Can IVUS and FFR be helpful to treat In-Stent Restenosis lesions ?

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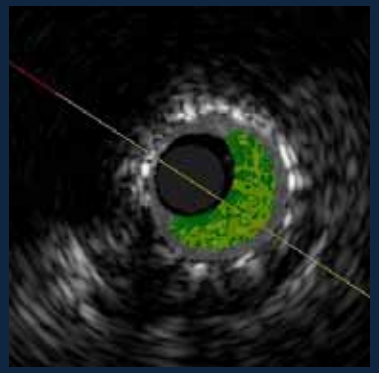
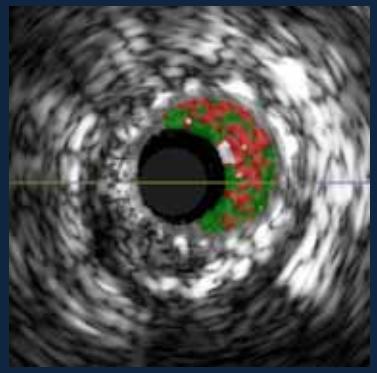
Can IVUS and FFR be helpful to treat ISR lesions ?



Pure
intima hyperplasia



High
risk plaque

Introduction

♠ Although drug-eluting stent improved the late outcome as compared with Bare metal stent, in-stent restenosis (ISR) is still major limitation of coronary intervention.

♠ The newly "created" stenosis within the stented lumen need to be
defined to treat whether revascularization is not necessary, and medical treatment can be used instead.

♠ It has been suggested that the application of fractional flow reserve(FFR) measurements may helpful in angiographically moderate ISR lesions

(López-Palop et al, Eur Heart J. 2004;25:1970-1971)
(Krüger et al, Chest. 2005;128:1645-1649)

- ♠ FFR was not valid to predict optimal stent expansion according to IVUS criteria but could delineate under-expanded stents despite a reasonable angiographic appearance.

  (Stempfle et al, Int J Cardiovasc Intervent. 2005;7:101-107)

- ♠ Pathologic studies have been suggested that the technology of DES now accelerated atherosclerosis and potentially greater late thrombosis.

  Atherosclerotic change was seen in 10% of BMS lesions (8 of 77) vs in DES lesions (35%; 23 of 66; p=0.0004). Earliest necrotic core 9 months of DES vs 5 years in BMS.

  (Hasegawa et al. CCI 2006:68:554–8) (Nakazawa et al. JACC Img 2009;2:625-8)

