Peri–Stent Contrast Staining induced Acute Coronary Syndrome with Bare Metal Stent and Nobori stent

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Nowadays, Peri-stent contrast staining (PSS) is known by many cardiologist in drug-eluting stent (DES) era. We show the case which had PSS in Nobori stent (NB) and bare metal stent (BMS) at the same time.
Background

Incidence, Risk Factors, and Clinical Sequelae of Angiographic Peri-Stent Contrast Staining After Sirolimus-Eluting Stent Implantation

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Background—We have noted abnormal angiographic findings—at the sites of drug-eluting stent implantation, suggesting contrast staining outside the stent struts—that do not fulfill the classic definition of coronary artery aneurysm. We propose a new term, peri-stent contrast staining (PSS), for these abnormal angiographic findings and assess their incidence, risk factors, and clinical sequelae.

Methods and Results Peri-stent contrast staining was defined as contrast staining outside the stent contour extending to ≥20% of the stent diameter. The study population consisted of 3081 lesions (1998 patients) that were treated exclusively with sirolimus-eluting stents and were evaluated by follow-up angiography within 12 months after sirolimus-eluting stent implantation in a single center. Late acquired PSS was observed in 58 lesions (1.9%) in 49 patients (2.5%). Independent risk factors of PSS included chronic total occlusion, whereas negative risk factors for PSS were left circumflex coronary artery lesion and in stent restenosis lesion. Stent fracture was more frequently observed in lesions with PSS than in lesions without PSS (43.1% versus 5.4%, P<0.0001). Excluding 269 lesions with target-lesion revascularization within 12 months, the study population for long-term follow-up consisted of 51 lesions (42 patients) with PSS and 2761 lesions (1751 patients) without PSS. Cumulative incidence of target-lesion revascularization and definite very late stent thrombosis at 3 years in the PSS group was higher than that in the non-PSS group (15.0% versus 6.5%, and 8.2% versus 0.2%, respectively).

Conclusions—Peri-stent contrast staining found within 12 months after sirolimus-eluting stent implantation appeared to be associated with subsequent target-lesion revascularization and very late stent thrombosis. (Circulation. 2011;123:2382-2391)
# Background

**Definition**: PSS was defined as contrast staining outside the stent contour extending to ≥20% of stent diameter measured by quantitative coronary angiography.

## Classification of PSS Morphology

<table>
<thead>
<tr>
<th>Classification</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focal</td>
<td>PSS width ≤ Stent diameter</td>
</tr>
<tr>
<td>Mono-focal</td>
<td>Single focal PSS at the stented segment</td>
</tr>
<tr>
<td>Multi-focal</td>
<td>Multiple focal PSS at the stented segment</td>
</tr>
<tr>
<td>Segmental**</td>
<td>PSS width &gt; Stent diameter</td>
</tr>
<tr>
<td>Irregular-contour***</td>
<td>Segmental PSS with irregular contour</td>
</tr>
<tr>
<td>Smooth-contour</td>
<td>Segmental PSS with smooth contour</td>
</tr>
</tbody>
</table>

*: Maximum contrast staining outside stent ≥50% of stent diameter was classified as severe PSS.
**: Including coexisting focal type PSS
***: Including coexisting smooth contour type

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Patient Background

58 years old  Female

She sometimes had a few short chest pains before one month. She were taken to hospital by ambulance for sustained chest pain. Her ECG showed ST segment elevation in leads II, III, and aVF. She was diagnosed as inferior wall myocardial infarction and transferred to our cath lab.
There were totally occlusion in proximal right coronary artery (RCA) and diffuse stenosis in mid left anterior descending (LAD).
The RCA lesion was treated with a BMS. MultiLink VISION 4.0x18mm (Abott Vascular Japan)
The patient remained asymptomatic for one month and she underwent a planned percutaneous coronary intervention (PCI) for residual stenosis in mid LAD.
The LAD lesion was treated with a DES.
Nobori 2.5x28mm (Terumo)
However, she had recurrent chest pain 3 months after 2nd PCI.

We performed exercise stress testing to estimate her cardiac ischemia. Exercise stress testing showed ST elevation in leads III, aVF.

We diagnosed recurrent cardiac ischemia and underwent emergent coronary angiography (CAG).
CAG showed restenosis and PSS at the BMS in RCA.
There was restenosis and PSS at the DES in LAD. It was similar to the lesion of RCA.
We underwent PCI for RCA. We performed intravascular ultrasonography (IVUS) at the culprit lesion, which showed stenosis in the stent and coronary aneurysm around it.
In addition to, we performed optical coherence tomography (OCT) at the lesion.
We treated the lesion with a DES. Endeavor Splint 3.5x24mm (Medtronic Japan)
Then we performed for the lesion at LAD. IVUS showed the lesion produced similar findings to it at the RCA.
This is OCT imaging for the PSS lesion at LAD.
We treated the lesion with a DES. Endeavor Splint 3.5x18mm (Medtronic Japan)
In order to differentiate the cause of PSS, we planned her skin patch test. 10 days before skin patch test, she had recurrent chest pain. It was 4 months after 3rd PCI. We underwent emergent CAG.
CAG showed there were restenosis and PSS at the same lesion in RCA and LAD.
From these results, we finally planned her coronary artery bypass grafting (CABG).
We checked her metallic allergy before CABG. Skin patch test was positive by potassium dichromate (K2Cr2O7) and Nickel sulfate (NiSO4).
Discussion

Nowadays etiology of PSS is reported as follows,

① Tear of the coronary media
② Metallic allergy
③ Absorption of hematoma induced stent implantation

We described that PSS was occurred by metallic allergy in this case.
We experienced the PSS and restenosis with BMS and Nobori stent. We diagnosed PSS by metallic allergy in this case.