may cause NURD.
When NURD is observed, it is important to check the catheter shaft and the valve. NURD sometimes disappear after dilatation of the lesion.

Case List

24 Stent Apposition





TRACE

ON

VIDEO

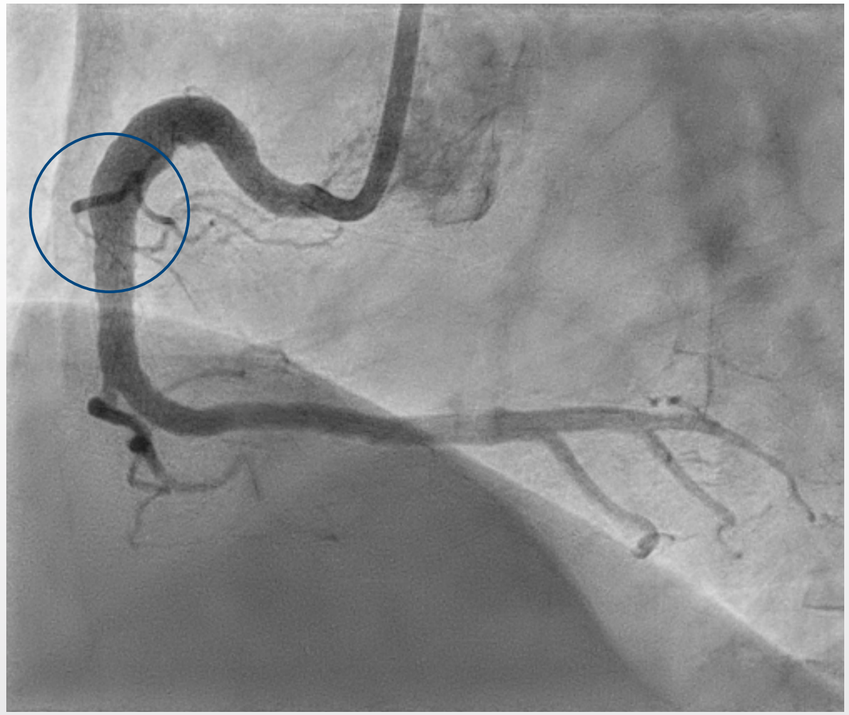
Angio

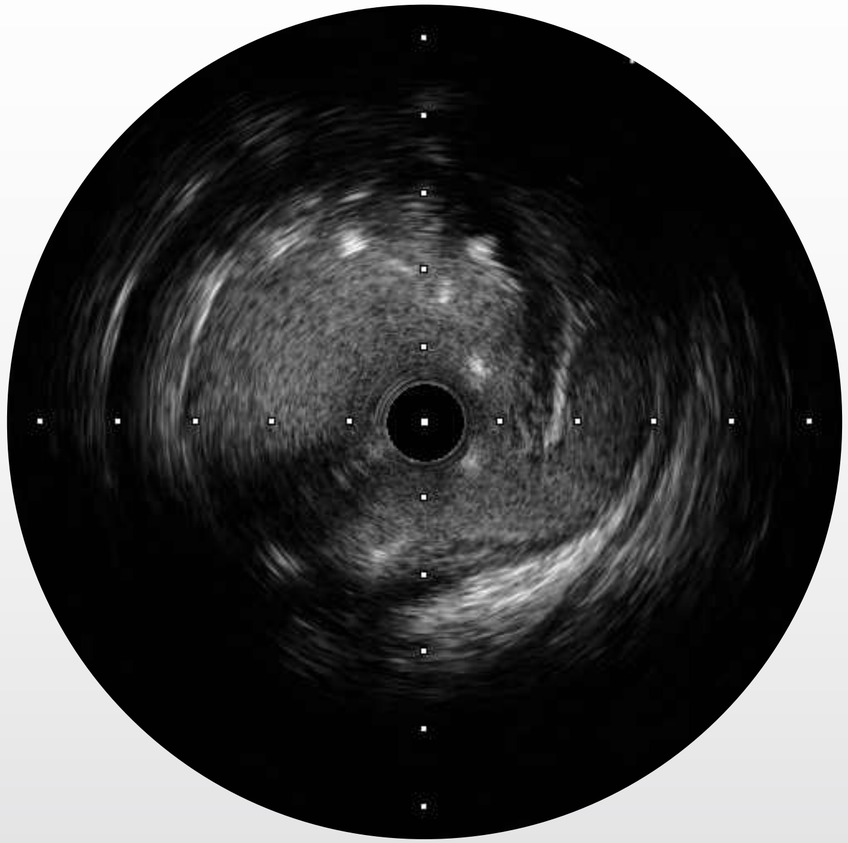
IVUS

The stent struts are evenly embedded in the plaque.

Case List

25 Stent Malapposition





TRACE

ON

VIDEO

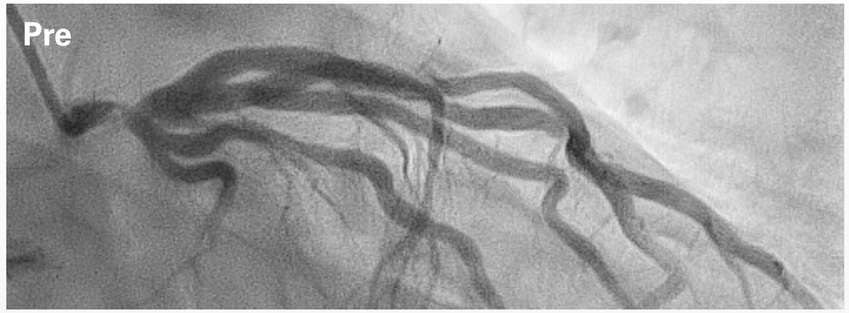
Angio

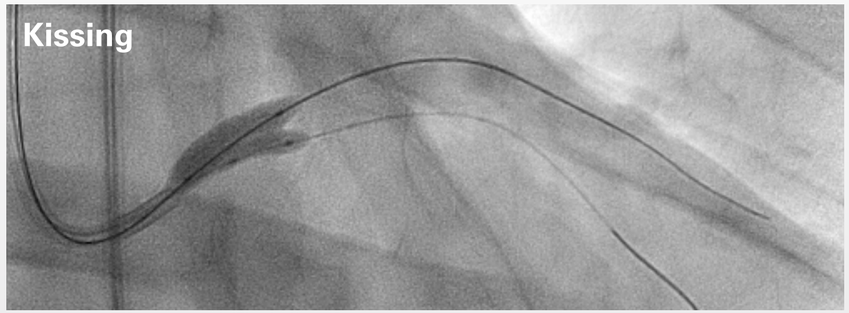
IVUS

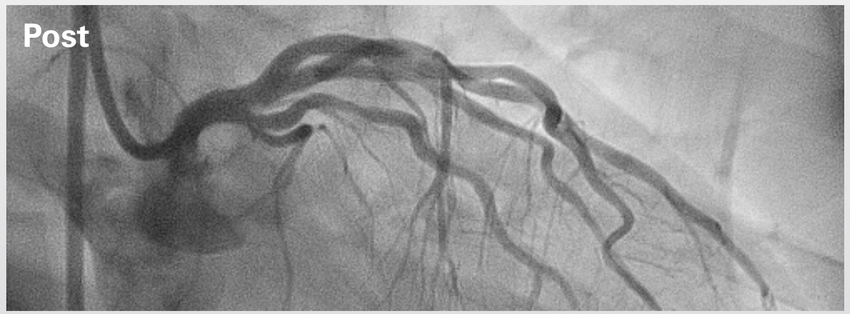
The stent struts from 11 to 6 o'clock do not contact the intima. If the image is not clear, flushing contrast media or saline while maintaining the IVUS catheter in place may help clearly visualize the stent struts and the vessel wall (known as negative contrast technique).

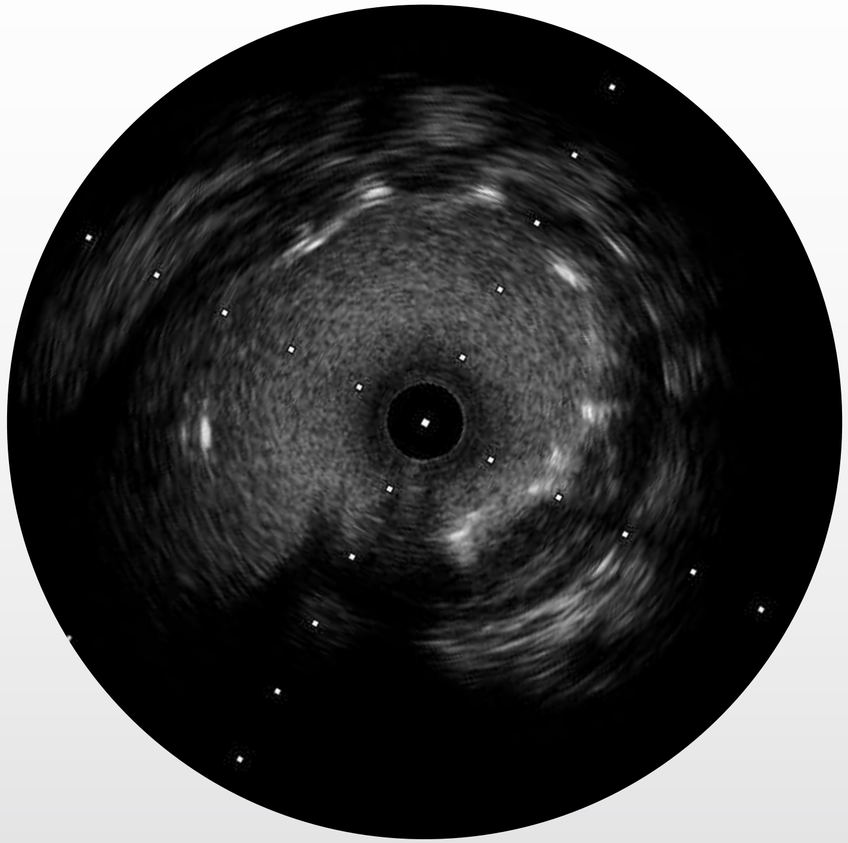
Case List

26 Bifurcation Stenting









TRACE

ON

VIDEO

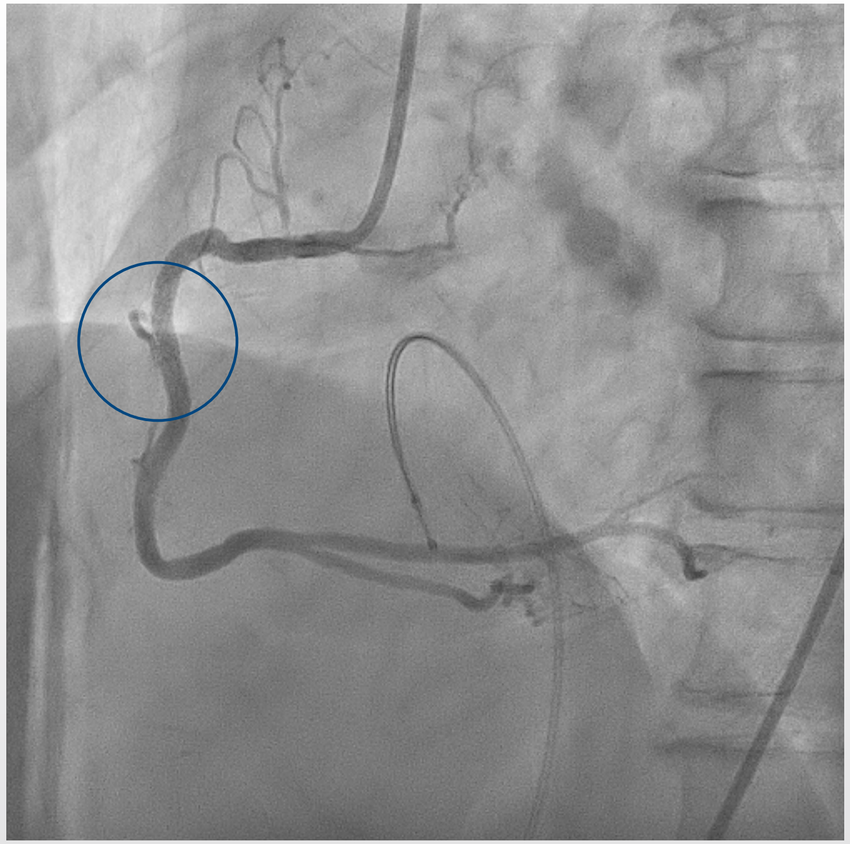
Angio

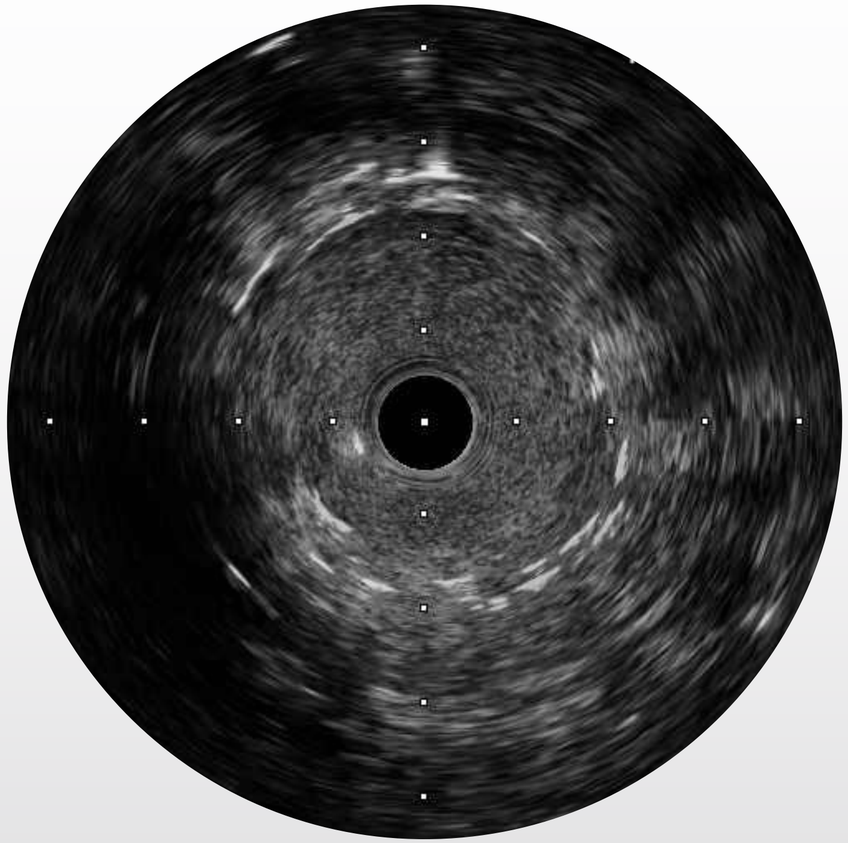
IVUS

The left circumflex (LCX) artery appears at 8 o'clock. Stent struts are well apposed from 10 to 6 o'clock clockwise. The stent struts from 6 to 10 o'clock disappears by kissing balloon inflation to avoid jailing the LCX ostium.

Case List

27 Stent Overlap





TRACE

ON

VIDEO

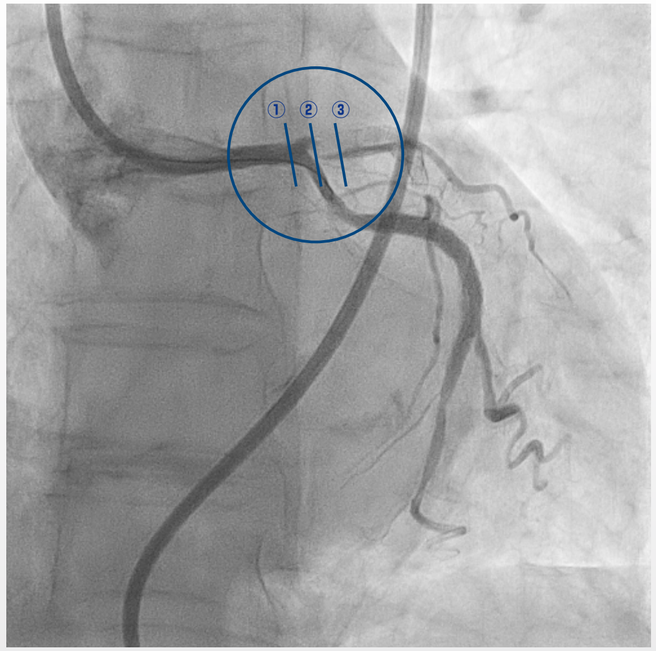
Angio

IVUS

Two layers of the stent struts are depicted. Due to the increased amount of metal, which reflects ultrasound, sometimes the entire vessel is not fully visualized because of the acoustic shadows of the stent struts.

Case List

28 Stent Deformation



Before Deformation

Image 1

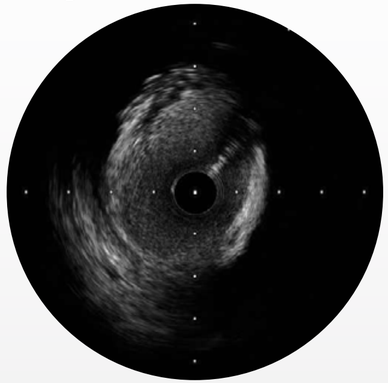


Image 2

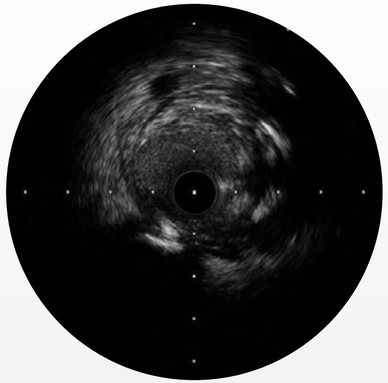


Image 3

After Deformation

Image 1´

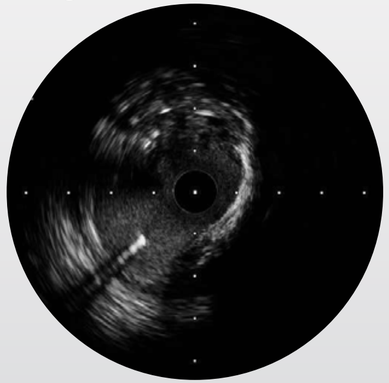


Image 2´

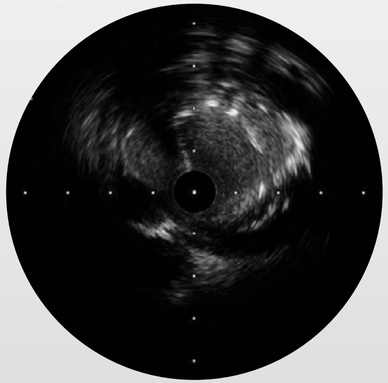
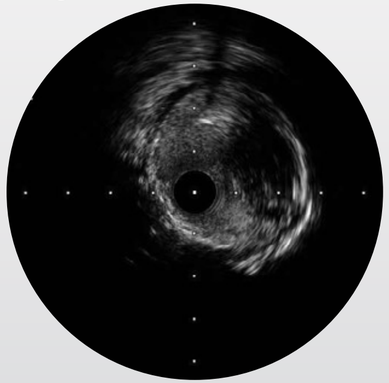


Image 3´



TRACE

ON

VIDEO

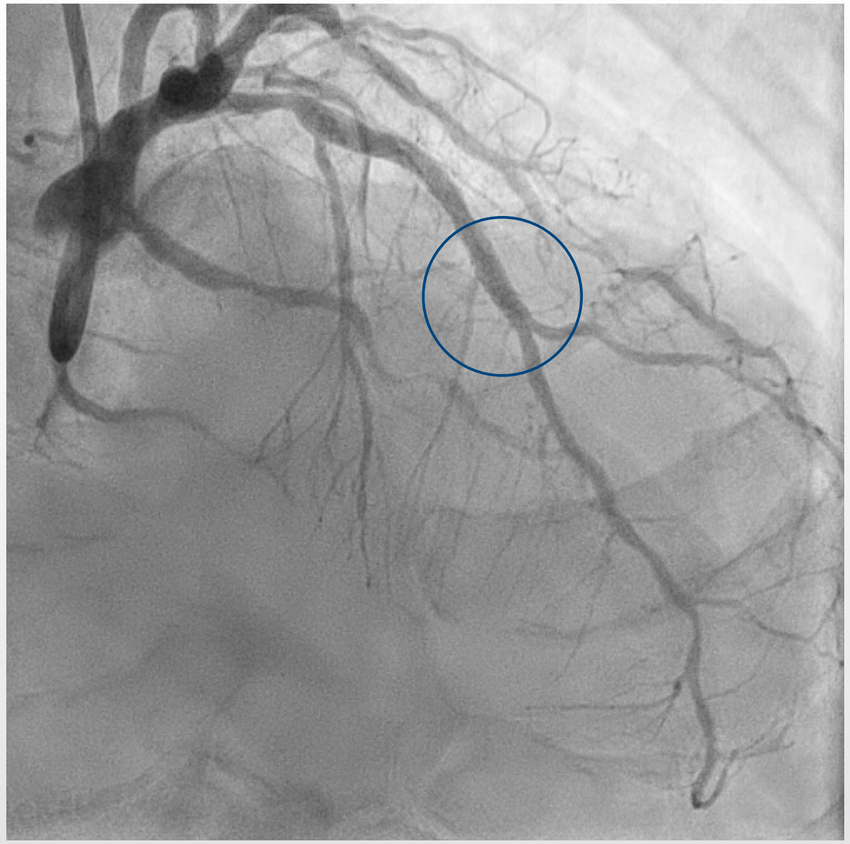
Angio

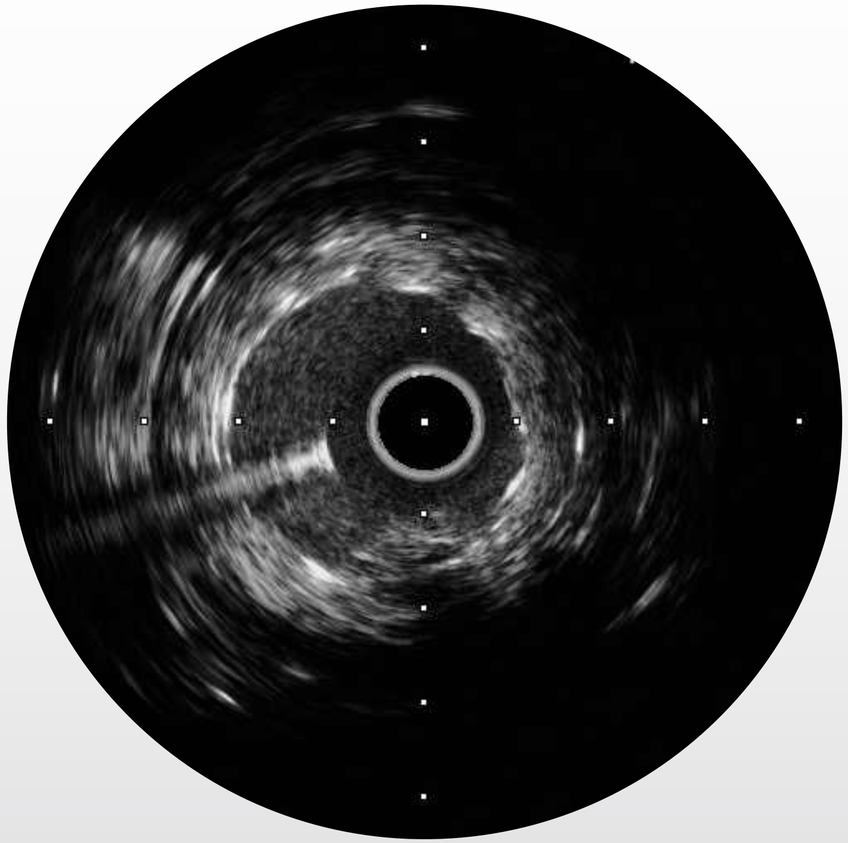
IVUS

Image 2 shows the target lesion before DCA. The proliferative tissue is seen from 2 to 6 o'clock clockwise on the stent struts. Image 3 is the body of the DES covered with the thin intima. Image 1 shows the distal LMT. After deformation, four stent struts are depicted in image 1´, which were not seen in image 1 which is the baseline. A protection wire in the CX is also seen in the same image. At the target site in image 2, the plaque from 3 to 6 o'clock was removed and the stent struts appear from 12 to 2 o'clock in image 2´. In image 3´, the stent struts disappeared which were depicted in image 3, and torn lumen is seen at 3 o'clock.
It is important to carefully check the IVUS images until you figure out what happened to the vessel.