Case 1. In-Stent Restenosis; Fibrofatty

F/67, Unstable angina

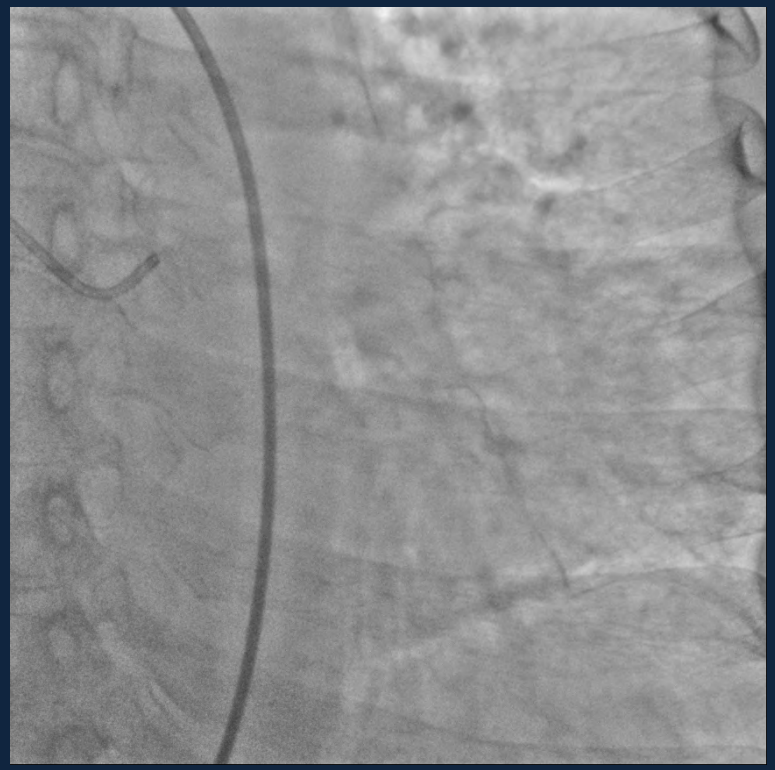
Chief complaint: chest pain recurred

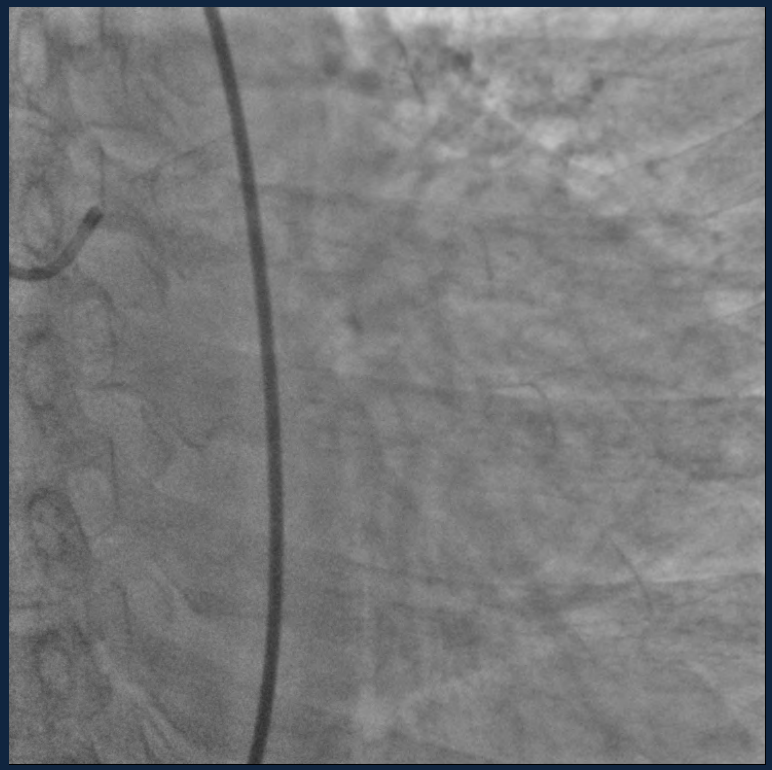
