

***Investigation of Neointimal Coverage
Grading and Yellow Plaque Grading in
Stent Site after Sirolimus-Eluting Stent
Implantation: Angioscopic Findings***

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Background

- **The efficacy and safety of sirolimus-eluting stent (SES) have been demonstrated in various reports.**
- **Recently, late stent thrombosis and inhibition of plaque sealing receives considerable attention after DES implantation.**
- **It is suggested that are caused by induction of neointimal coverage and reduction of repeat revascularization.**

Objective

To evaluate the degree of neointimal coverage, existence of thrombus and plaque yellow grade on coronary angioscopy after SES implantation at follow-up.

Methods

- 1. 80 lesions in 68 patients who had implanted SES from August 2004 to January 2008.**
- 2. Angioscopic observation both baseline at the time of SES implantation and at follow-up study.**
- 3. Angioscopic system:
FT-201 (FiberTech)
Fiber catheter (AS-003, FiberTech)**

Angioscopic classification of yellow plaque

Grade0



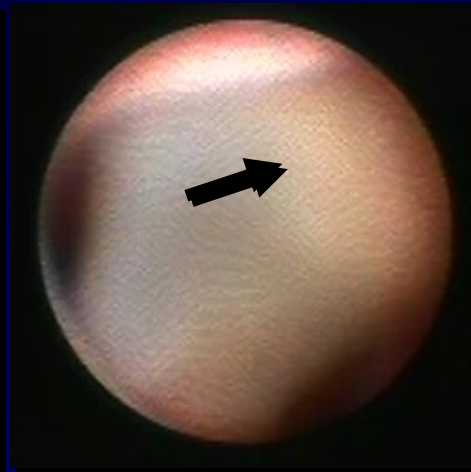
White

Grade1



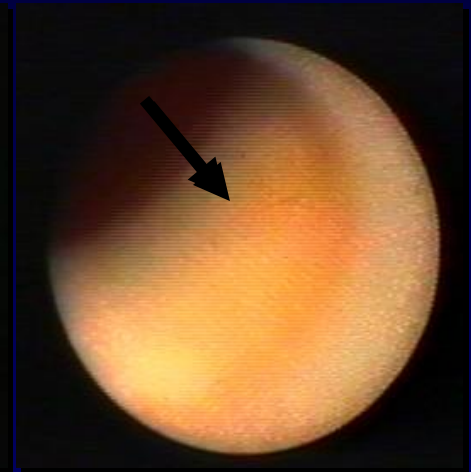
light Yellow

Grade2



Yellow

Grade3



Intensive Yellow

Angioscopic classification of neointima

Grade 0: Stent struts that are fully visible

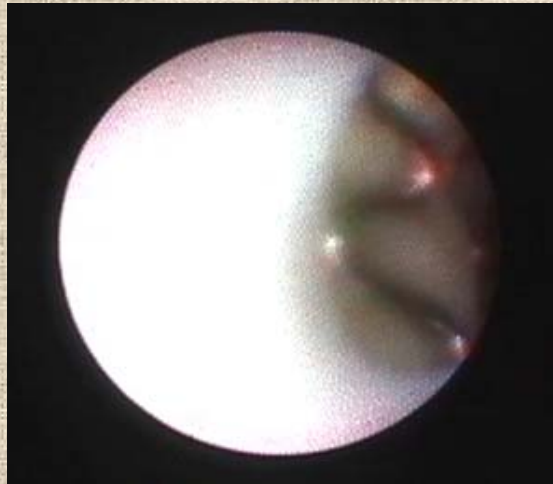
Grade 1: Stent struts that bulged into the lumen but covered with transparent neointima

Grade 2: Stent struts that are visible but not clearly seen

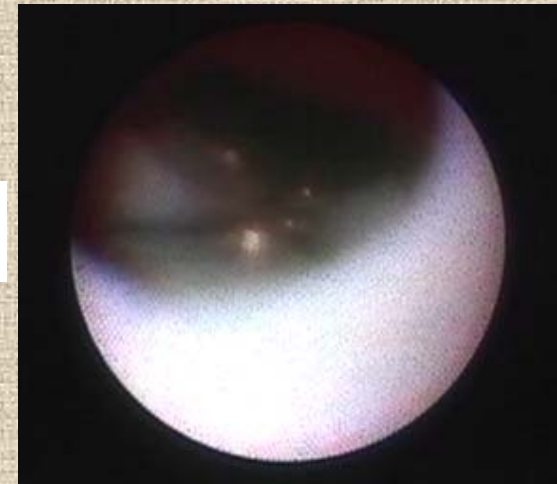
Grade 3: Stent struts that are not visible

Angioscopic classification of neointima

Grade 0



Grade 1



Grade 2



Grade 3



Patient Characteristics (n=68)

Age (mean \pm SD) 65.6 \pm 9.8

Male 51 (75.0%)

Clinical diagnosis

Stable effort angina 42 (61.8%)