Case List

29 Plaque Protrusion





TRACE

ON

VIDEO

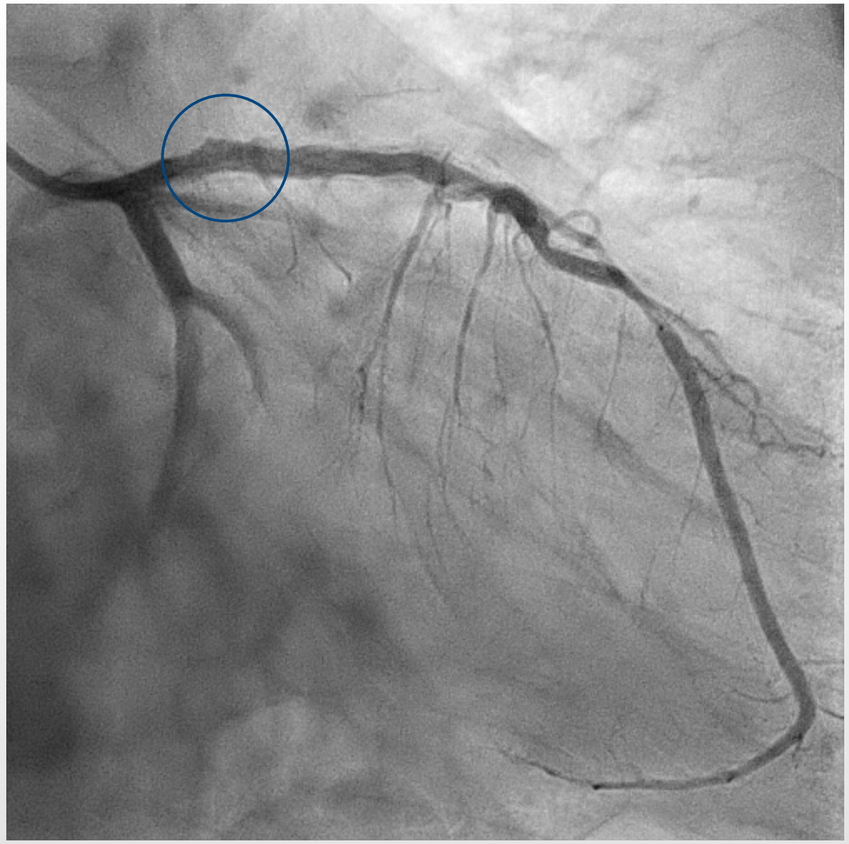
Angio

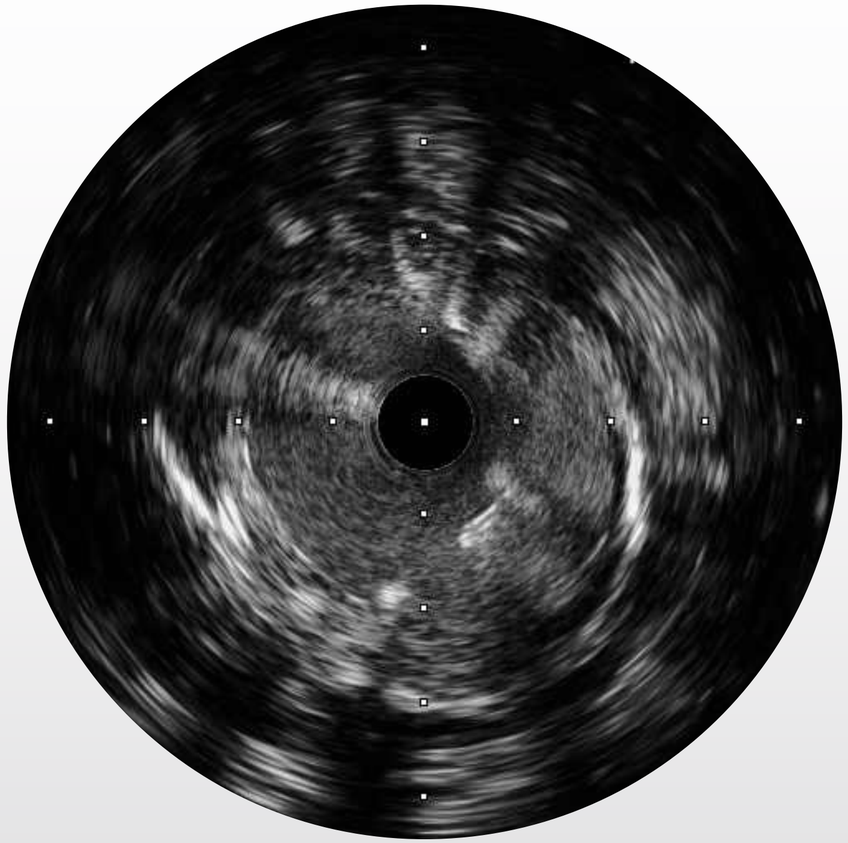
IVUS

On stent implantation in an ACS case, some protrusions may be observed in between the stent struts.
In the IVUS image, a protrusion appears in between the stent struts from 5 to 6 o'clock. The protrusion is presumed to be a thrombus or protruded plaque.

Case List

30 Peri-stent Contrast Staining





TRACE

ON

VIDEO

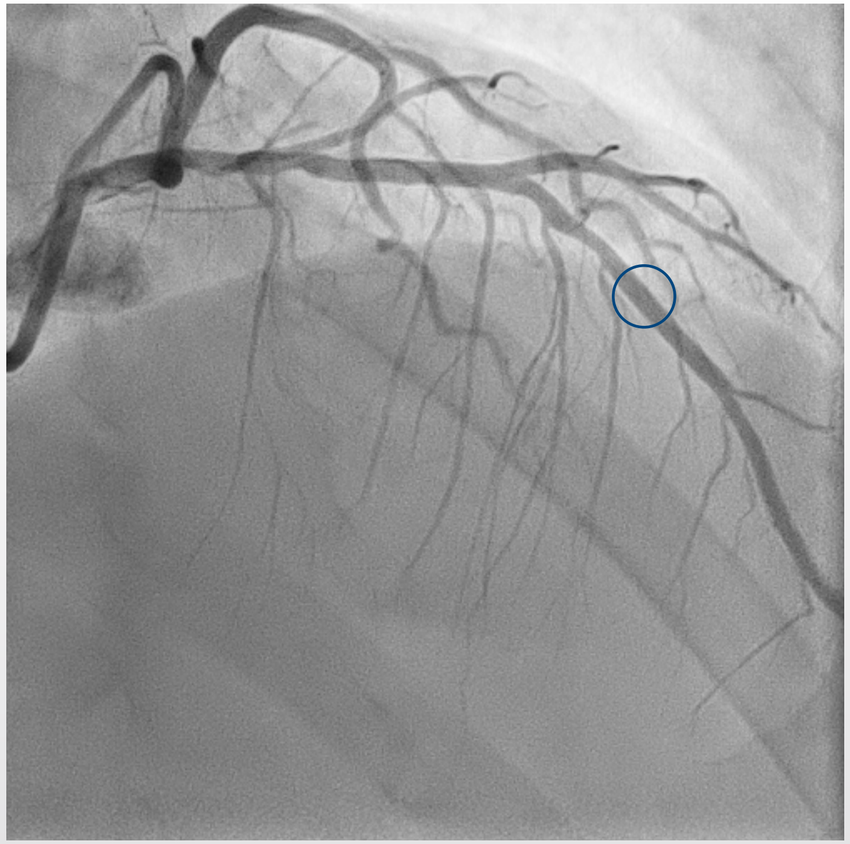
Angio

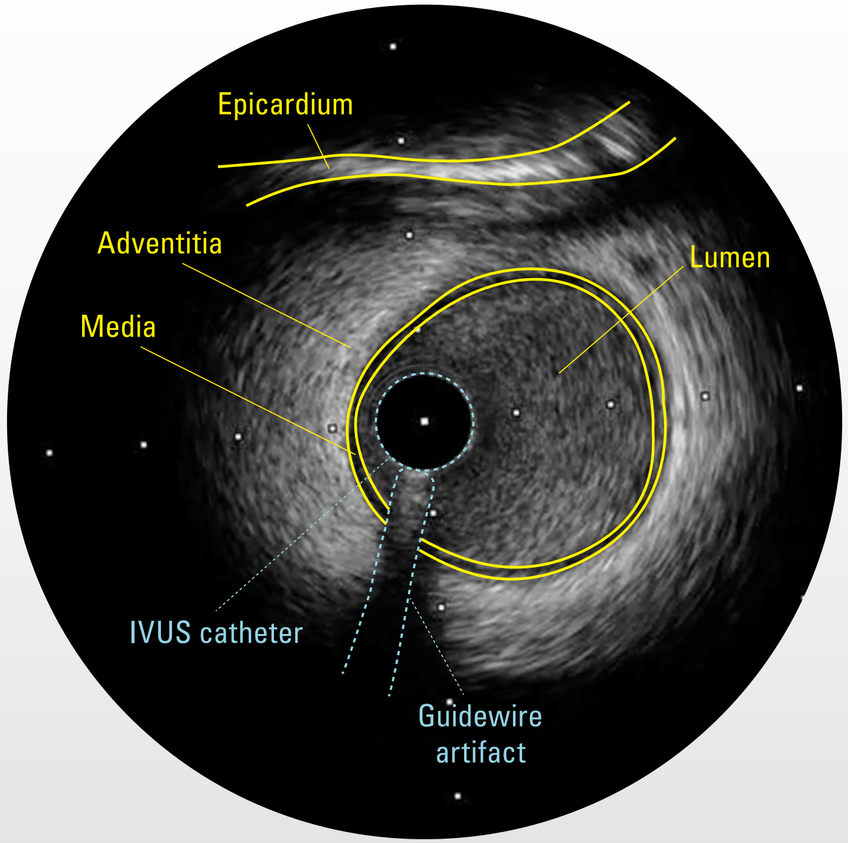
IVUS

A sirolimus-eluting stent (SES) was implanted in the left anterior descending artery (LAD) fourteen years ago. The IVUS image shows that the stent struts do not contact the vessel wall from 1 to 7 o'clock and blood speckle is observed behind the struts. Meanwhile, the vessel size and diameter are enlarged to approximately 6 mm. Following angiogram shows peri-stent contrast staining (PSS). Contrast media is visualized behind the stent struts by angiogram.

Case List

1 Normal Coronary Artery





TRACE

OFF

VIDEO

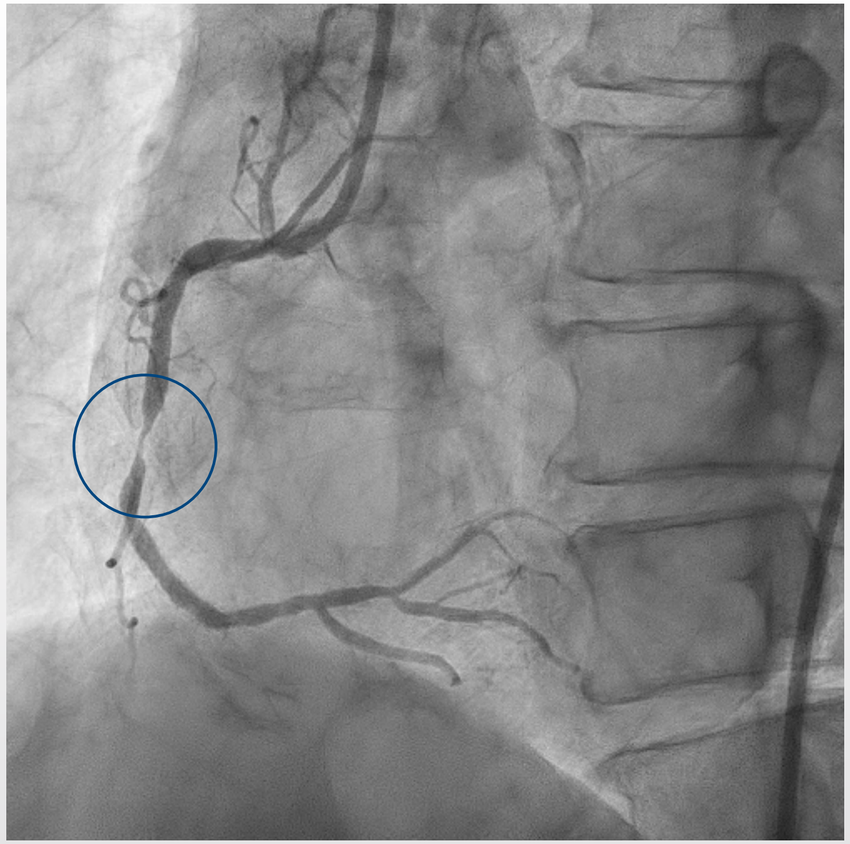
Angio

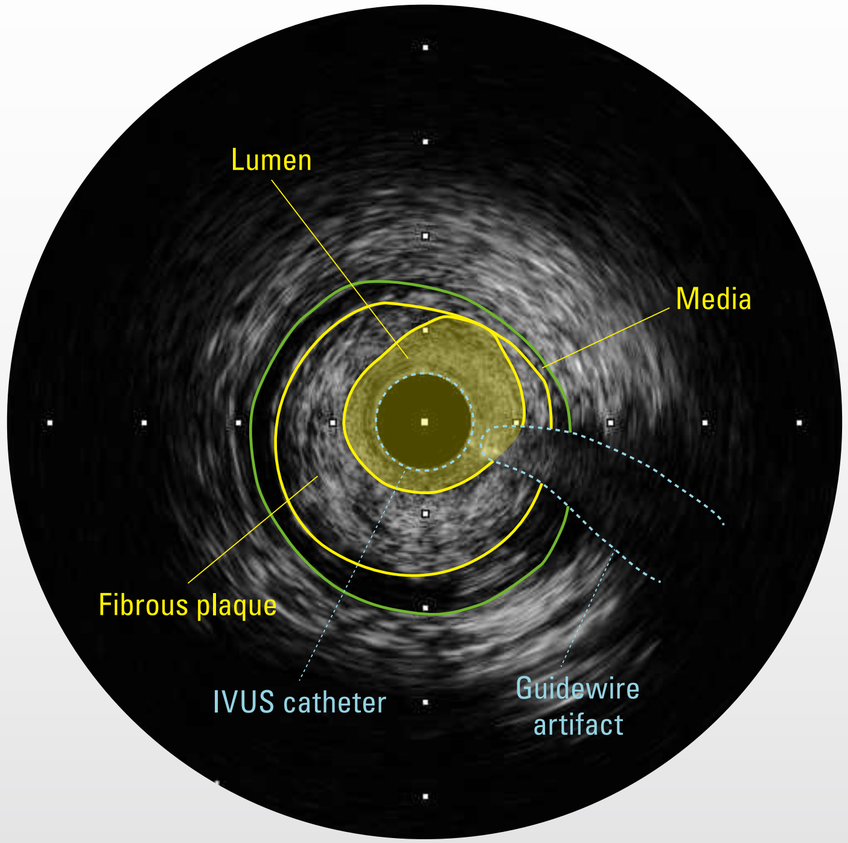
IVUS

An intravascular ultrasound (IVUS) image is a cross-sectional view of a blood vessel, looking from the proximal towards the distal end. Differences in acoustic impedance are represented by echogenic shadows that depict intravascular structures.
The normal coronary artery wall consists of three major layers, from inside the vessel, the intima, the media, and the adventitia. There is a thin layer called internal elastic membrane (IEM) in between the intima and the media, which is depicted as a hyperechoic layer. And there is another thin layer called external elastic membrane (EEM) in between the media and the adventitia, which is also depicted as a hyperechoic layer. The intima is the most inner layer of the vessel wall. It is dense and appears as a white layer between the media and lumen. The media is rendered as a hypoechoic and about 0.1 mm wide band surrounding the IEM. The adventitia and the surrounding tissue are depicted as a continuous hyperechoic region.
This IVUS image is rotated, and the epicardium is positioned at 12 o'clock. The hyperechoic region at 6 o'clock and subsequent shadow are guidewire artifacts.

Case List

2 Fibrous Plaque





TRACE

OFF

VIDEO

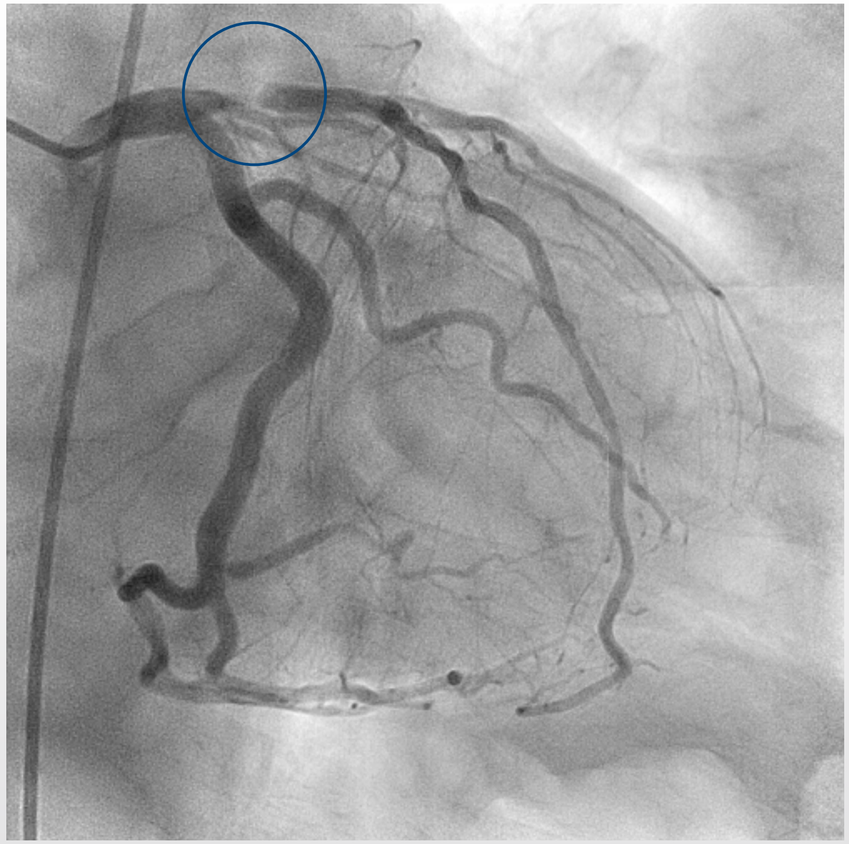
Angio

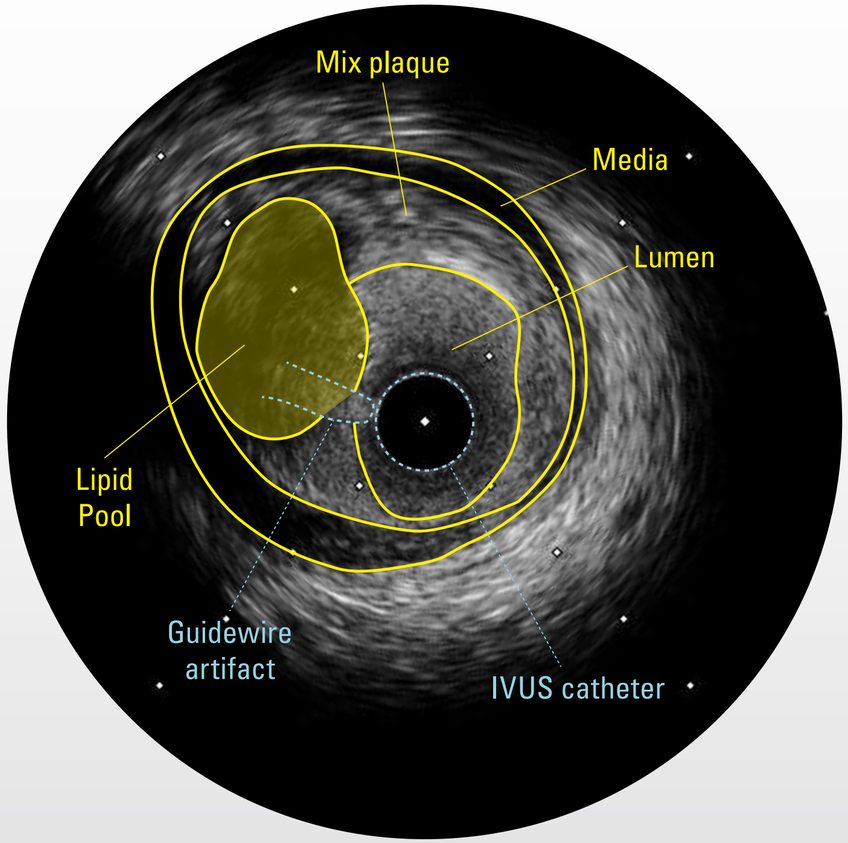
IVUS

The image shows an uneven circumferential fibrous plaque which is as echogenic as the adventitia.
The lumen looks homogenous and relatively hyperechoic due to reflected ultrasound by red blood cells with the stagnant blood flow.