Pico Elite stent 3.5x16 mm, pLAD

TC 116 mg/dl, LDL 76 mg/dl, HDL 32 mg/dl, TG 163 mg/dl

Pitavastatin 2 mg/day

Follow-up CAG after 4 months



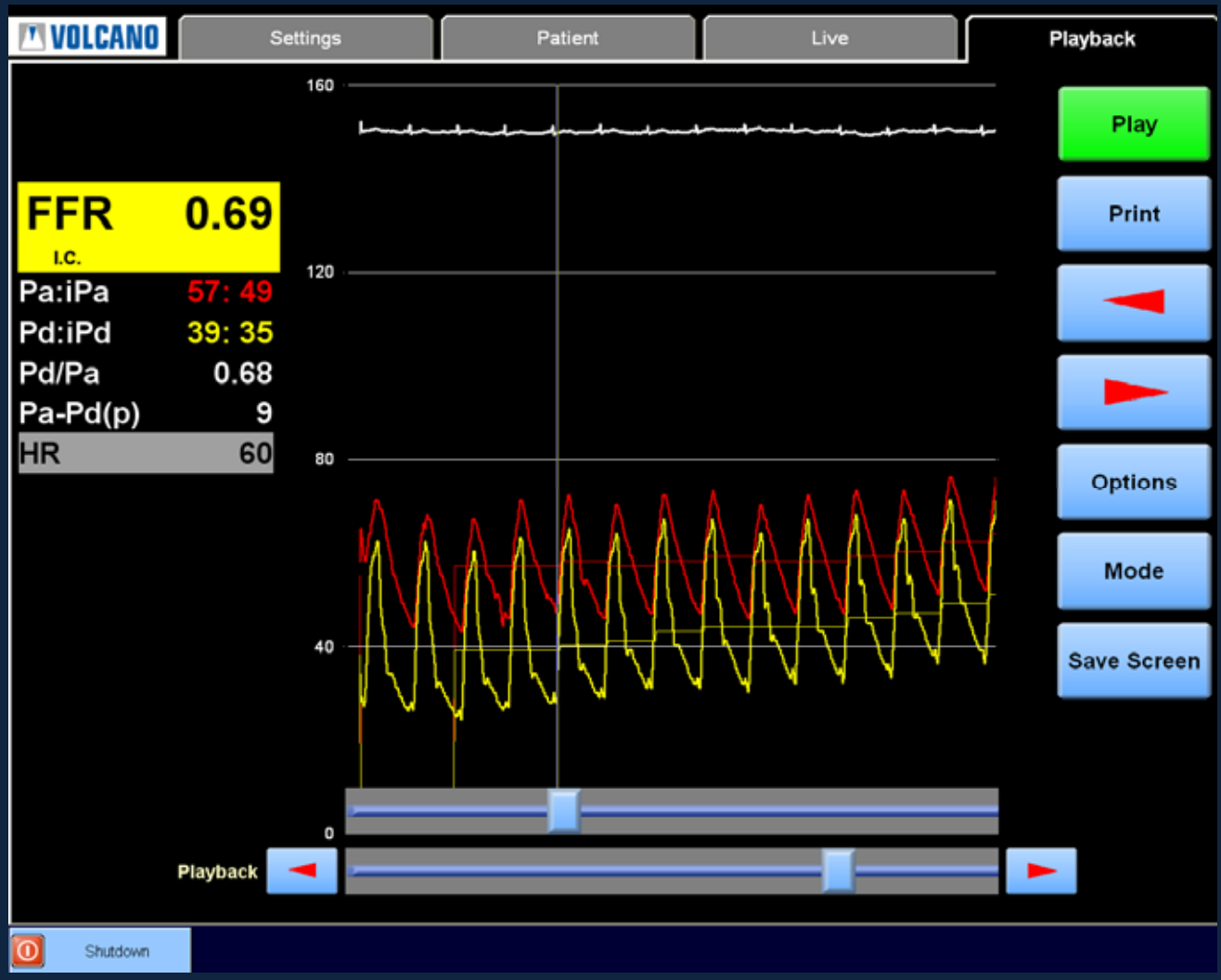


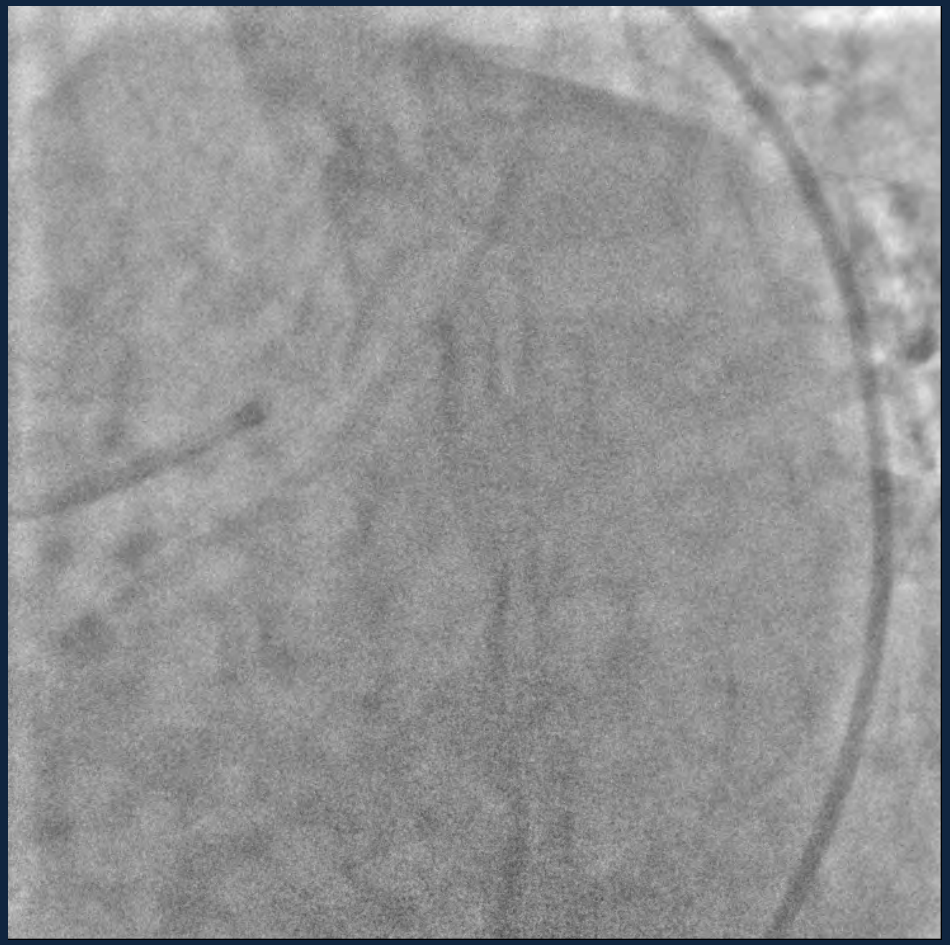
EEM area (mm^2)	**17.5**
Lumen area (mm^2)	1.9
Stent area (mm^2)	9.7
Minimal stent area (mm^2)	8.0
IH area (mm^2)	7.8
Plaque area (mm^2)	7.8
Plaque burden(%)	89.3
Remodeling index	1.04

Fibrotic area (mm^2)	**3.8**
Fibrofatty area (mm^2)	1.3
Necrotic area (mm^2)	0.2
Dense calcium area (mm^2)	0
Fibrotic area (%)	71
Fibrofatty area (%)	24
Necrotic area (%)	4.6
Dense calcium area (%)	0.6

maximum IH necrotic core site

Intracoronary Adenosine Injection 60 ug





Case 2. In-Stent Restenosis; Necrotic

M/58, Unstable angina

Routine follow-up , no chest pain

Two Taxus stent ; 3.0x16 mm, pLAD

3.0x12 mm, 1st diagonal

Final Kissing balloon technique

TC 219 mg/dl, LDL 111 mg/dl, HDL 54 mg/dl, TG 315 mg/dl

Pitavastatin 2 mg/day

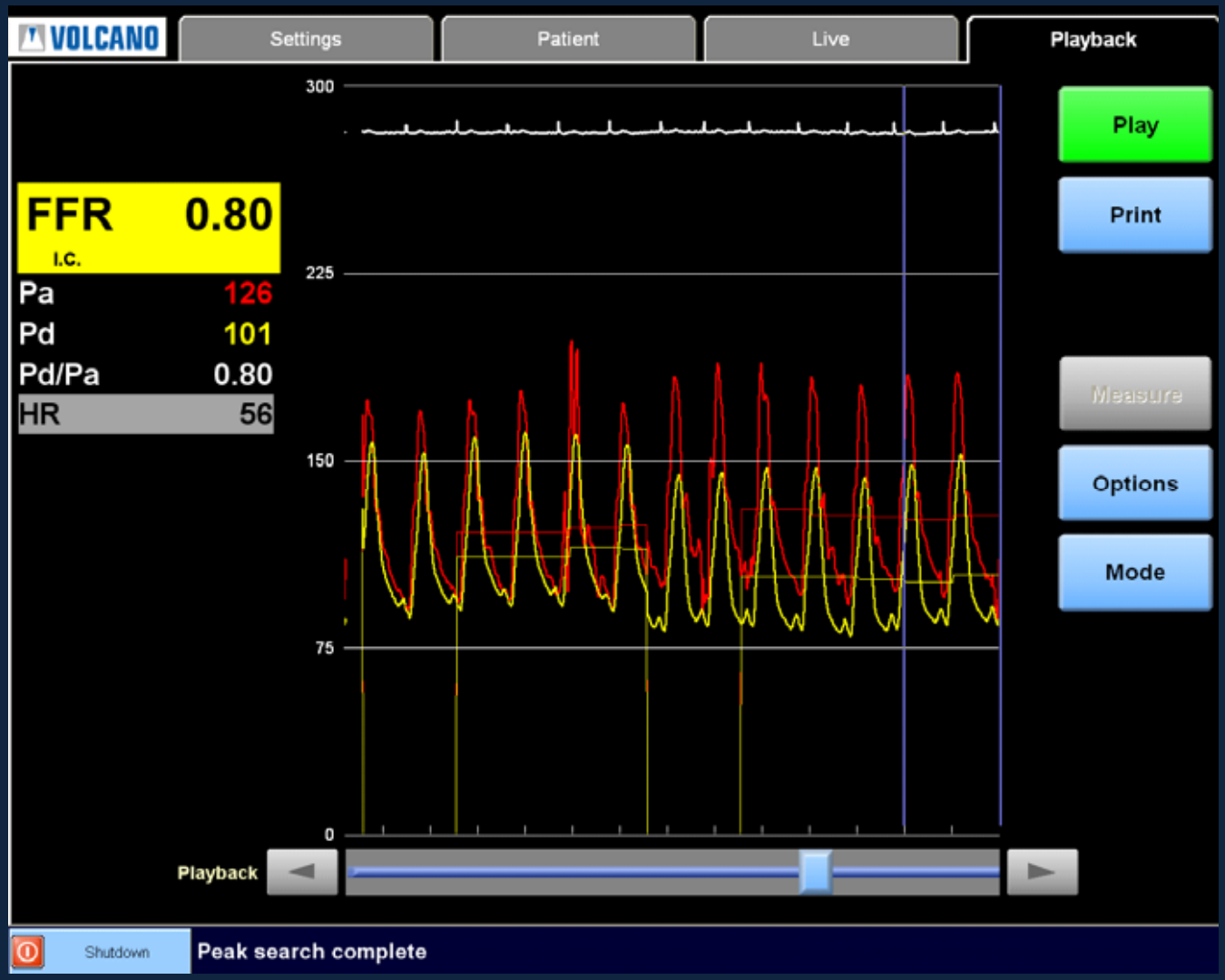
Follow-up CAG after 9 months

EEM area (mm^2)	**13.1**
Lumen area (mm^2)	3.1
Stent area (mm^2)	8.2
Minimal stent area (mm^2)	6.6
IH area (mm^2)	5.1
Plaque area (mm^2)	14
Plaque burden(%)	89.3
Remodeling index	1.16

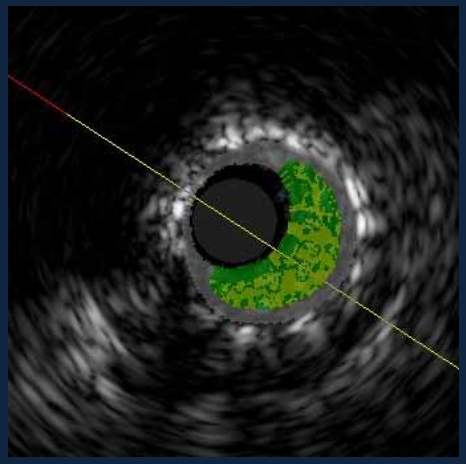
Fibrotic area (mm^2)	**3.1**
Fibrofatty area (mm^2)	0.2
Necrotic area (mm^2)	1.3
Dense calcium area (mm^2)	0.1
Fibrotic area (%)	66
Fibrofatty area (%)	5.2
Necrotic area (%)	27.7
Dense calcium area (%)	1.1