Case List

3 Lipid Plaque





TRACE

OFF

VIDEO

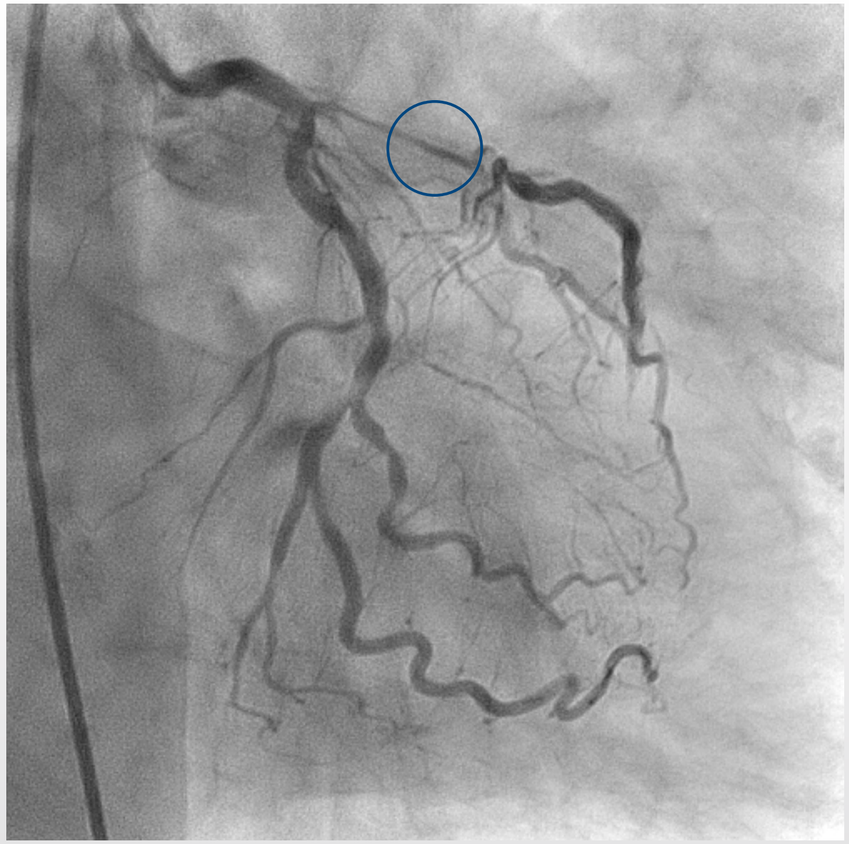
Angio

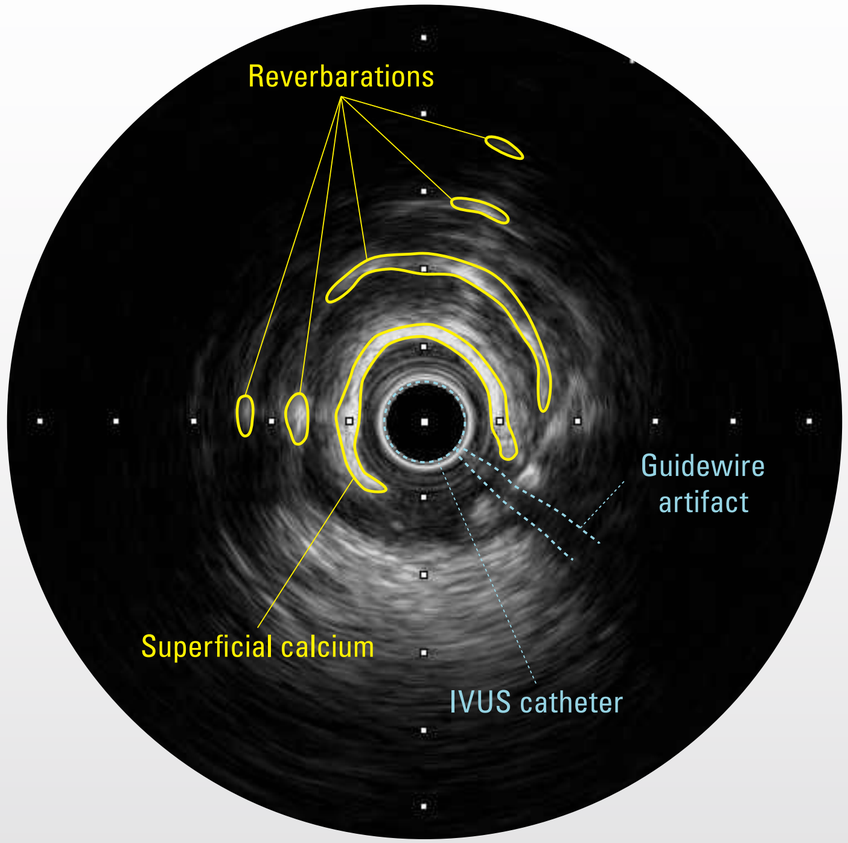
IVUS

The IVUS image is rotated to position the epicardium at 12 o'clock. The stenosis is located at the proximal LAD with RAO caudal view by angiogram. On the IVUS image, a hypoechoic area is observed from 9 to 12 o'clock, which looks dark (attenuated echo).
The area is considered as a lipid pool and presumed to be lipid rich. A lipid pool can be mistaken as a thrombus, and it is sometimes difficult to distinguish them.

Case List

4 Superficial Calcified Plaque





TRACE

OFF

VIDEO

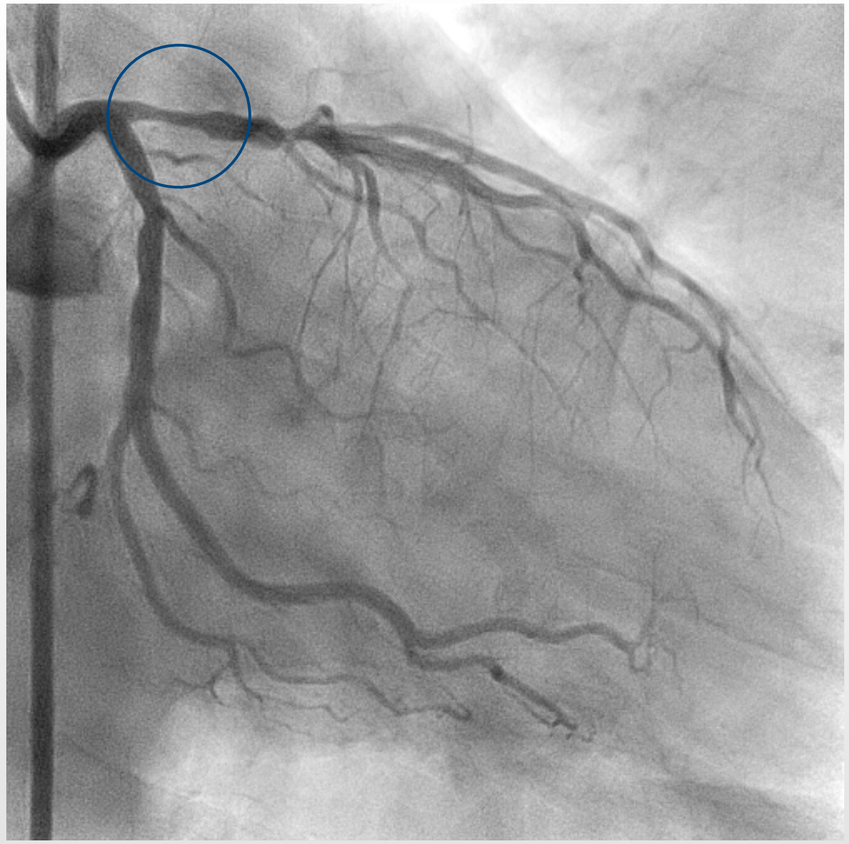
Angio

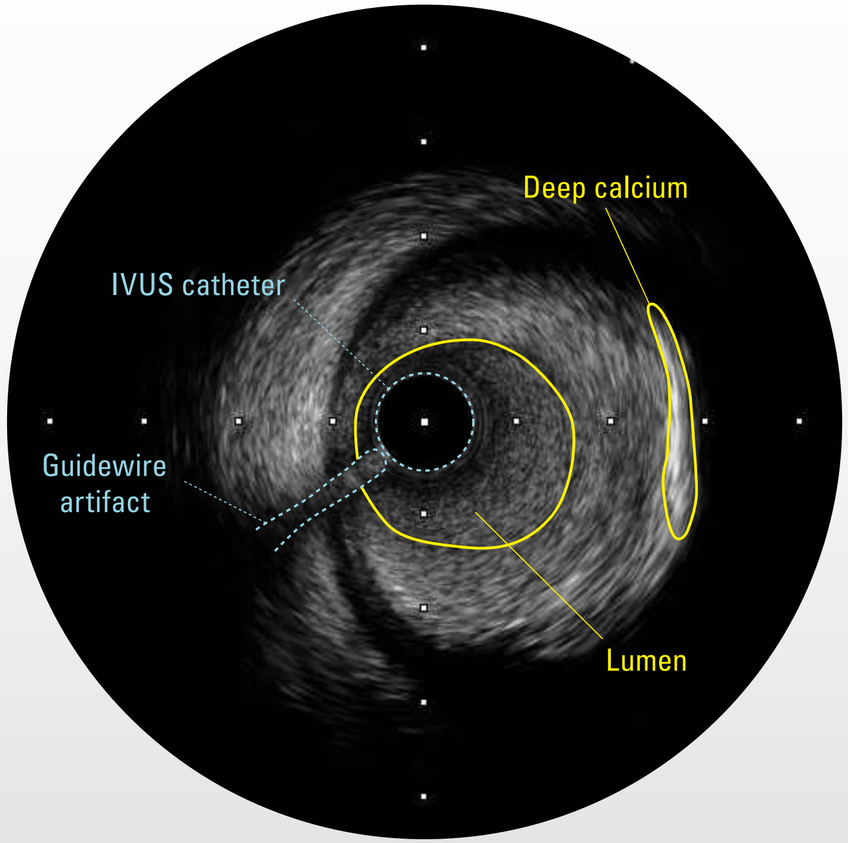
IVUS

There is a 270-degree arch of bright hyperechoic band from 7 to 4 o'clock clockwise, which represents superficial calcified plaque with dark area behind it, which is called acoustic shadows.
Multiple reflections of ultrasound waves between the IVUS catheter and the calcified plaque create equally spaced hyperechoic areas called reverberation.

Case List

5 Deep Calcified Plaque





TRACE

OFF

VIDEO

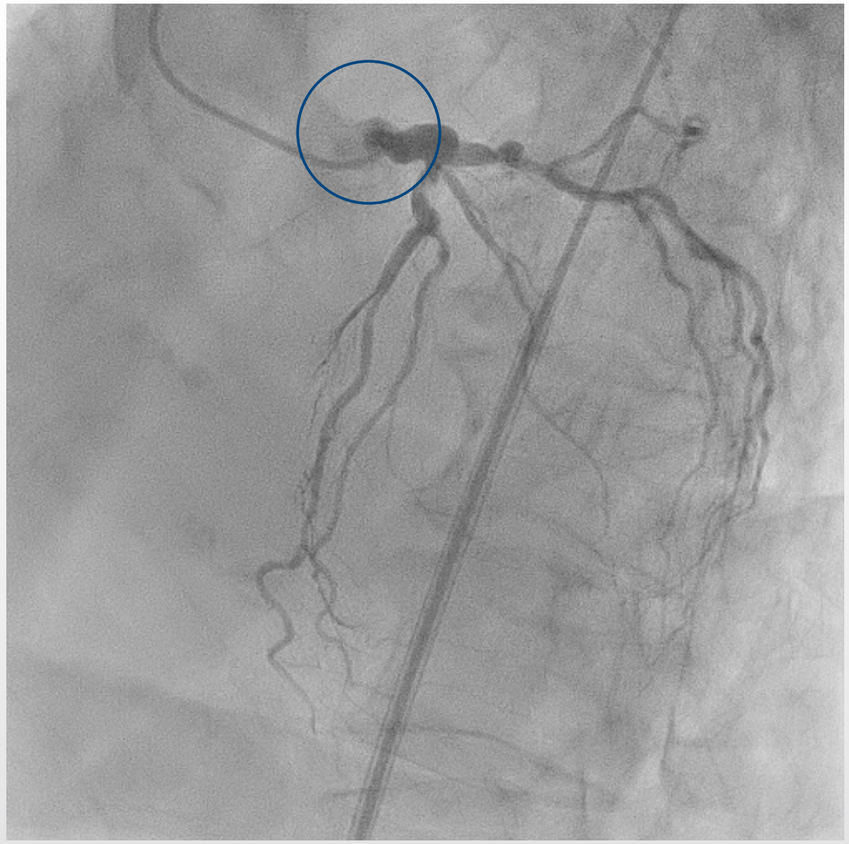
Angio

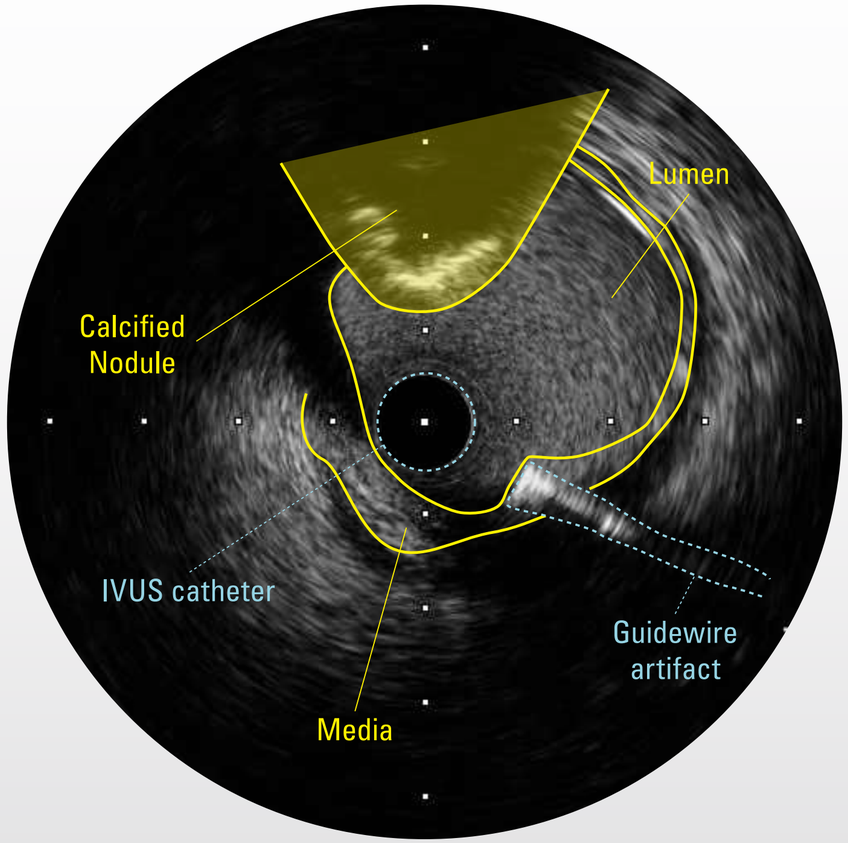
IVUS

The image is rotated to position the epicardium at 12 o'clock.
The hyperechoic area from 2 to 4 o'clock clockwise with acoustic shadow behind it is defined as deep calcified plaque.
The plaque inside the deep calcified plaque is as bright as the adventitia therefore it is considered as fibrous plaque.

Case List

6 Calcified Nodule





TRACE

OFF

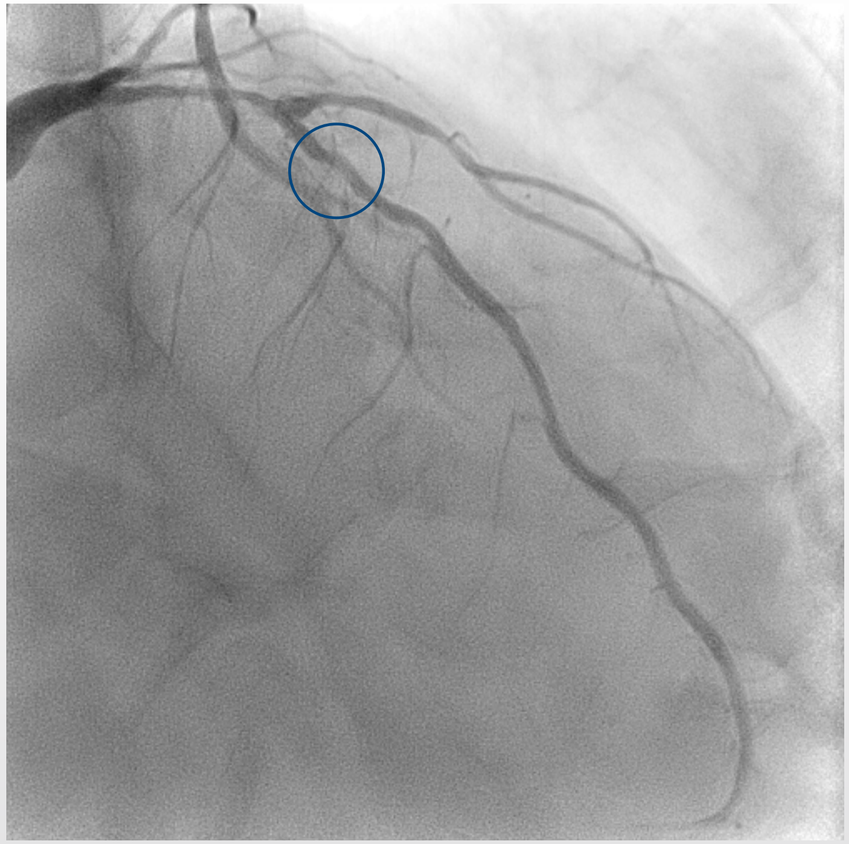
VIDEO

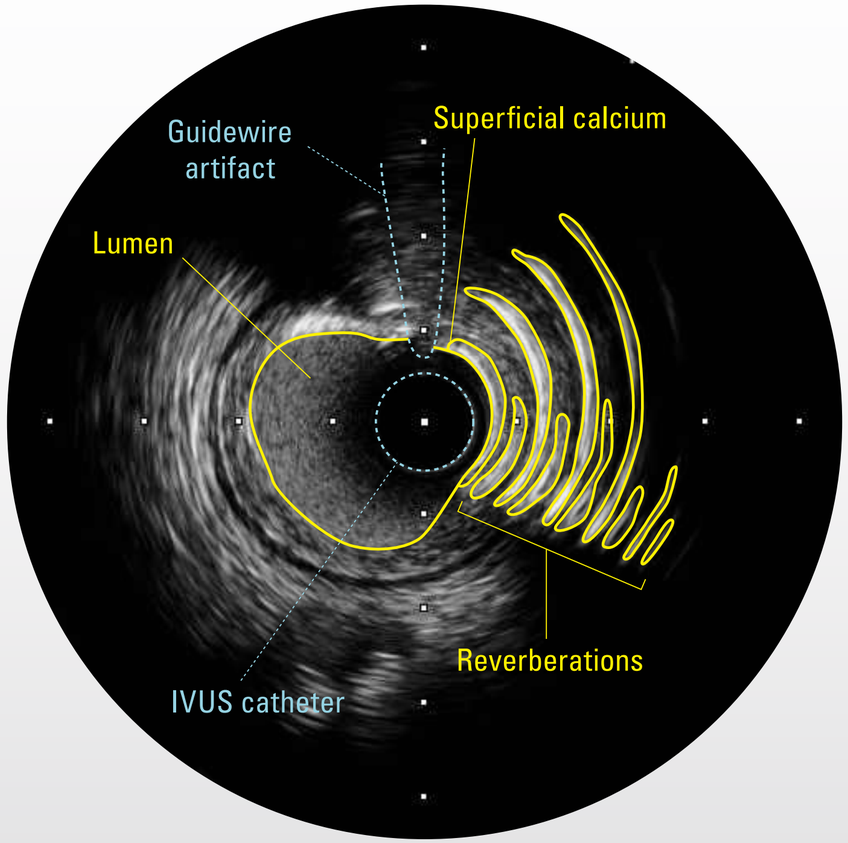
Angio

IVUS

A distorted hyperechoic area is observed with an acoustic shadow protruding at the 12 o'clock position in the left main trunk (LMT). It is found to be protruding into the lumen and is thus considered to be a calcified nodule. Calcified nodules have irregular surface and sometimes have coral-like shape. On the IVUS image, the LMT is not significantly stenosed.