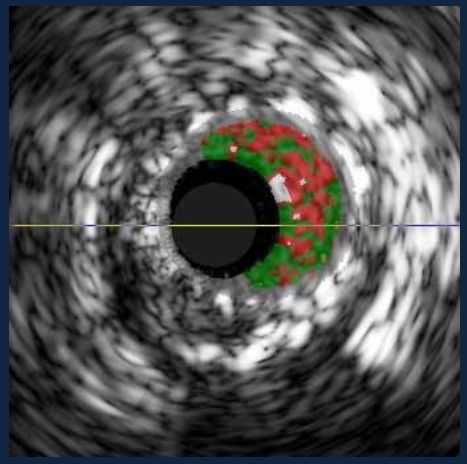
maximum IH necrotic core site

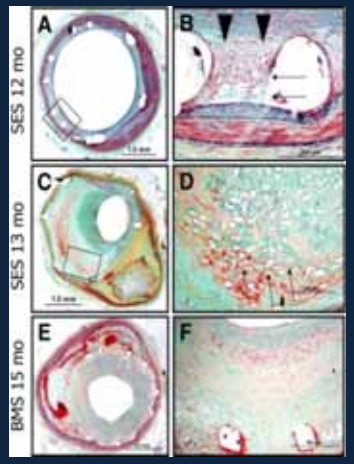
Intracoronary Adenosine injection 60 ug



Discussion







Nakazawa et al. J Am Coll Cardiol Img 2009;2:625-8

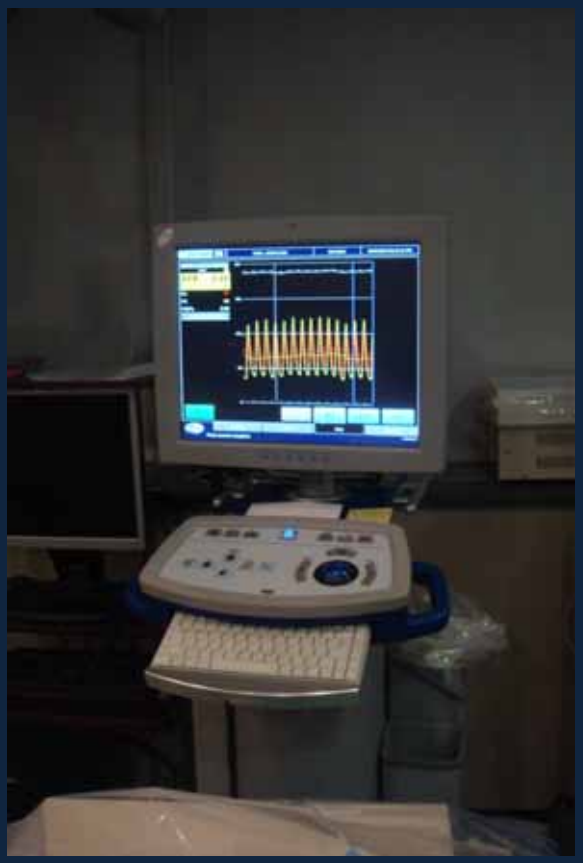
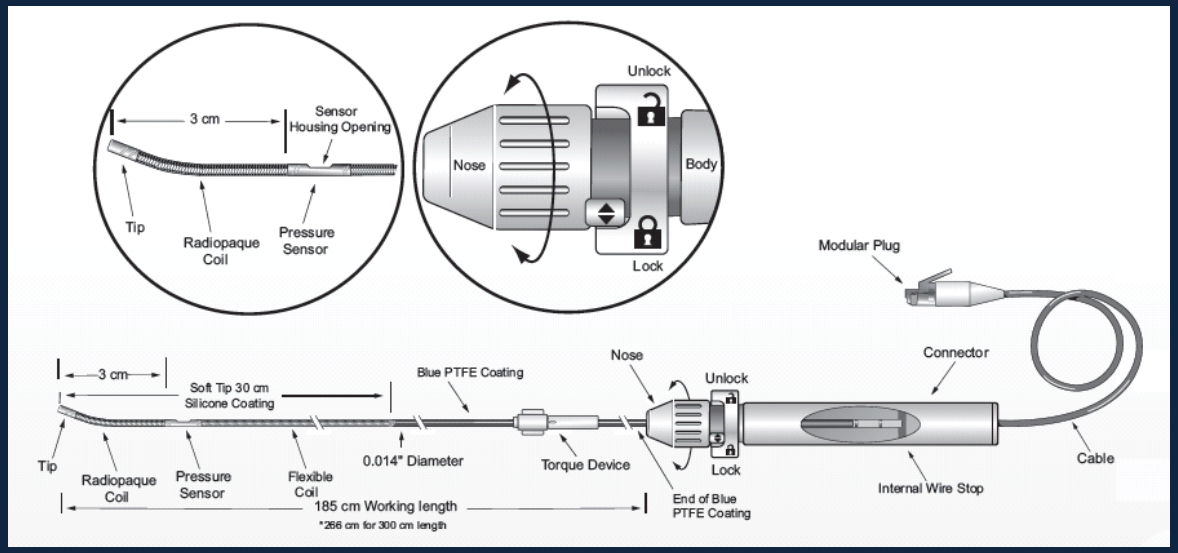
Can IVUS and FFR be helpful to treat In-Stent Restenosis lesions ? Yes, Of Course.

1) How to assess the newly "created“ prominent necrotic core within the stented lumen ?
   Which treatment strategy will be appropriate to treat ? - Statin vs PCI

2) Although FFR looks reasonable, however the cut-off value 0.75 is enough for the newly "created“ prominent necrotic core ?

Thank you for your attention

Volcano s5/s5i Imaging System with IVUS & FFR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