7 Reverberation





TRACE

OFF

VIDEO

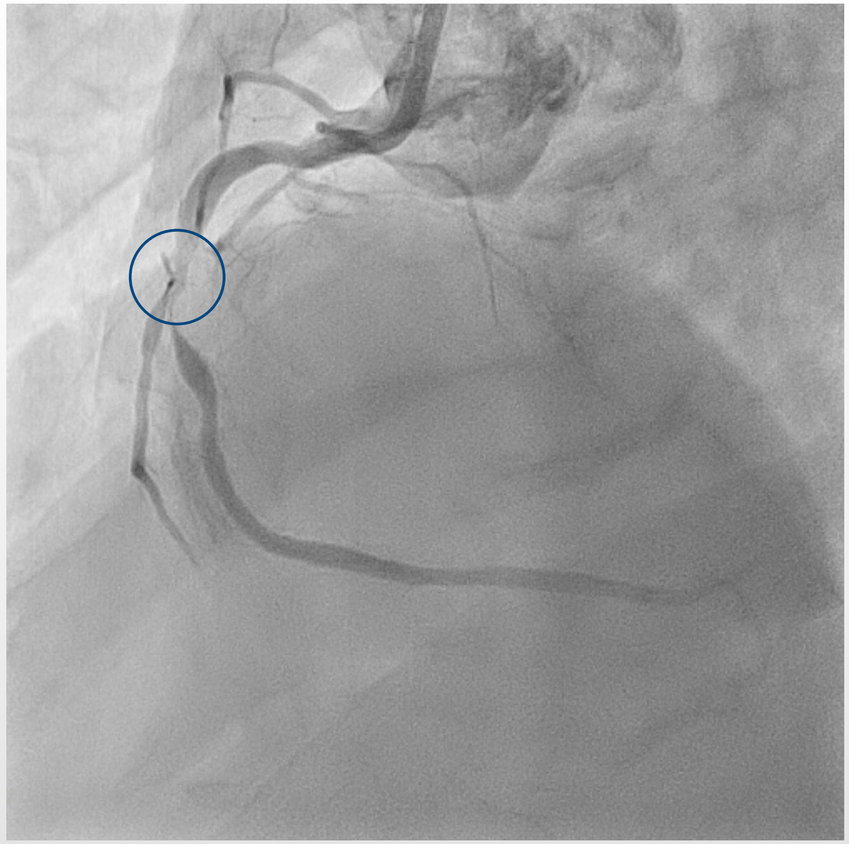
Angio

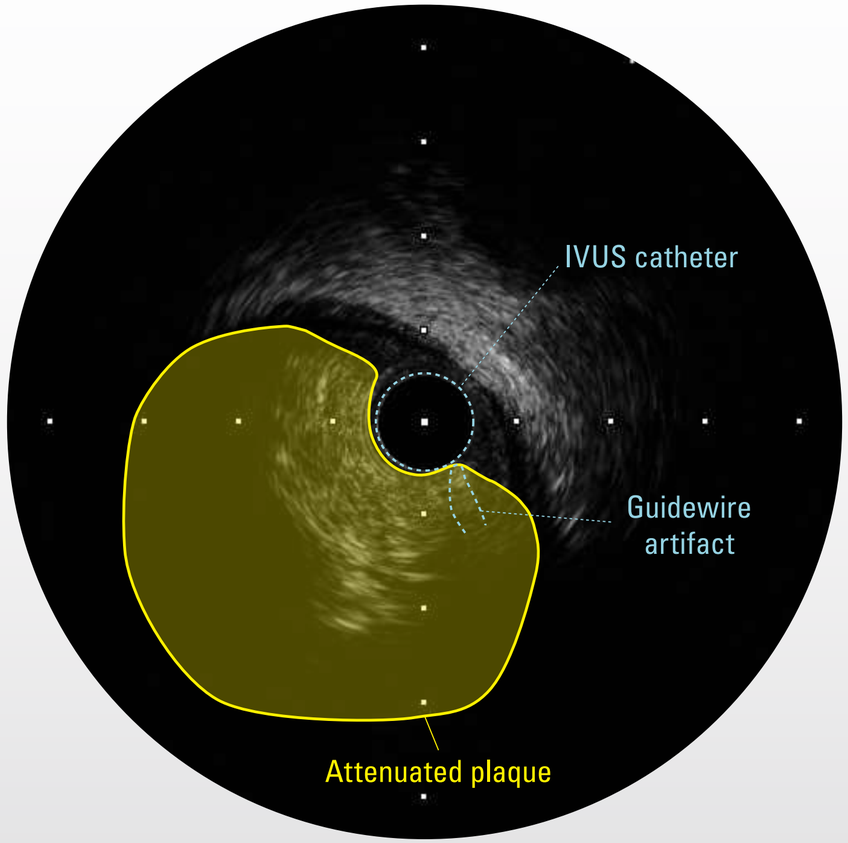
IVUS

Equally spaced hyperechoic arches, which are observed concentrically from 2 to 4 o'clock clockwise, are called reverberations of calcified plaque.
Multiple reflections of ultrasound beam between the ultrasound transducer and the calcified surface are depicted.
The space between the hyperechoic arches represents the distance between the transducer and the calcified plaque.

Case List

8 Attenuated Plaque





TRACE

OFF

VIDEO

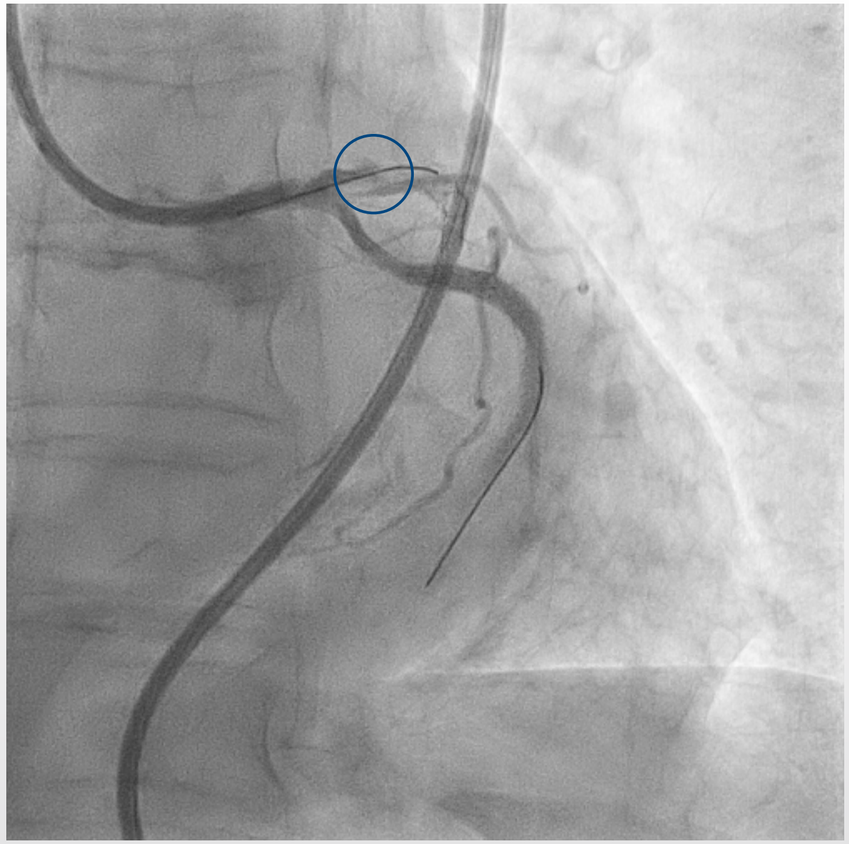
Angio

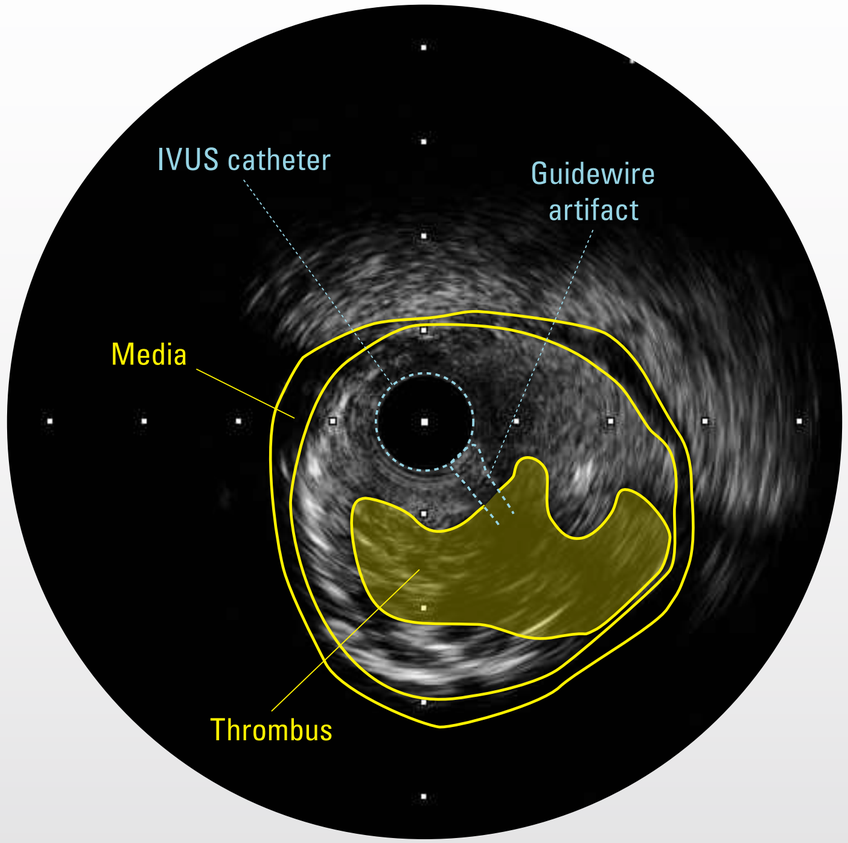
IVUS

The far field is not well depicted due to the scattering and absorption of the ultrasound waves by plaque. This is attenuated plaque. Microcalcifications and/or cholesterol crystals within the plaque cause poor signal reflection behind them. The attenuated plaque is considered to contain a large necrotic core, which may cause slow flow, no re-flow and/or distal embolization after balloon and/or stent dilation.

Case List

9 Thrombus





TRACE

OFF

VIDEO

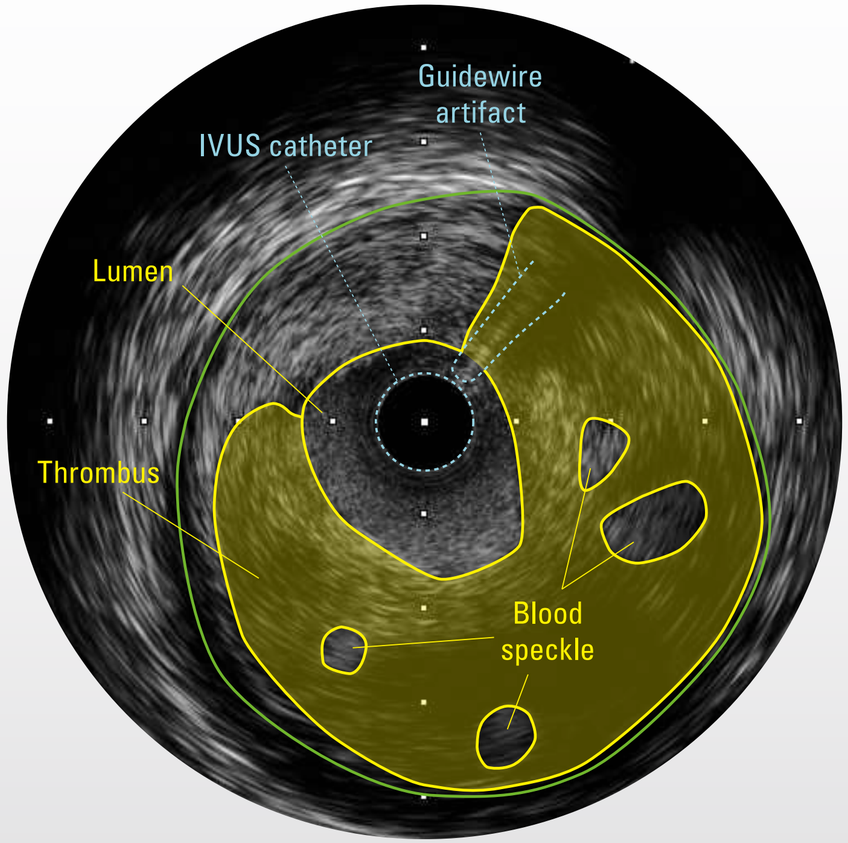
Angio

IVUS

This IVUS image was captured after wire crossing in an acute coronary syndrome (ACS) case. An intramural low echogenic mass with attenuation is observed. In case of ACS, any echolucent (hypoechoic) areas are presumed to represent thrombi. A thrombus becomes hyperechoic as it become organized, then it demonstrates various image patterns. A thrombus can be identified considering clinical presentation.

Case List

10 Honeycomb-like Thrombus



TRACE

OFF

VIDEO

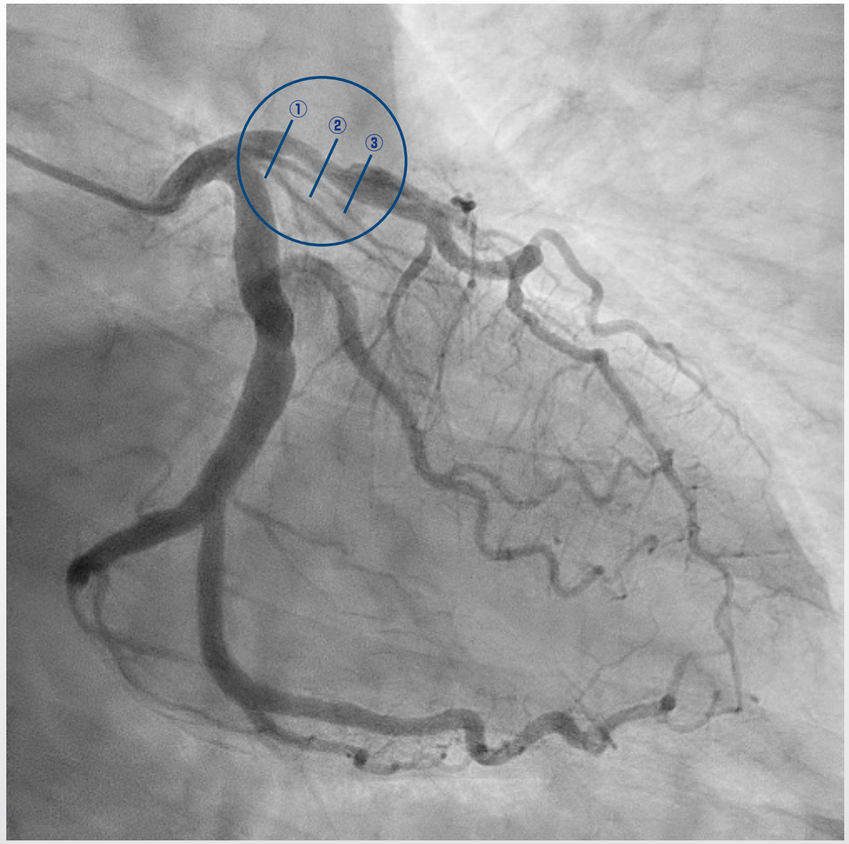
Angio

IVUS

The IVUS image shows multiple cavities generated inside the thrombus. The angiogram is not able to visualize them.

Case List

11 Negative Remodeling



Proximal
Image 1

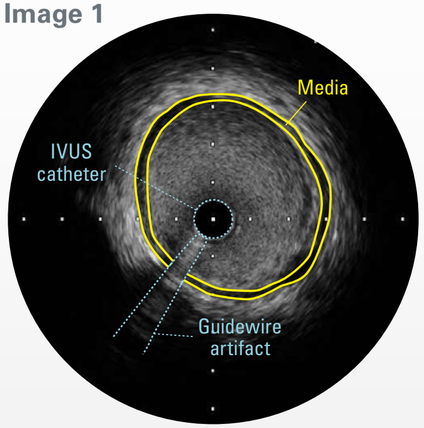
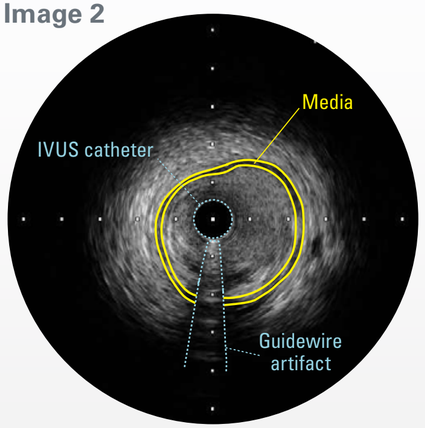
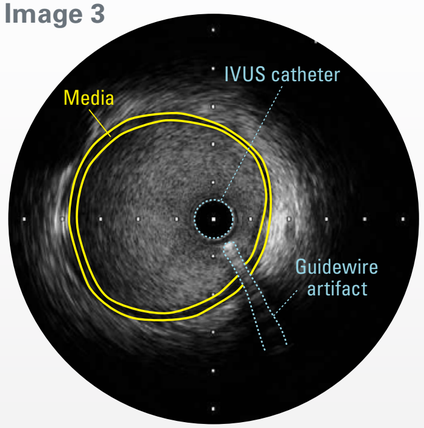
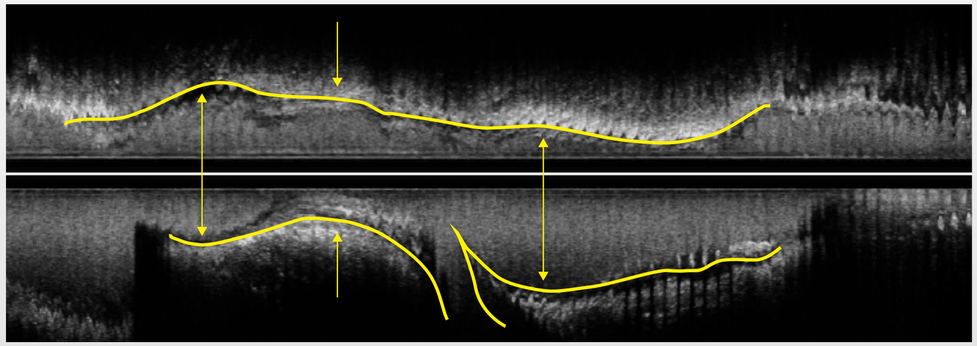


Image 2



Distal
Image 3





① ② ③

The vessel cross sectional area in image 2 appears smaller than the distal vessel in image 3. Blood vessels normally taper from the proximal to the distal end, but the vessel diameter in image 2 is smaller than that of the distal side. This is called negative remodeling.

TRACE

OFF

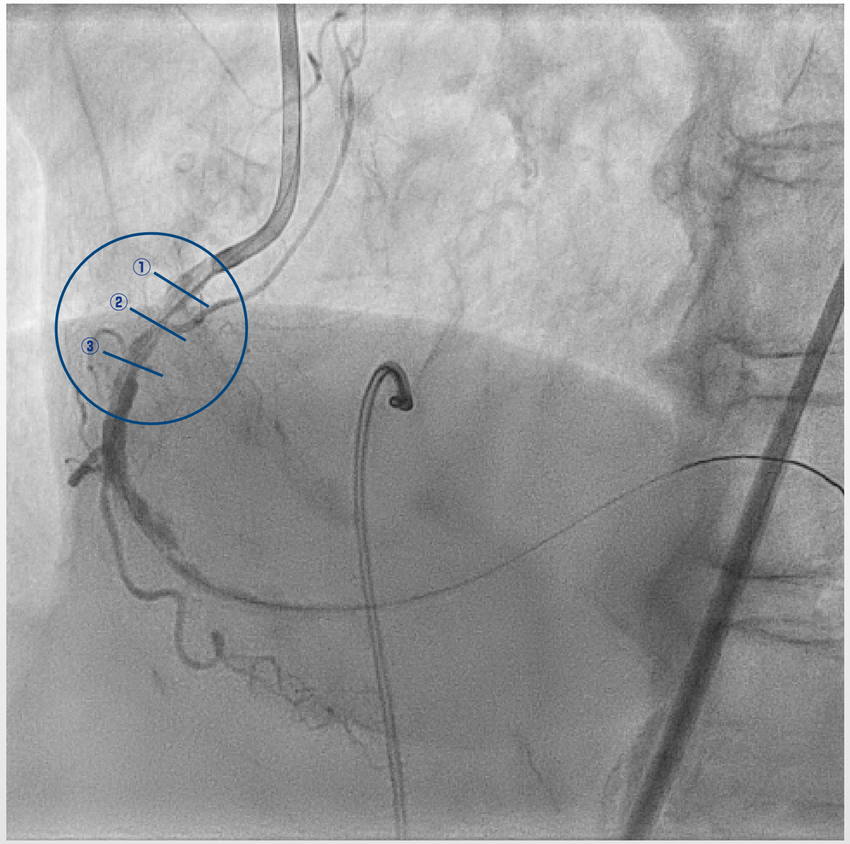
VIDEO

Angio

IVUS

Case List

12 Positive Remodeling



Proximal
Image 1

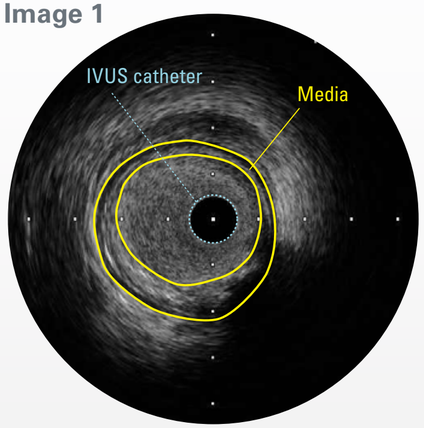
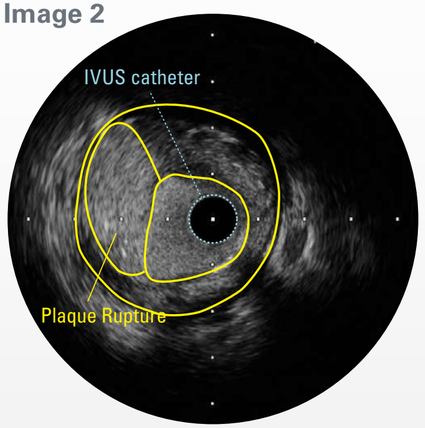
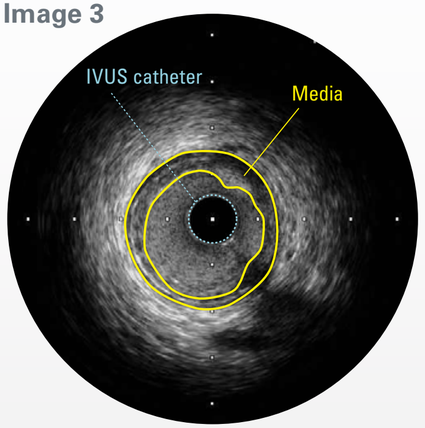
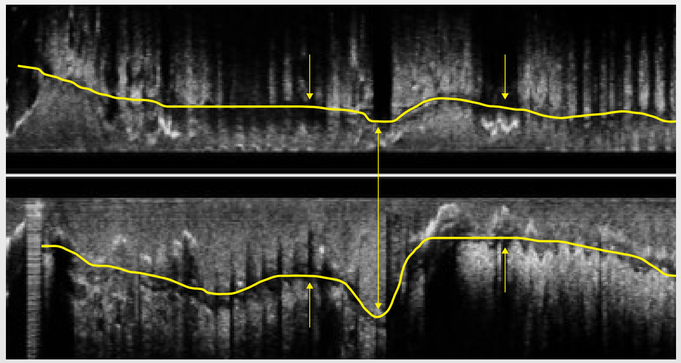


Image 2



Distal
Image 3





① ② ③

The vessel cross sectional area in image 2 is larger than that of image 1 (which is proximal to image 2) and image 3 (which is the distal reference to the same), and this is called positive remodeling. Plaque rupture is visualized at 9 o'clock in image 2.

TRACE

OFF

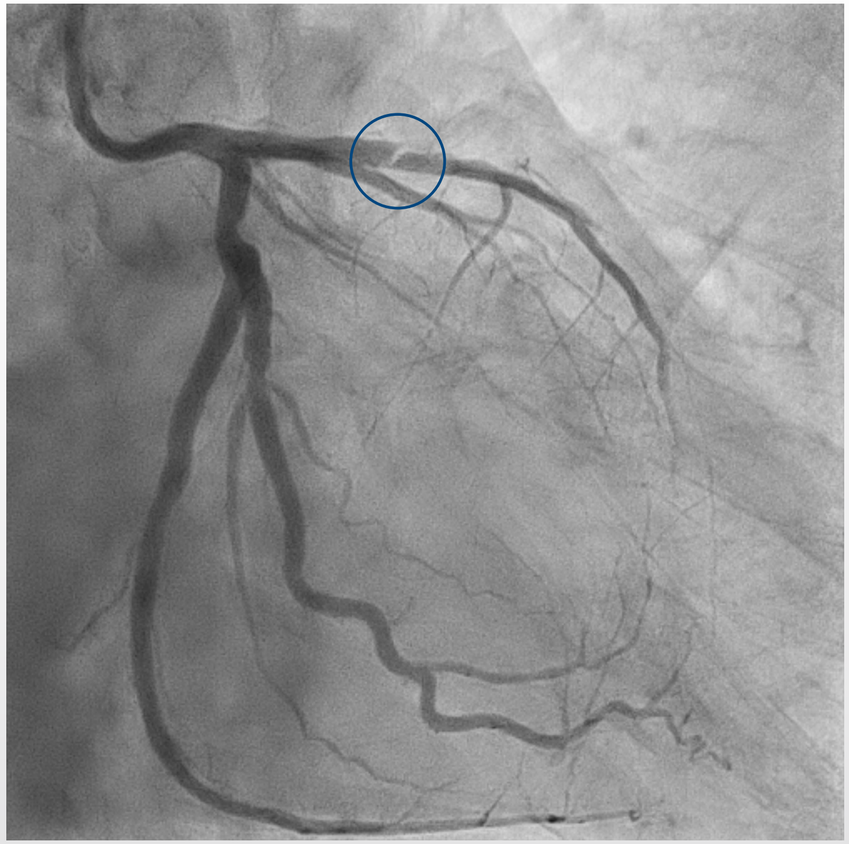
VIDEO

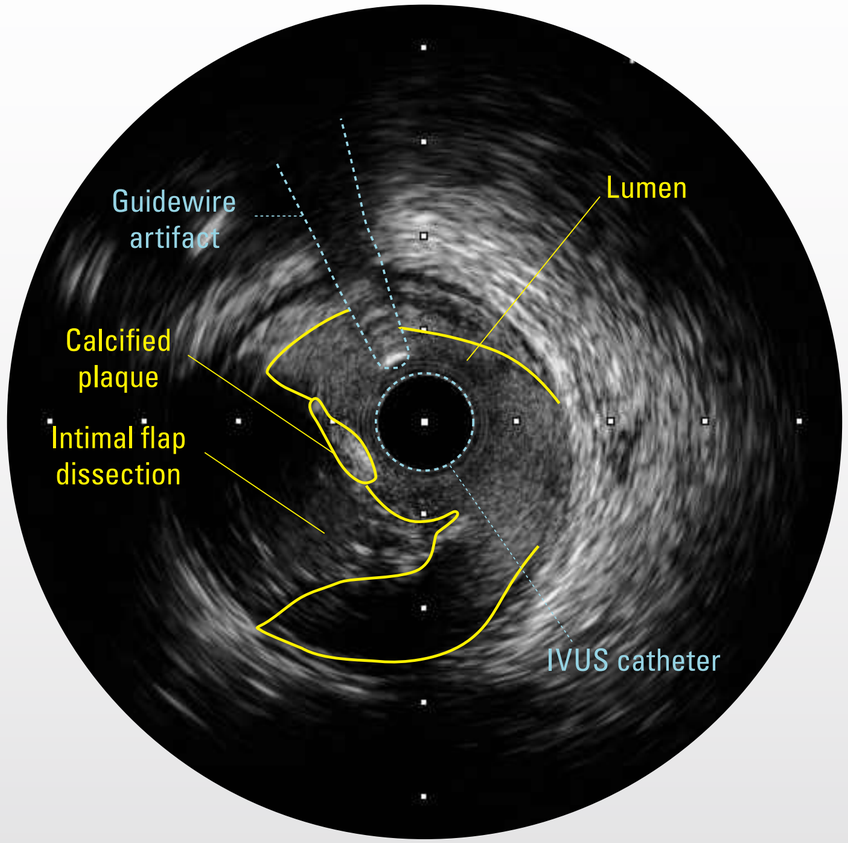
Angio

IVUS

Case List

13 Plaque Dissection





TRACE

OFF

VIDEO

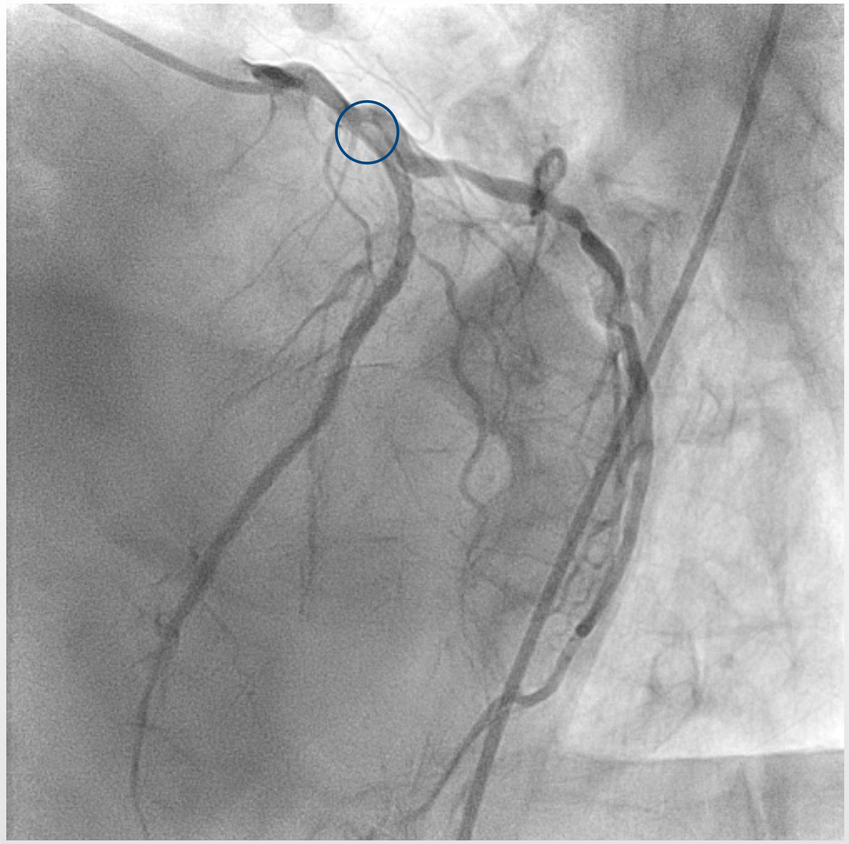
Angio

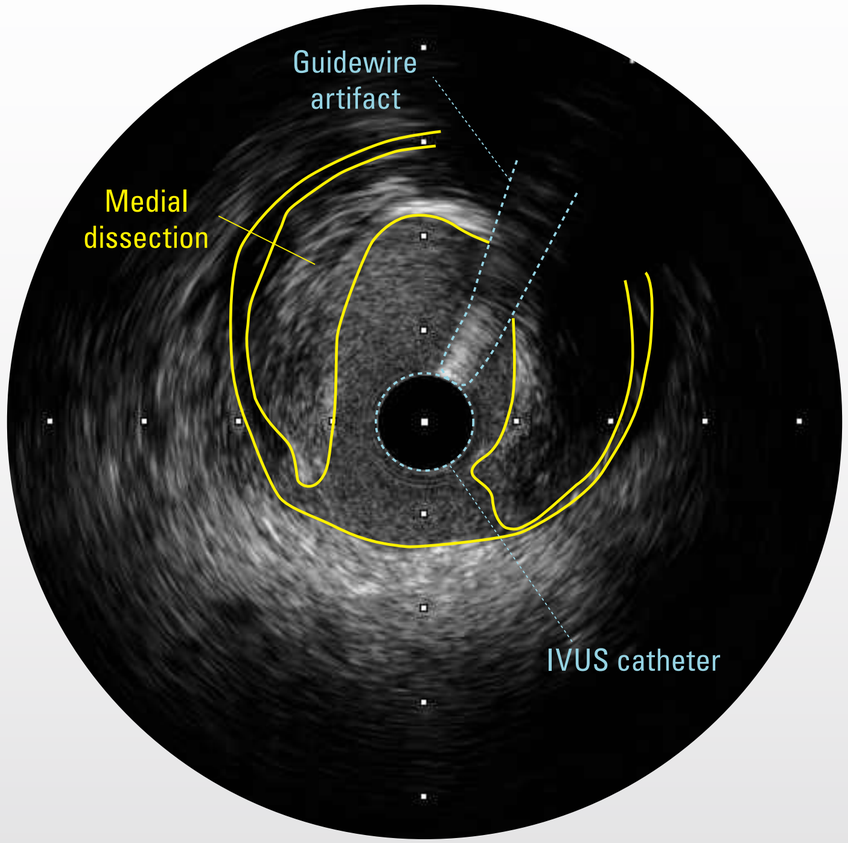
IVUS

An example of plaque dissection. Both the intima and the plaque are disrupted, and the disruption extends into the media. Where the ruptured end protrudes into the lumen and if it becomes thin and movable, it is called a flap.

Case List

14 Medial Dissection





TRACE

OFF

VIDEO

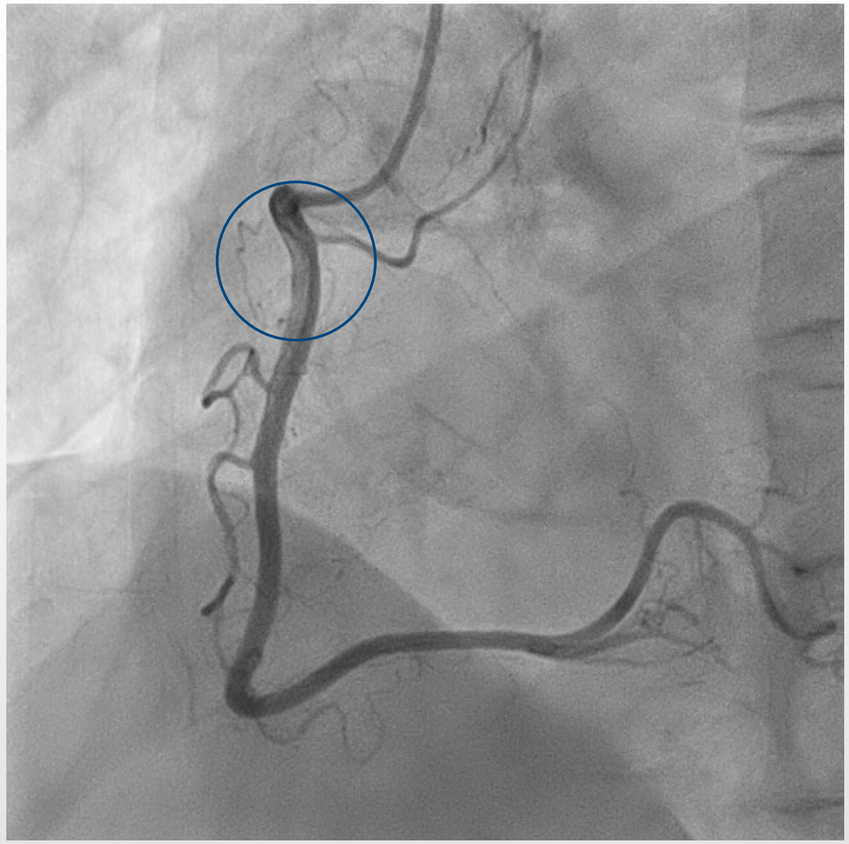
Angio

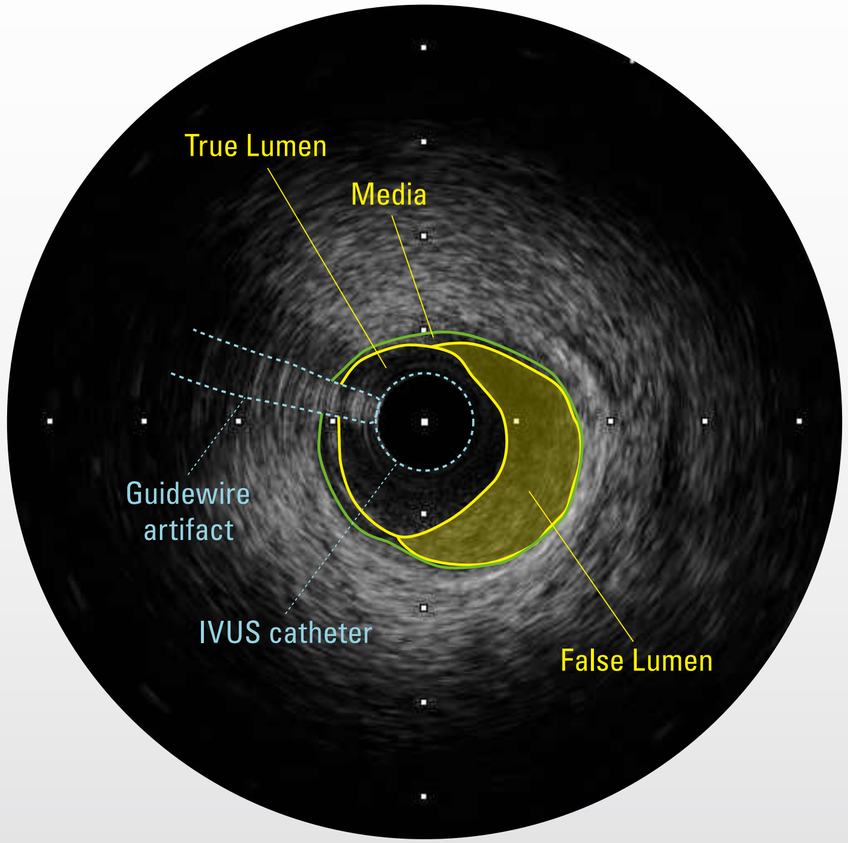
IVUS

Following the line of the vascular intima, it discontinues at approximately 6 o'clock , indicating that plaque dissection has occurred. The black band of the media has also disappeared, indicating that the dissection has reached the media.

Case List

15 SCAD - Spontaneous Coronary Artery Dissection





TRACE

OFF

VIDEO

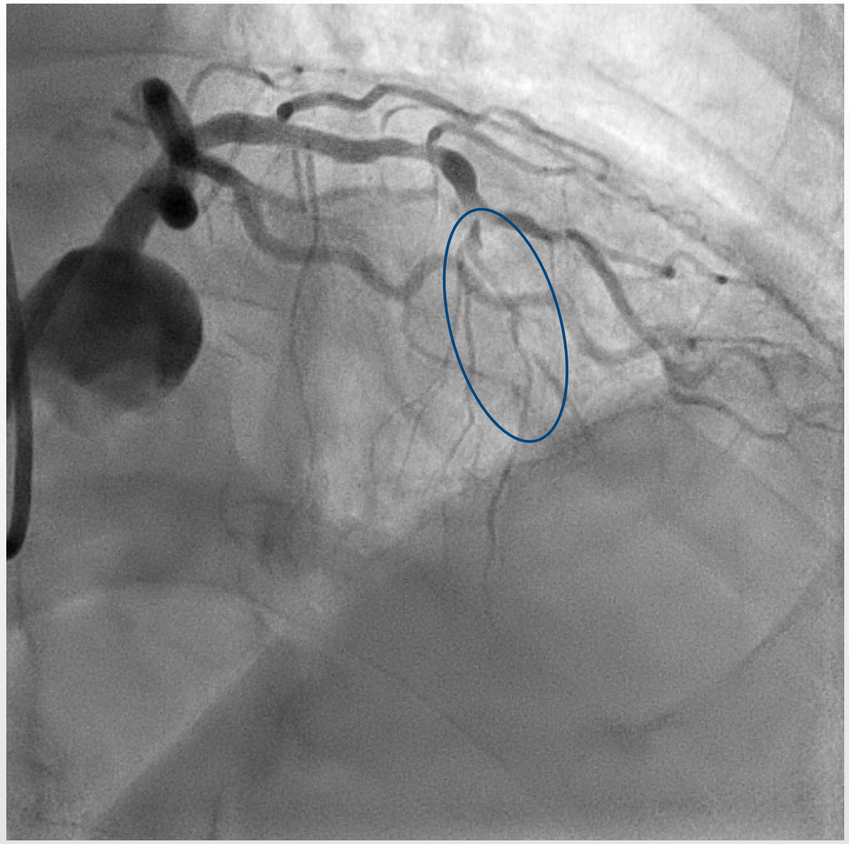
Angio

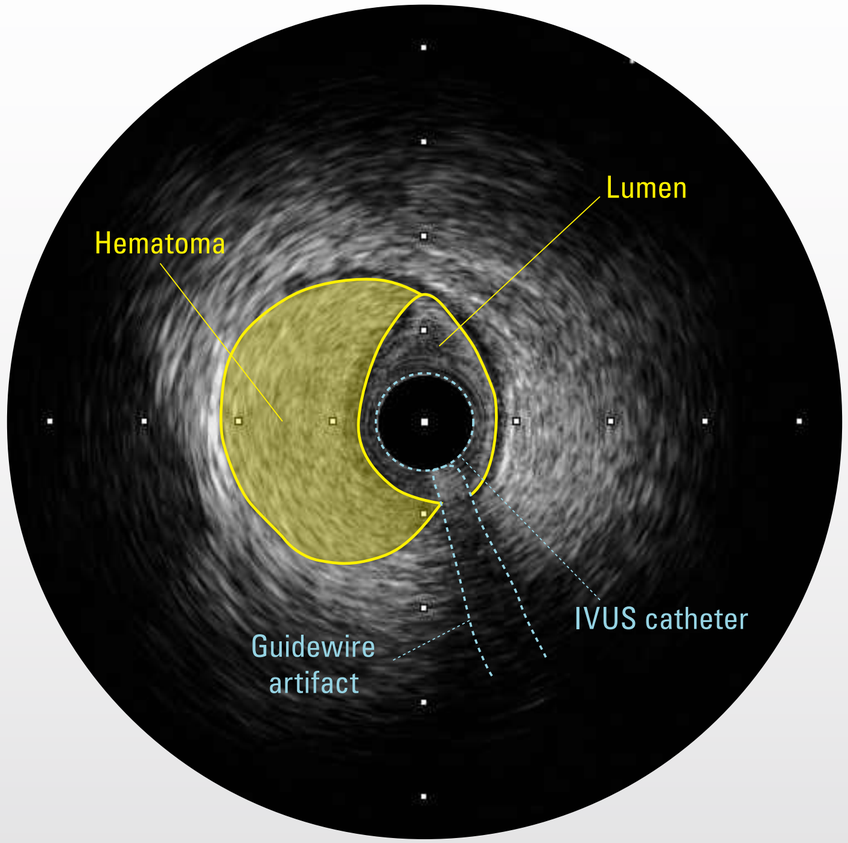
IVUS

Spontaneous coronary artery dissection (SCAD) is rarely associated with intimal thickening and mostly found in relatively young female population. The dissection extends into the boundary of the media and the adventitia. Three-layered circular structure is visualized around the IVUS catheter in the IVUS image. The inner small circle represents the true lumen which is compressed by the false lumen. The false lumen appears like a crescent which covers from 12 to 6 o'clock clockwise.

Case List

16 Hematoma





TRACE

OFF

VIDEO

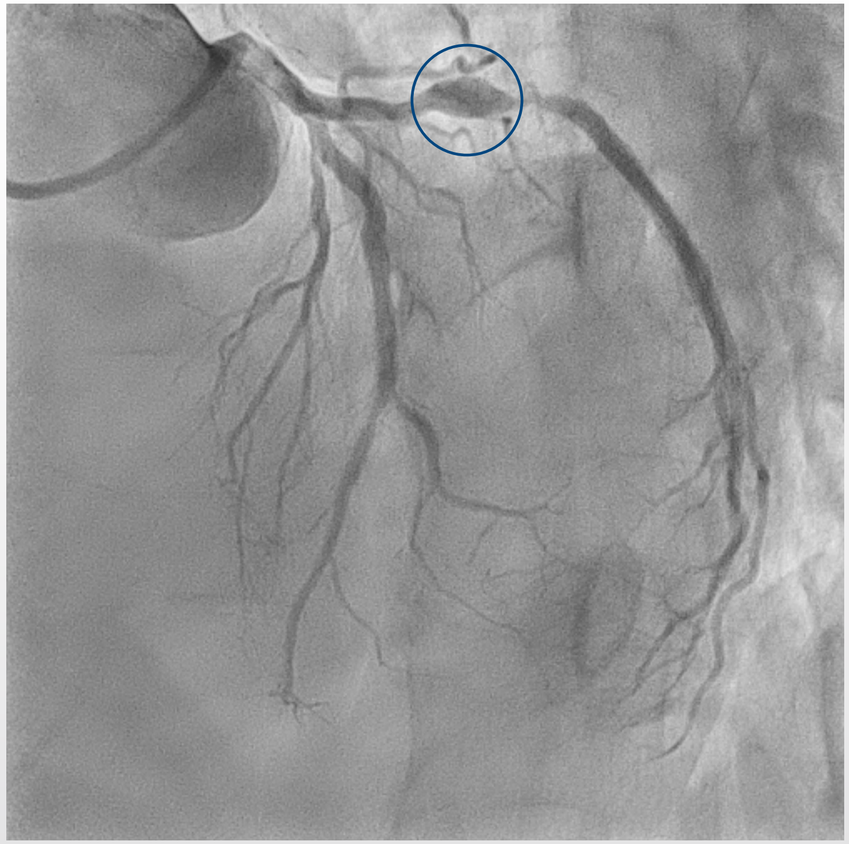
Angio

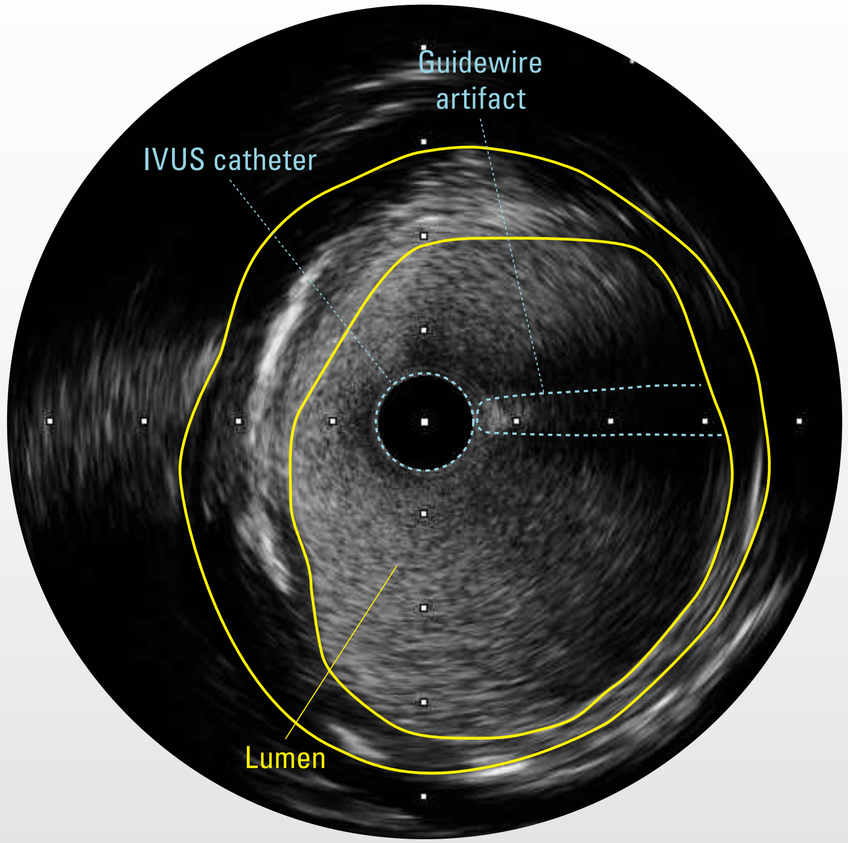
IVUS

A vast and homogenous hyperechoic region (hematoma) shaped like an inverted crescent covers from 6 to 12 o'clock clockwise. The true lumen around the IVUS catheter is compressed by the false lumen containing the hematoma. Hematoma and/or stagnant blood flow are normally visualized as homogenous hyperechoic blood speckle.

Case List

17 Aneurysm





TRACE

OFF

VIDEO

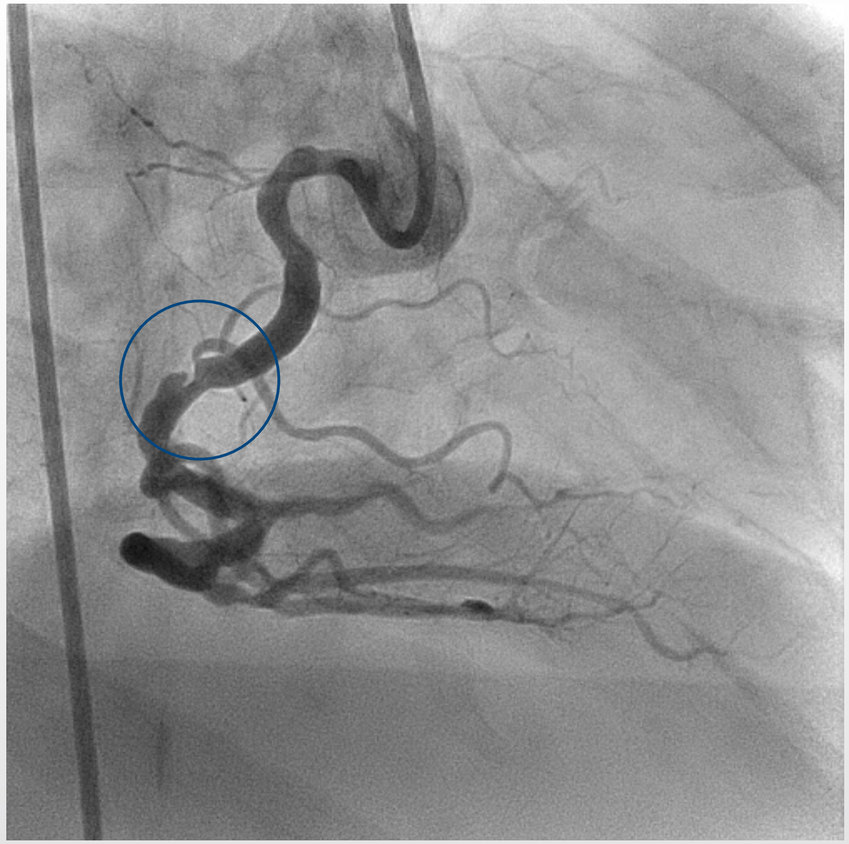
Angio

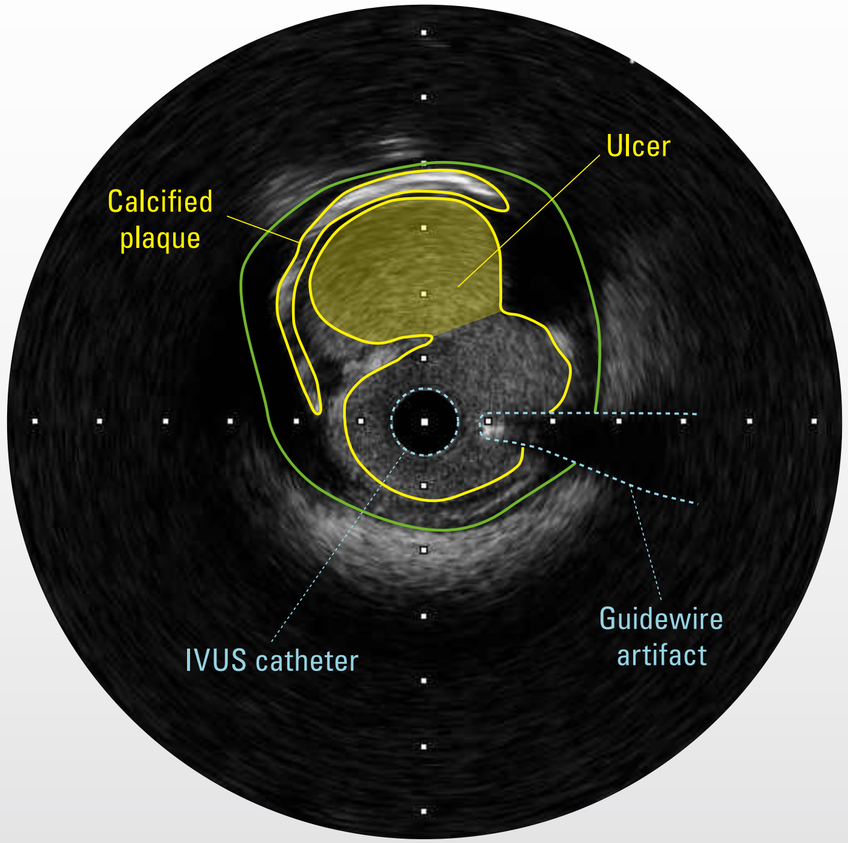
IVUS

Coronary artery aneurysm is defined as a blood vessel which has the diameter of 1.5 times or greater of the reference vessel diameter by angiogram.
IVUS is not capable of diagnosing an aneurysm, however the three-layered vessel structure in the aneurysm is visualized in the IVUS image.

Case List

18 Ulcer





TRACE

OFF

VIDEO

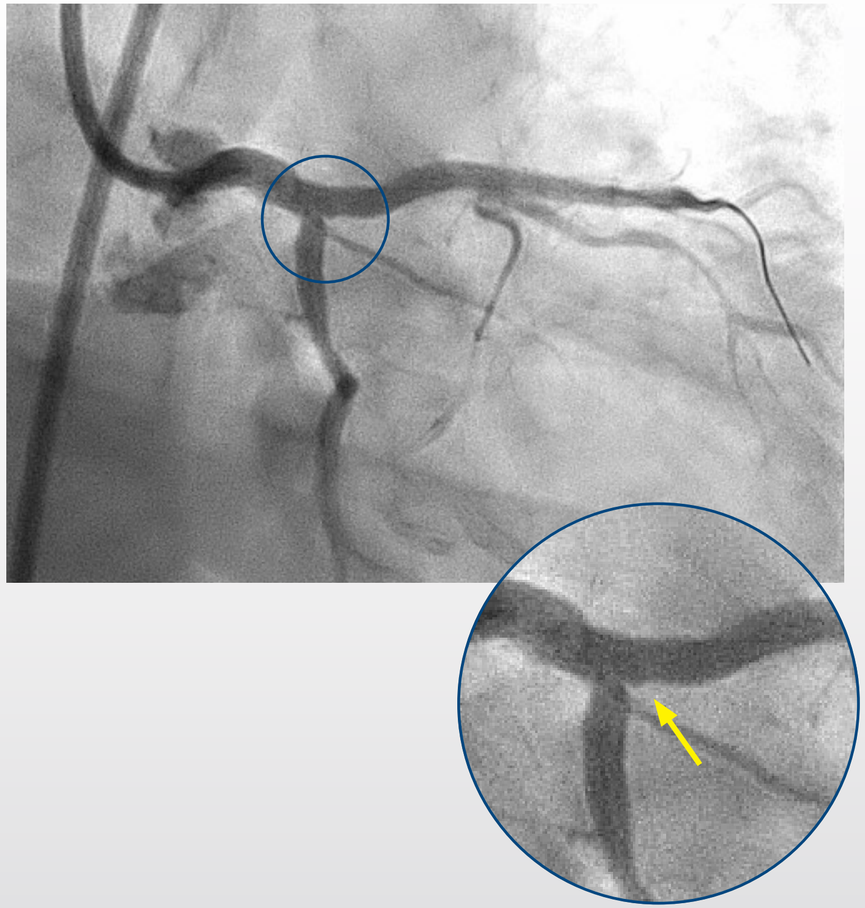
Angio

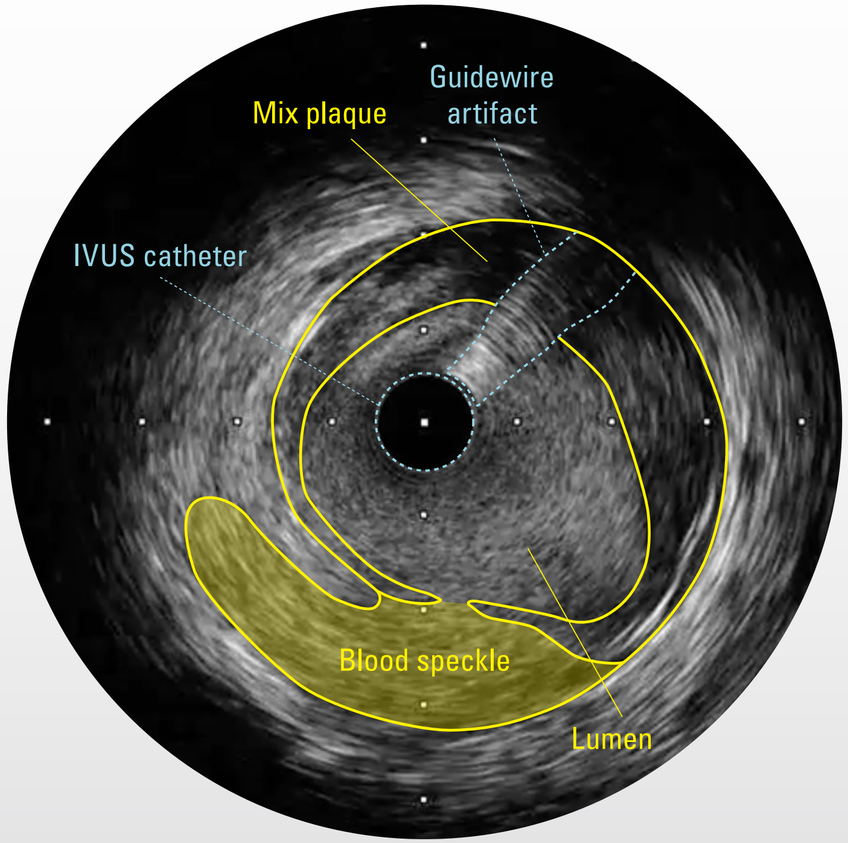
IVUS

The intima is disrupted in between 12 and 1 o'clock, and a cavity which is created by the ulcer extends to the upper part of the image. In this IVUS image, the plaque is presumed to have lost the endothelium on the surface and the accumulated cholesterol inside the plaque has dissolved to create the cavity.

Case List

19 Perforation





TRACE

OFF

VIDEO

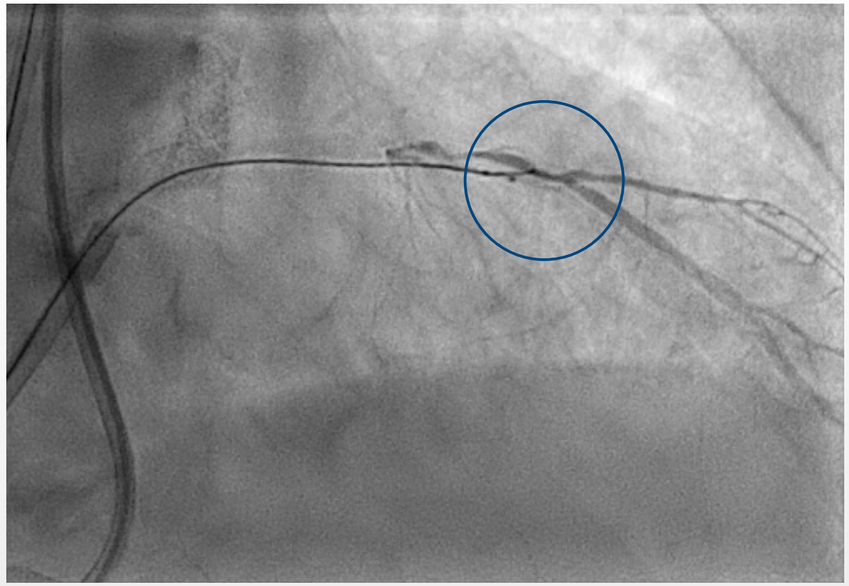
Angio

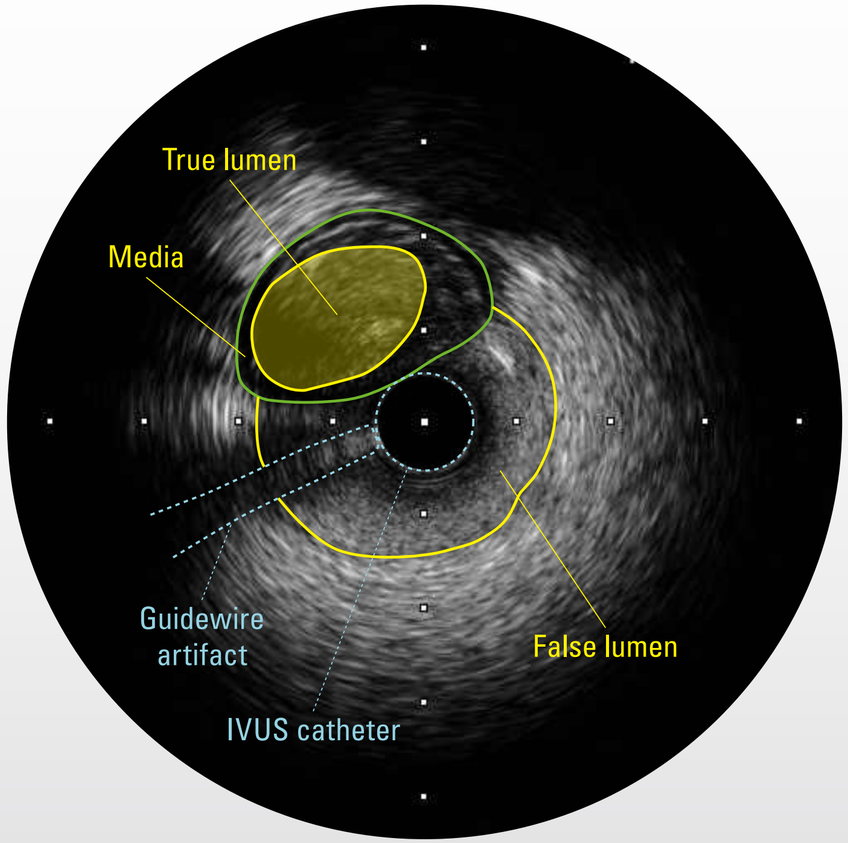
IVUS

Directional coronary atherectomy (DCA) was performed to remove the plaque located in between the left main trunk (LMT) and the left anterior descending artery (LAD). A protrusion is visualized at the point indicated by the arrow in the angiogram. The intima disappears from 5 to 7 o'clock and a crescent-shaped, hypoechoic space extends into the adventitia and the surrounding tissue, which represents hematoma.

Case List

20 CTO - False Lumen





TRACE

OFF

VIDEO

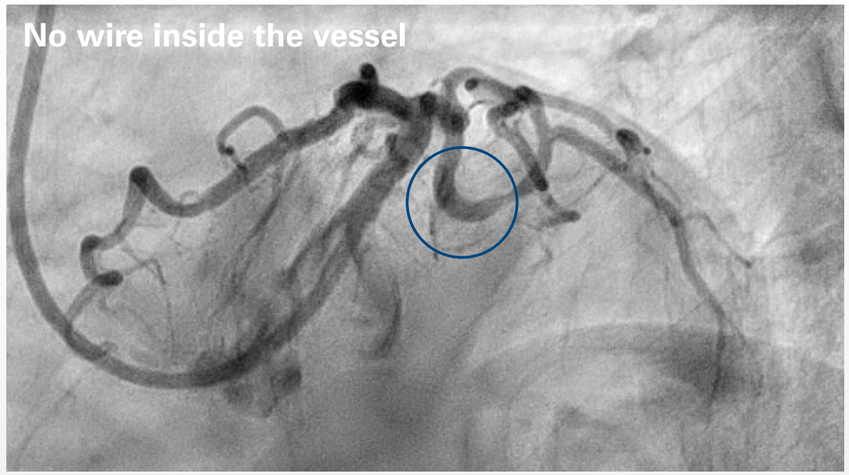
Angio

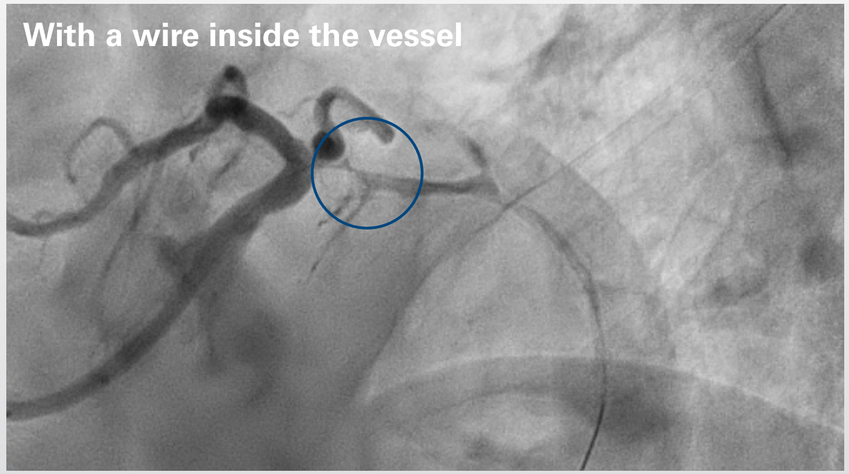
IVUS

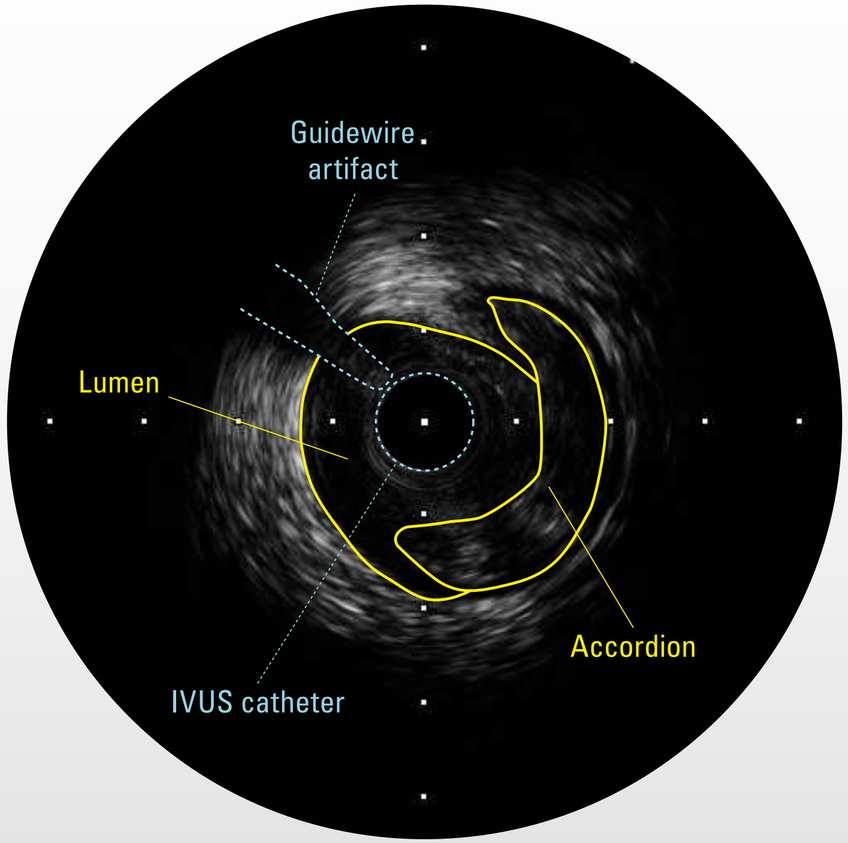
This image was taken during a case of CTO PCI using an antegrade dissection reentry (ADR) device. The IVUS catheter is inside the false lumen. The true lumen with the three-layered structure is observed at 11 o'clock. The false lumen is visualized by hyperechoic homogenous blood speckle due to the stagnant blood flow.

Case List

21 Accordion







TRACE

OFF

VIDEO

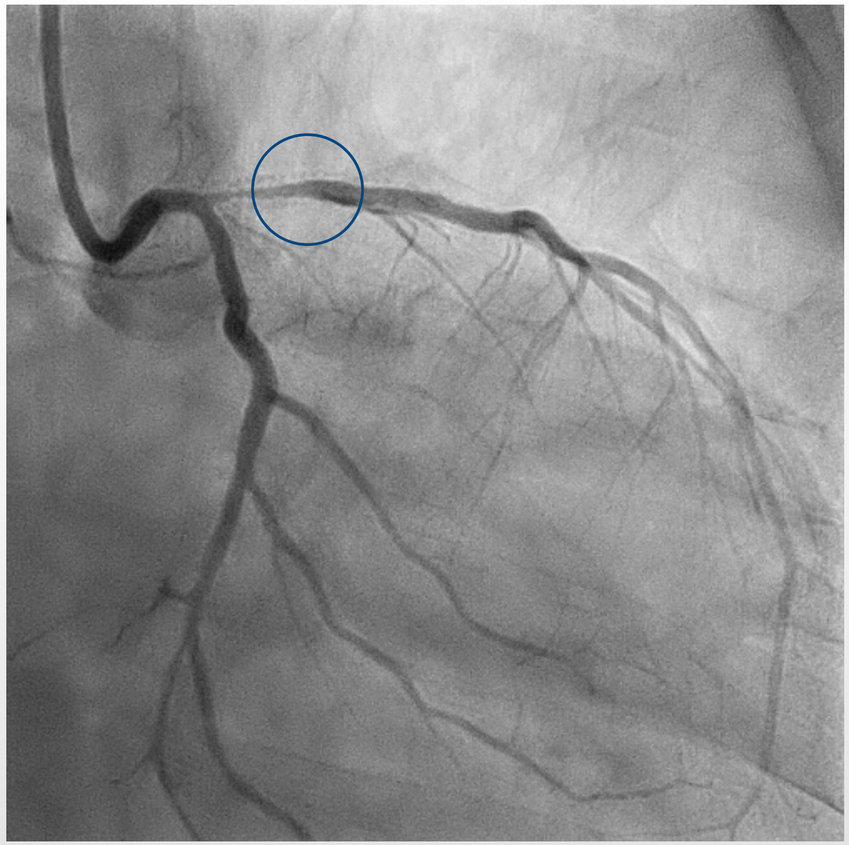
Angio

IVUS

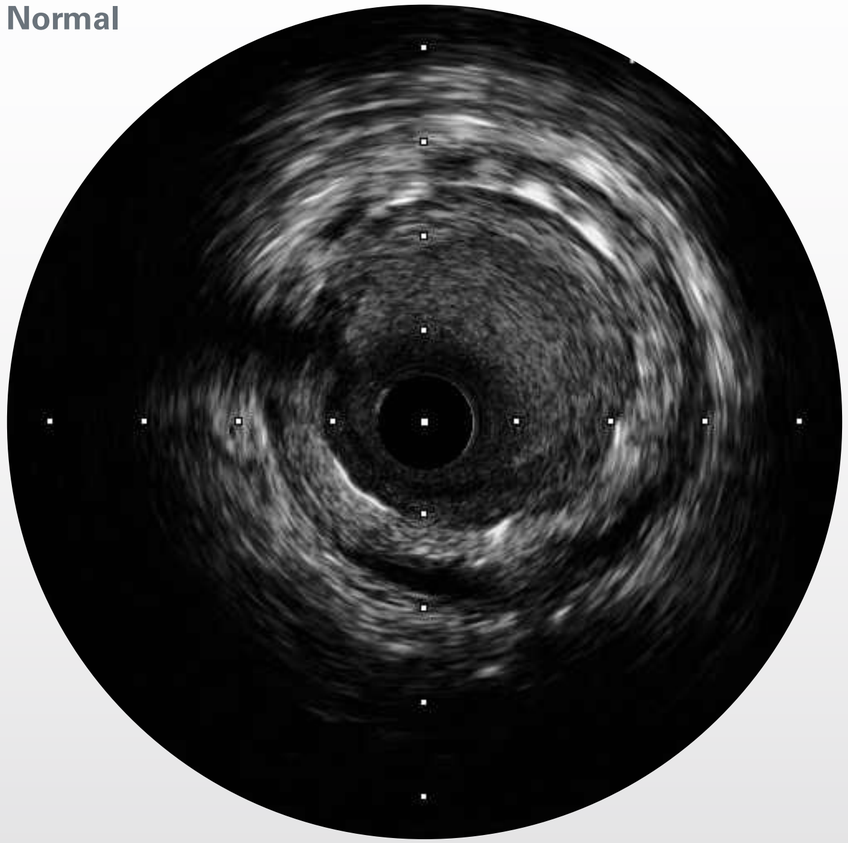
A vague crescent-shaped vessel structure is observed from 1 to 7 o'clock. The media is observed near the IVUS catheter, but another media is depicted from 2 to 5 o'clock. This image was created due to the accordioned vessel as two vessel structures are observed in one image. The accordion is observed when an IVUS catheter straightens a tortuous vessel.

Case List

22 Air Bubbles



Normal



Normal

OFF

VIDEO

Angio

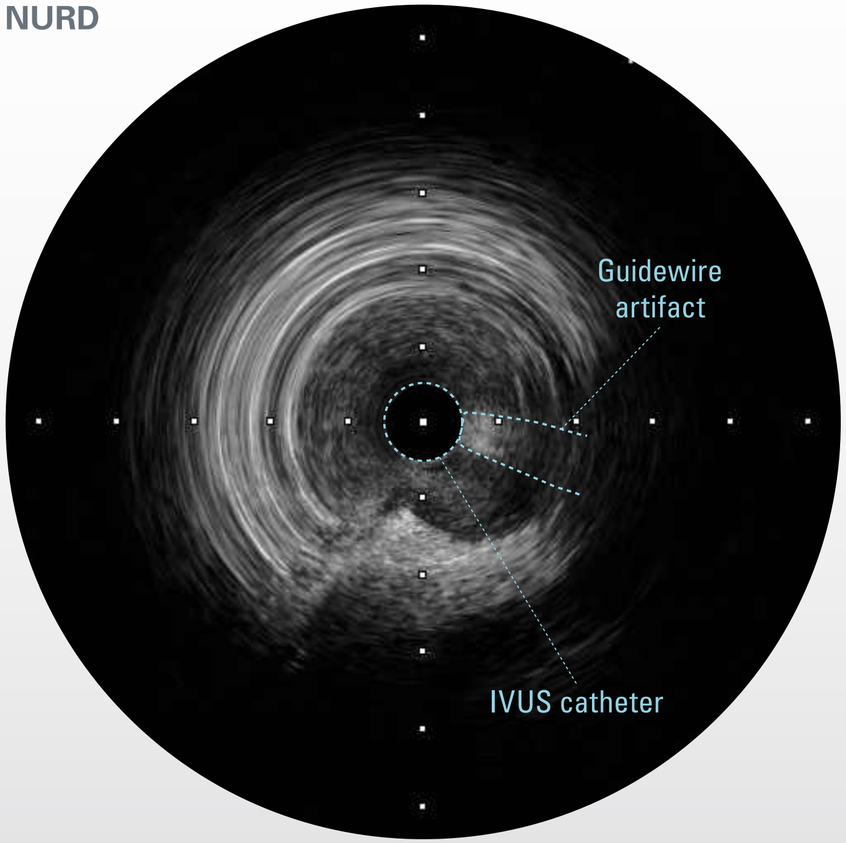
IVUS

Inadequate flushing of the IVUS catheter my result in residual micro air bubbles around the ultrasound transducer, which attenuates ultrasound to create unstable dark images. The image sometimes changes its brightness according to the cardiac cycle.
When this happens, the IVUS catheter should be taken out of the patient's body and fully flushed.
Flushing the IVUS catheter inside the vessel may result in air embolism and subsequent ST elevation.

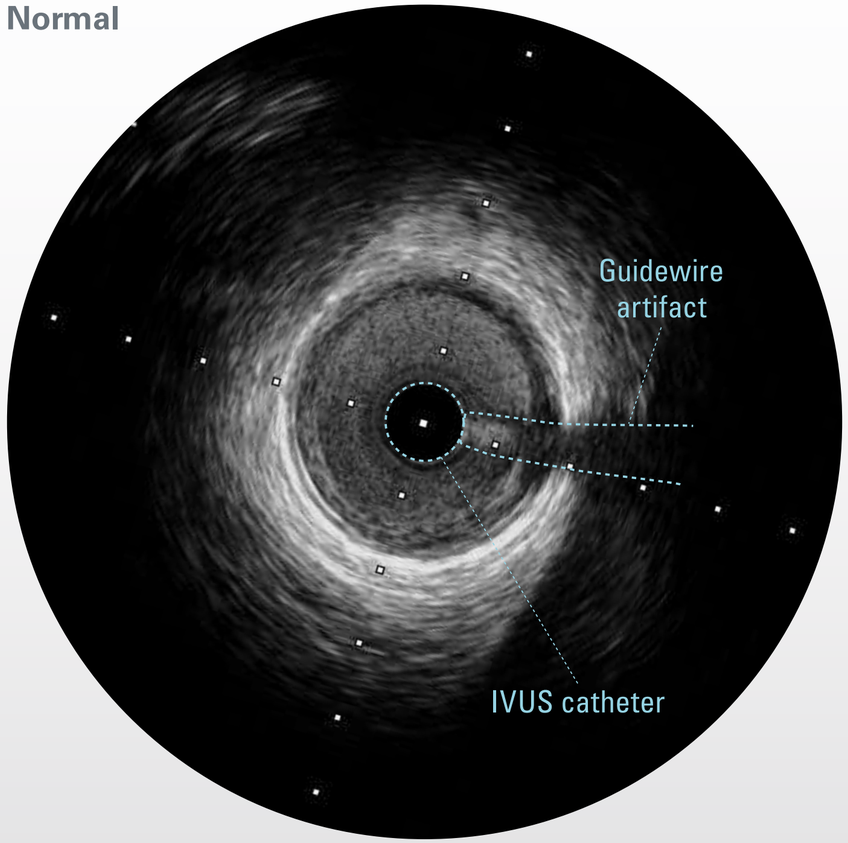
Case List

23 NURD - Non Uniform Rotational Distortion

NURD



Normal



TRACE

OFF

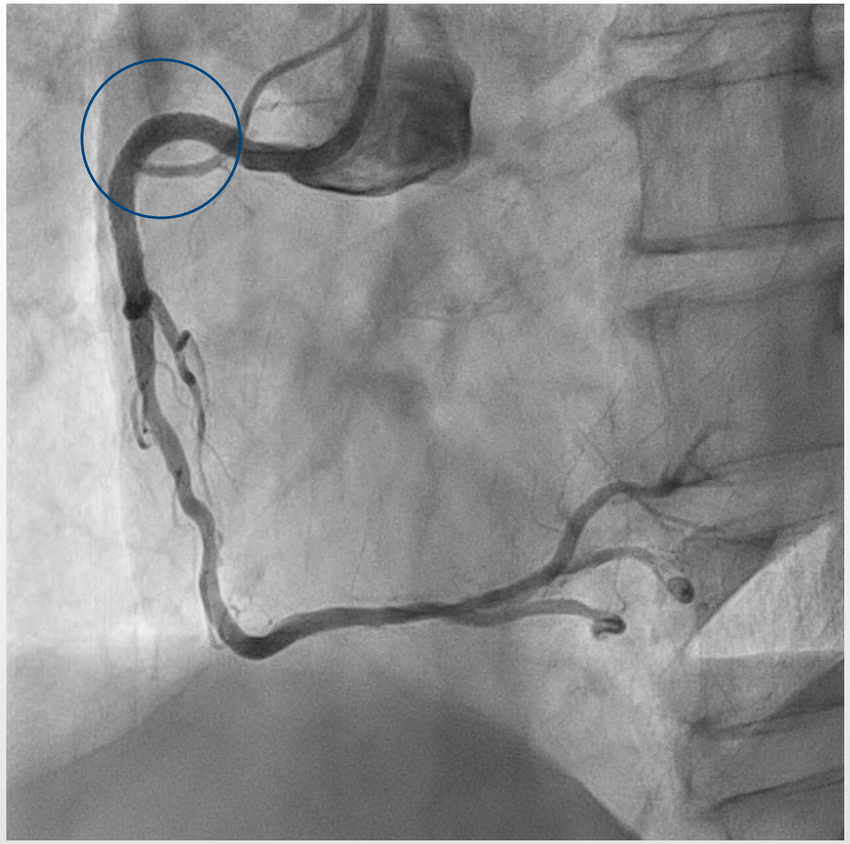
VIDEO

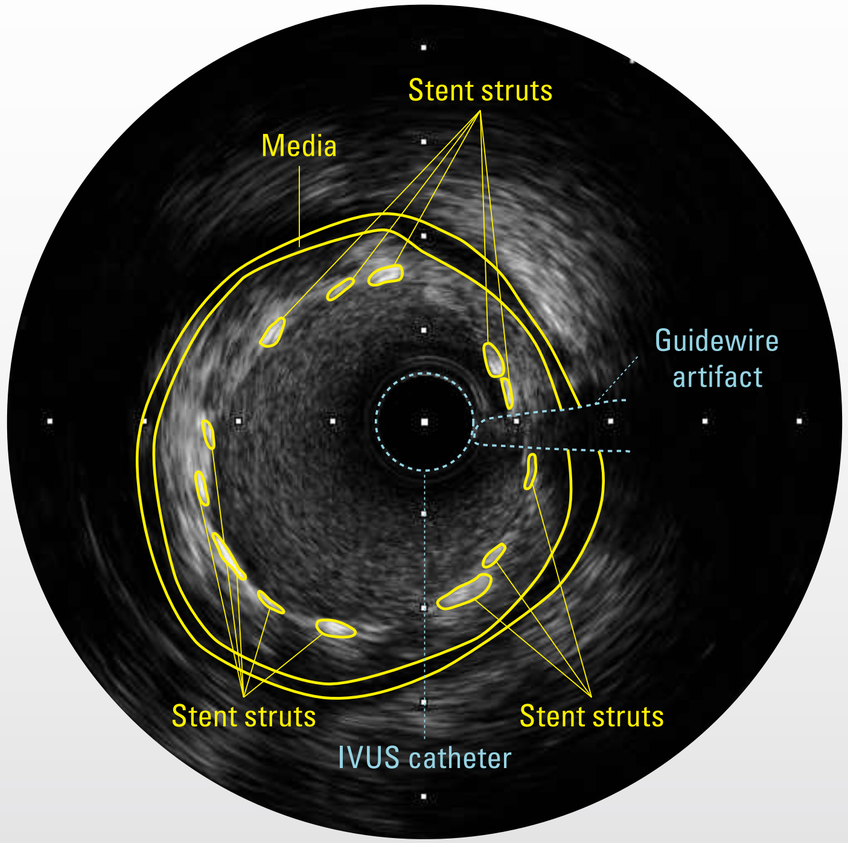
IVUS

Distortion of the image is observed from 7 to 2 o'clock and at 4 o'clock. Non uniform rotational distortion (NURD) may originate from uneven rotation of the ultrasound transducer induced by various factors, such as highly tortuous vessel, calcified lesion, etc. Meanwhile, a bent of the proximal shaft of the IVUS catheter outside the valve and the overtighten valve may cause NURD.
When NURD is observed, it is important to check the catheter shaft and the valve. NURD sometimes disappear after dilatation of the lesion.

Case List

24 Stent Apposition





TRACE

OFF

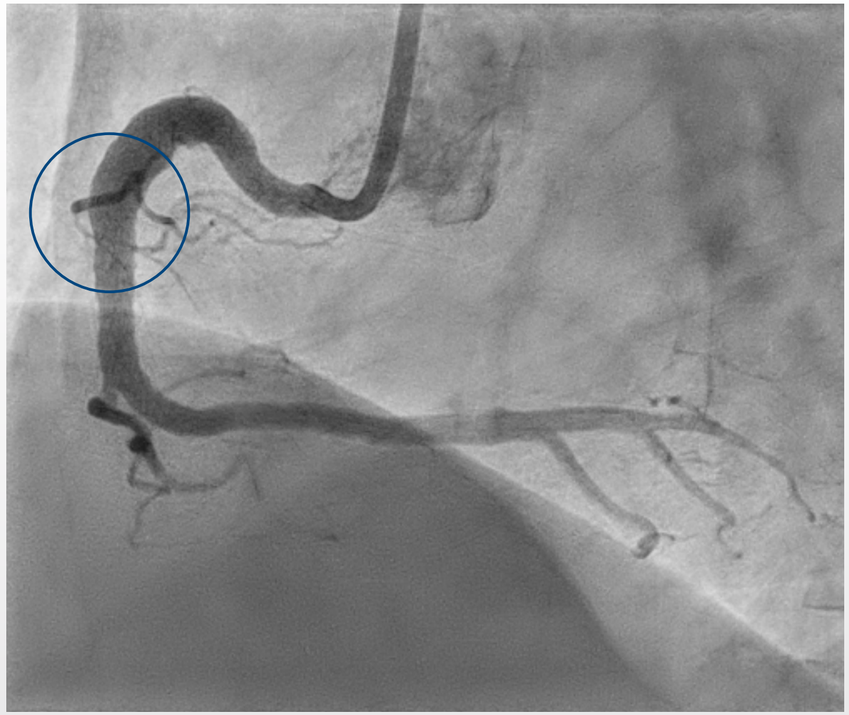
VIDEO

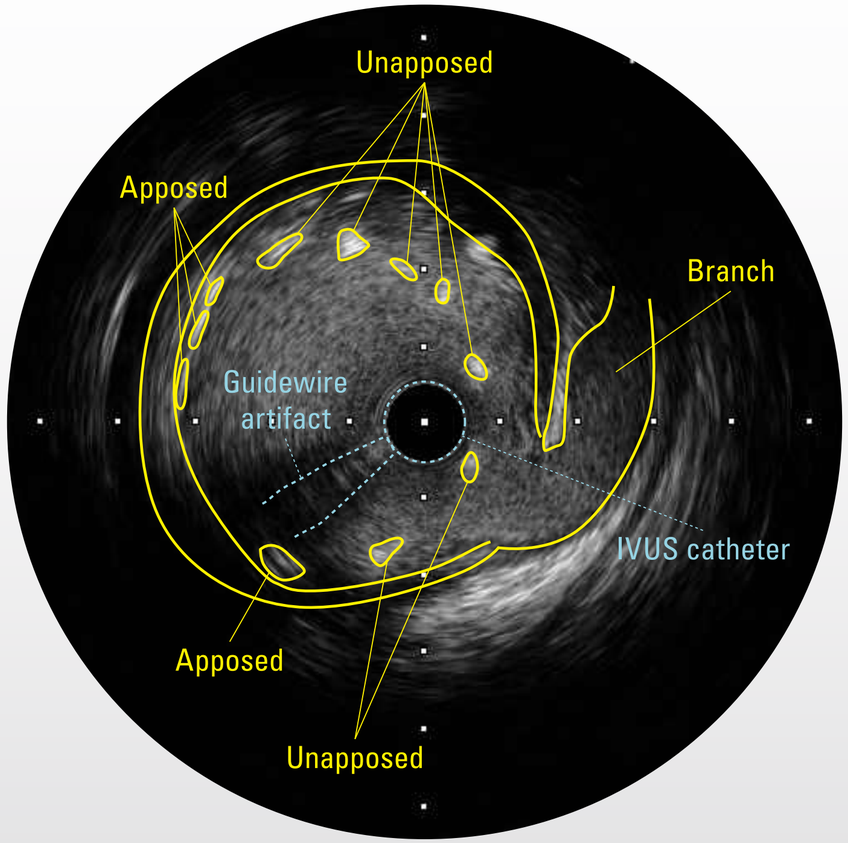
Angio

IVUS

The stent struts are evenly embedded in the plaque.

25 Stent Malapposition





TRACE

OFF

VIDEO

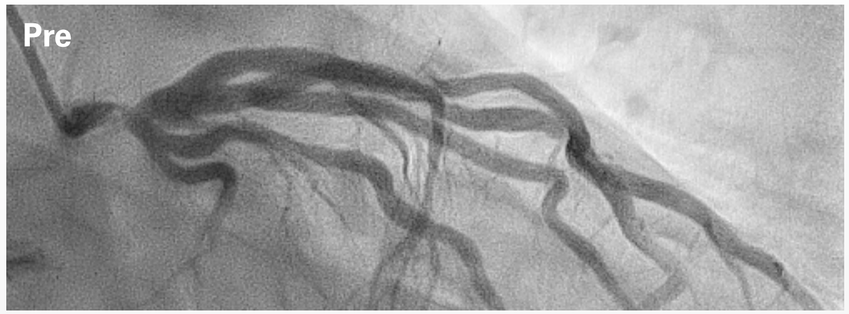
Angio

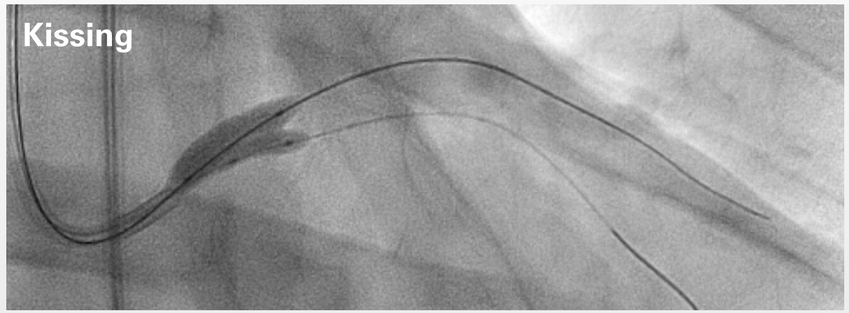
IVUS

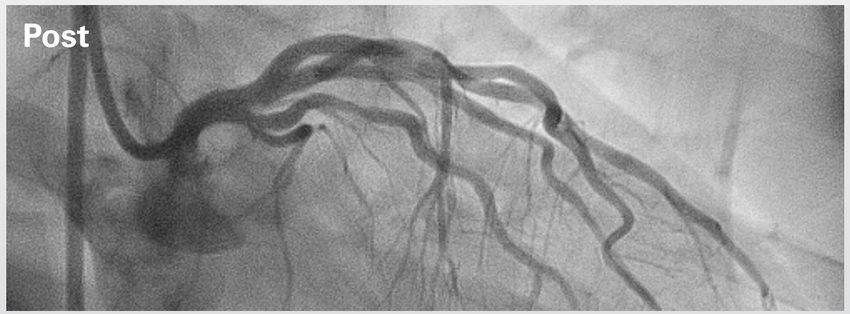
The stent struts from 11 to 6 o'clock do not contact the intima. If the image is not clear, flushing contrast media or saline while maintaining the IVUS catheter in place may help clearly visualize the stent struts and the vessel wall (known as negative contrast technique).

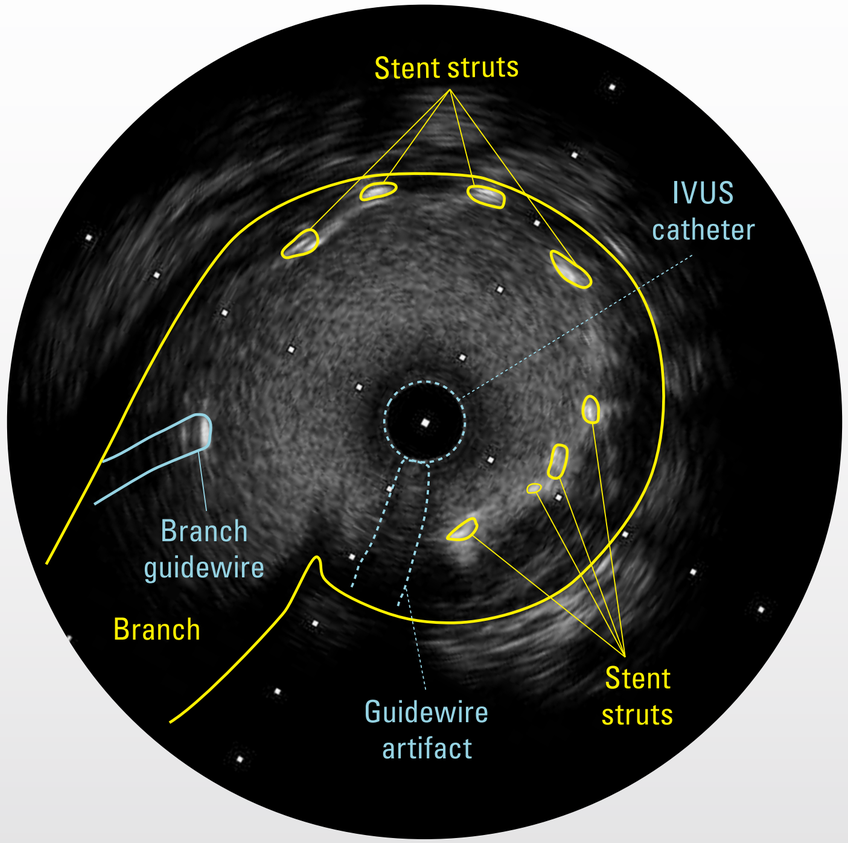
Case List

26 Bifurcation Stenting









TRACE

OFF

VIDEO

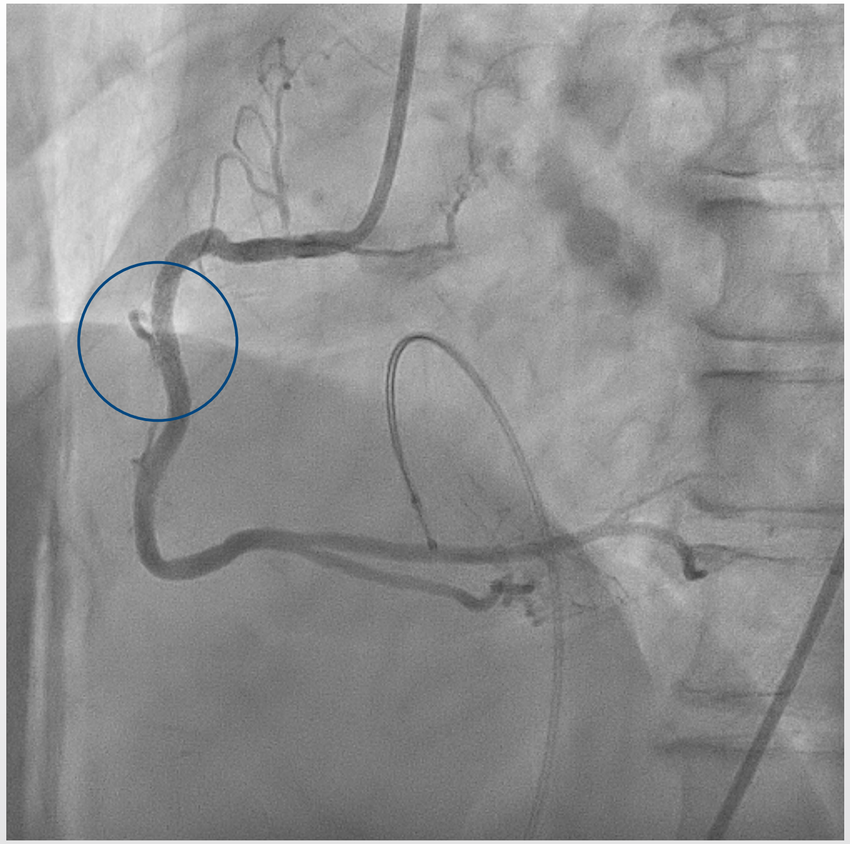
Angio

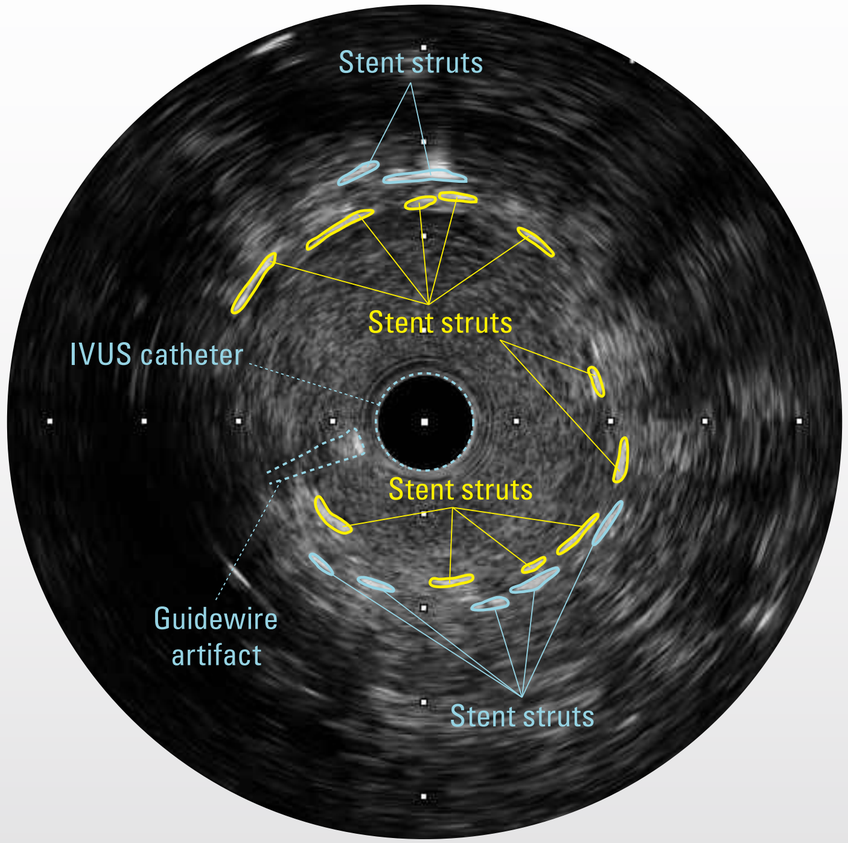
IVUS

The left circumflex (LCX) artery appears at 8 o'clock. Stent struts are well apposed from 10 to 6 o'clock clockwise. The stent struts from 6 to 10 o'clock disappears by kissing balloon inflation to avoid jailing the LCX ostium.

Case List

27 Stent Overlap





TRACE

OFF

VIDEO

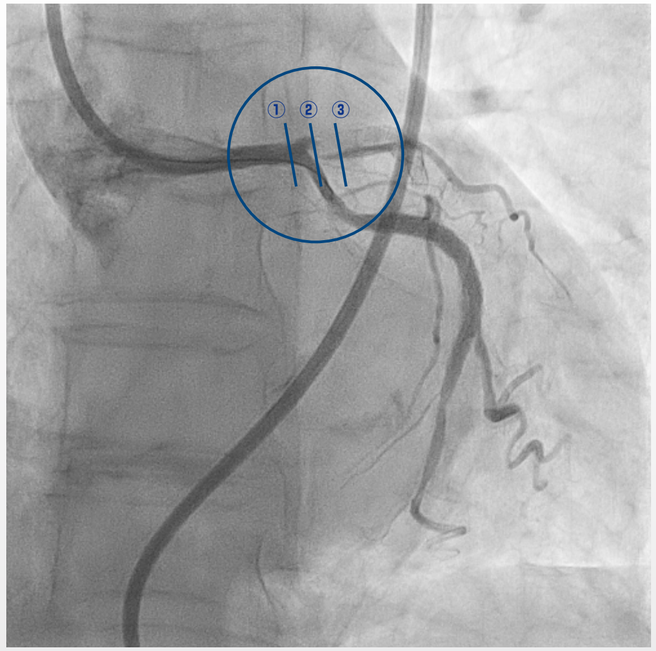
Angio

IVUS

Two layers of the stent struts are depicted. Due to the increased amount of metal, which reflects ultrasound, sometimes the entire vessel is not fully visualized because of the acoustic shadows of the stent struts.

Case List

28 Stent Deformation



Before Deformation

Image 1

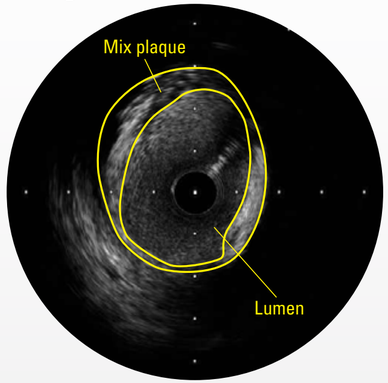


Image 2

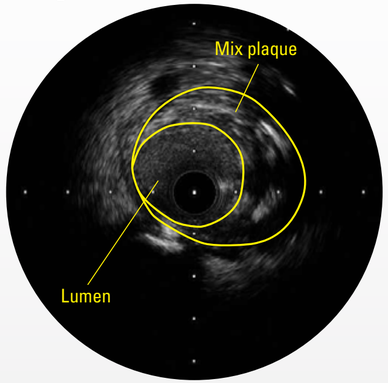
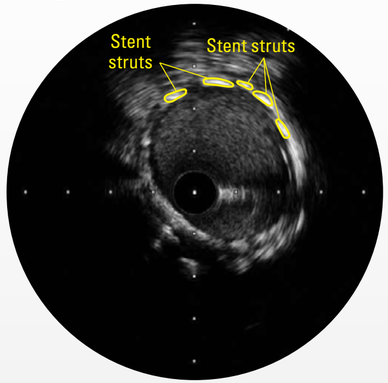


Image 3



After Deformation

Image 1´

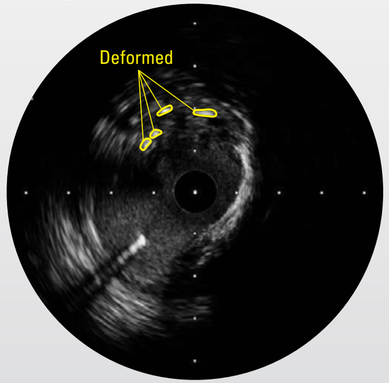


Image 2´

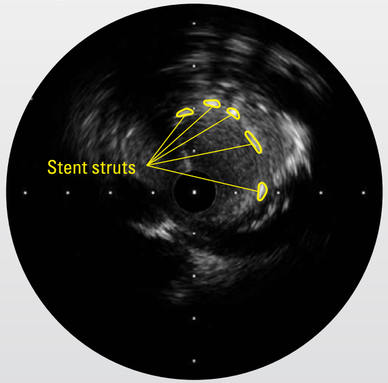
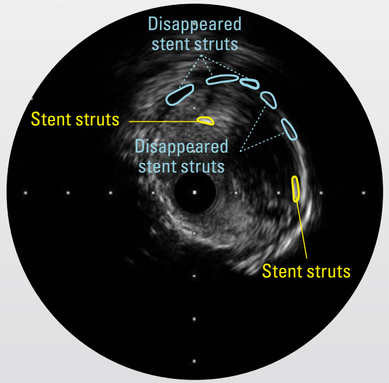


Image 3´



TRACE

OFF

VIDEO

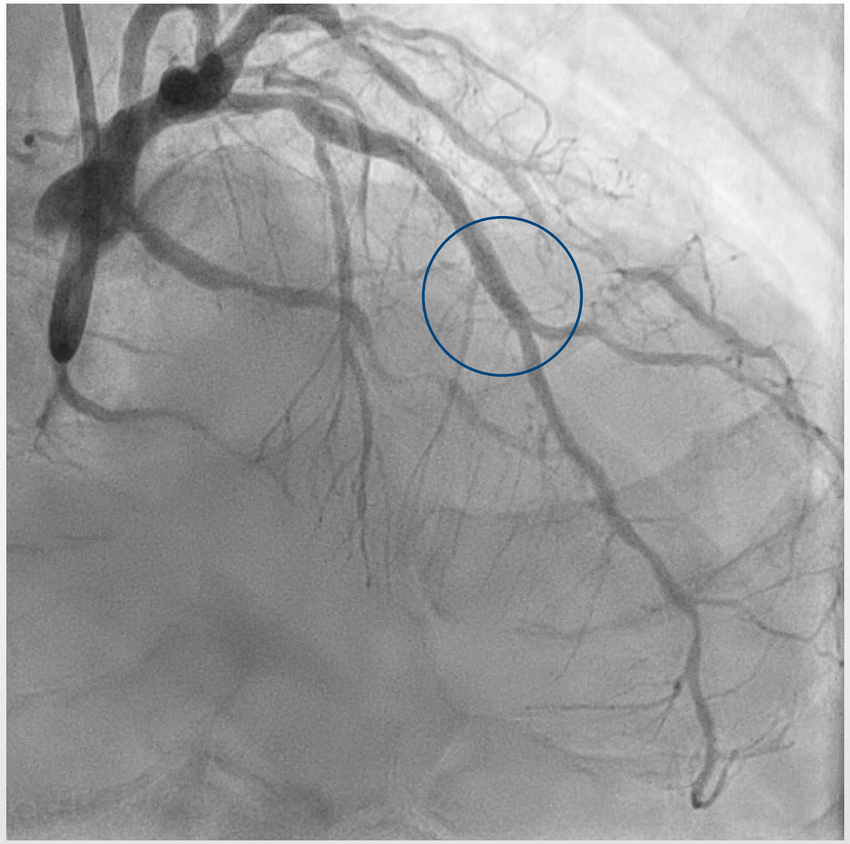
Angio

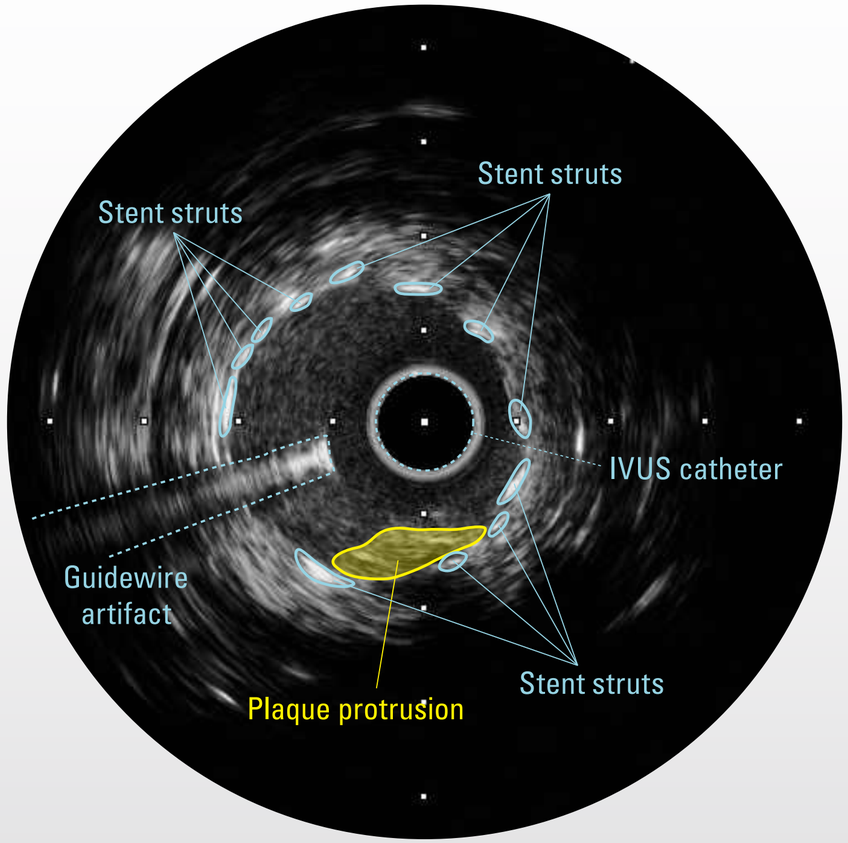
IVUS

Image 2 shows the target lesion before DCA. The proliferative tissue is seen from 2 to 6 o'clock clockwise on the stent struts. Image 3 is the body of the DES covered with the thin intima. Image 1 shows the distal LMT. After deformation, four stent struts are depicted in image 1´, which were not seen in image 1 which is the baseline. A protection wire in the CX is also seen in the same image. At the target site in image 2, the plaque from 3 to 6 o'clock was removed and the stent struts appear from 12 to 2 o'clock in image 2´. In image 3´, the stent struts disappeared which were depicted in image 3, and torn lumen is seen at 3 o'clock.
It is important to carefully check the IVUS images until you figure out what happened to the vessel.

Case List

29 Plaque Protrusion





TRACE

OFF

VIDEO

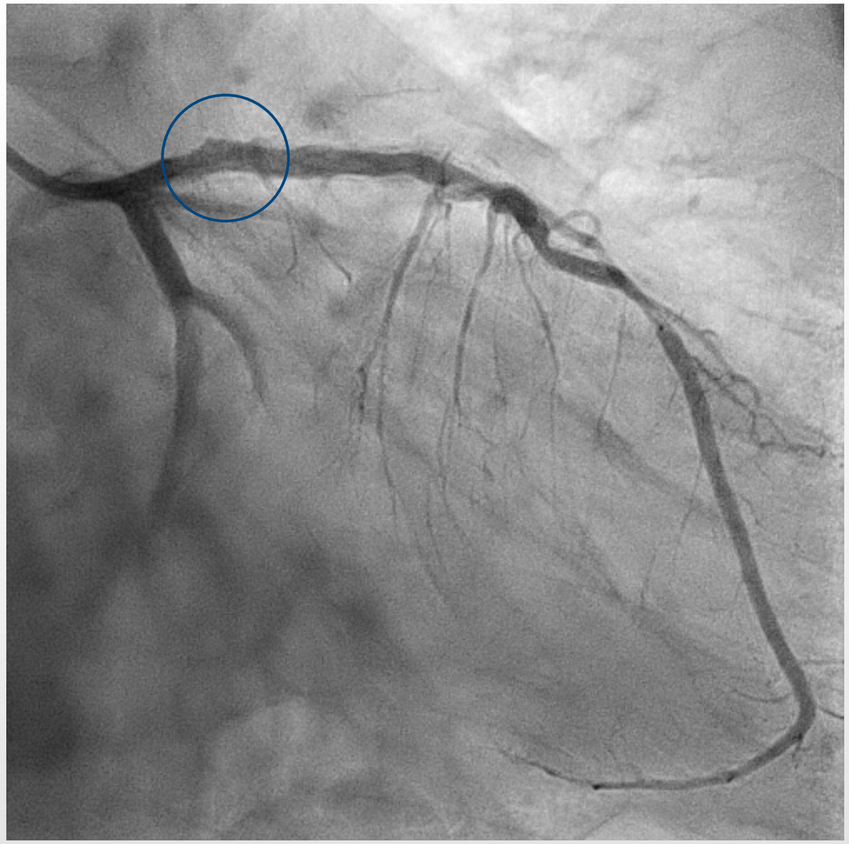
Angio

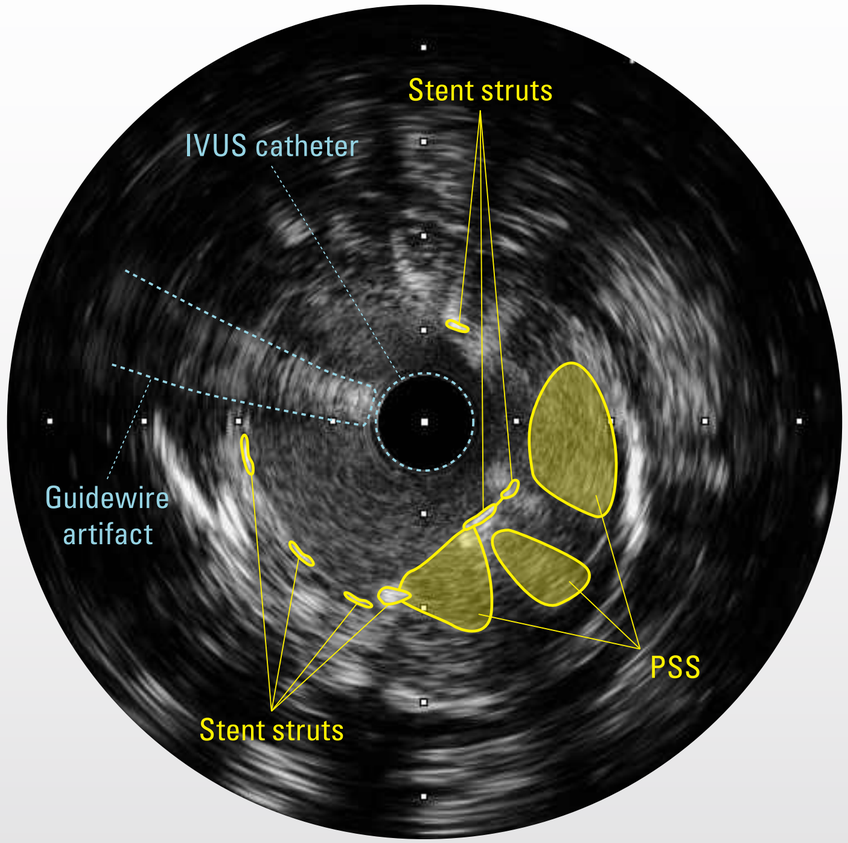
IVUS

On stent implantation in an ACS case, some protrusions may be observed in between the stent struts.
In the IVUS image, a protrusion appears in between the stent struts from 5 to 6 o'clock. The protrusion is presumed to be a thrombus or protruded plaque.

Case List

30 Peri-stent Contrast Staining





TRACE

OFF

VIDEO

Angio

IVUS

A sirolimus-eluting stent (SES) was implanted in the left anterior descending artery (LAD) fourteen years ago. The IVUS image shows that the stent struts do not contact the vessel wall from 1 to 7 o'clock and blood speckle is observed behind the struts. Meanwhile, the vessel size and diameter are enlarged to approximately 6 mm. Following angiogram shows peri-stent contrast staining (PSS). Contrast media is visualized behind the stent struts by angiogram.

Case List

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