Unstable angina / NSTEMI 17 (25.0%)

STEMI 0 (0.0%)

Silent myocardial ischemia / OMI 9 (13.2%)

Risk factors

Diabetes 31 (45.6%)

Hypertension 43 (64.2%)

Dyslipidemia 48 (71.5%)

LDL-C / HDL-C 104.4 \pm 26.1 / 45.7 \pm 13.0

Hyperuricemia 13 (19.1%)

Obesity 20 (29.9%)

Smoking 37 (54.4%)

Family history of IHD 10 (14.7%)

Lesion characteristics (n=84)

Distribution

LAD	43 (51.2%)
LCX	17 (20.2%)
RCA	24 (28.6%)

Number of stents **120**

Stents / lesion **1.4 ± 0.6**

Stent size **3.1 ± 0.4mm**

Stent length **22.2 ± 4.8mm**

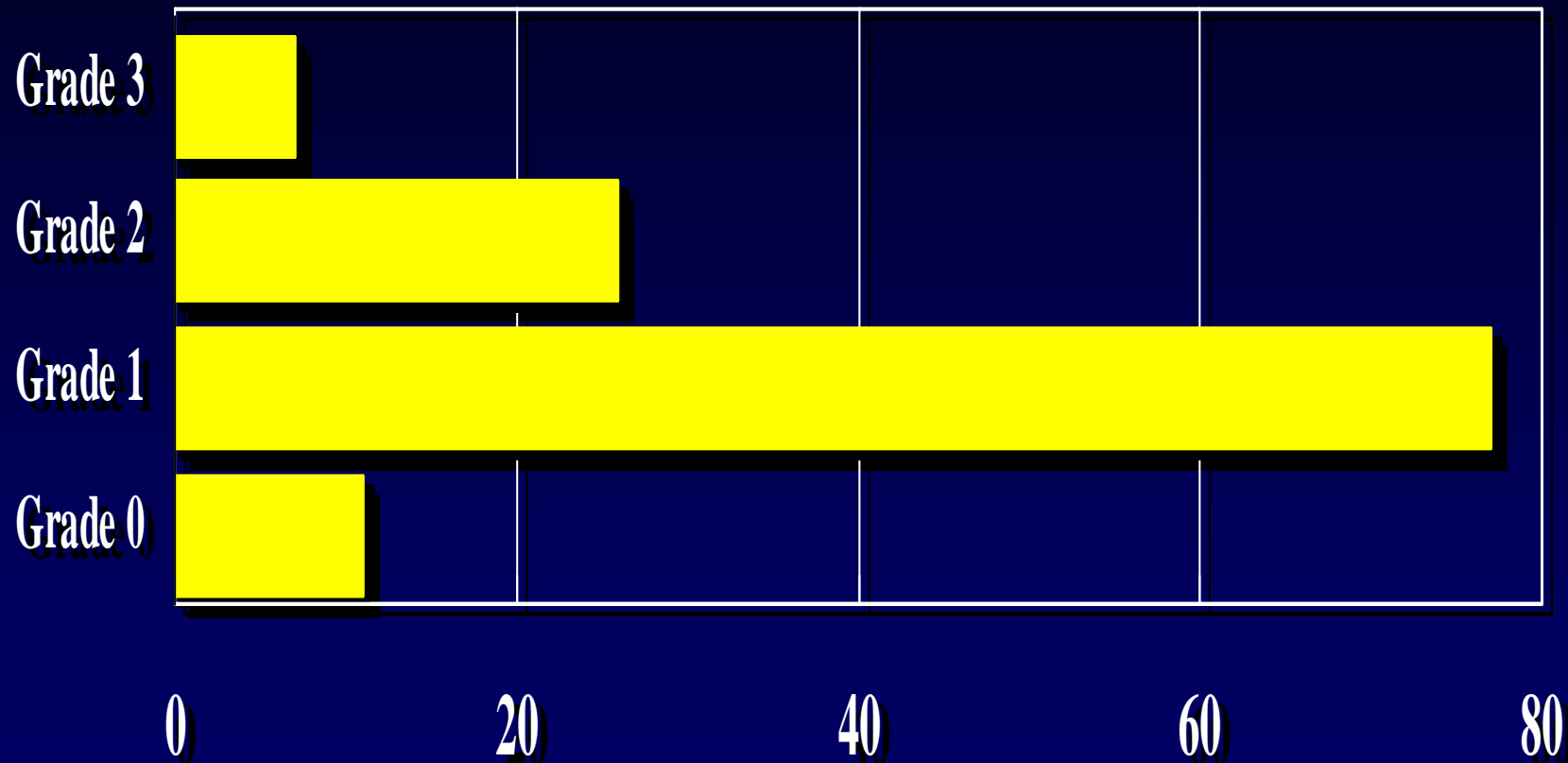
Follow-up period **12.7 ± 5.3**

Chronic total occlusion **13 (10.8%)**

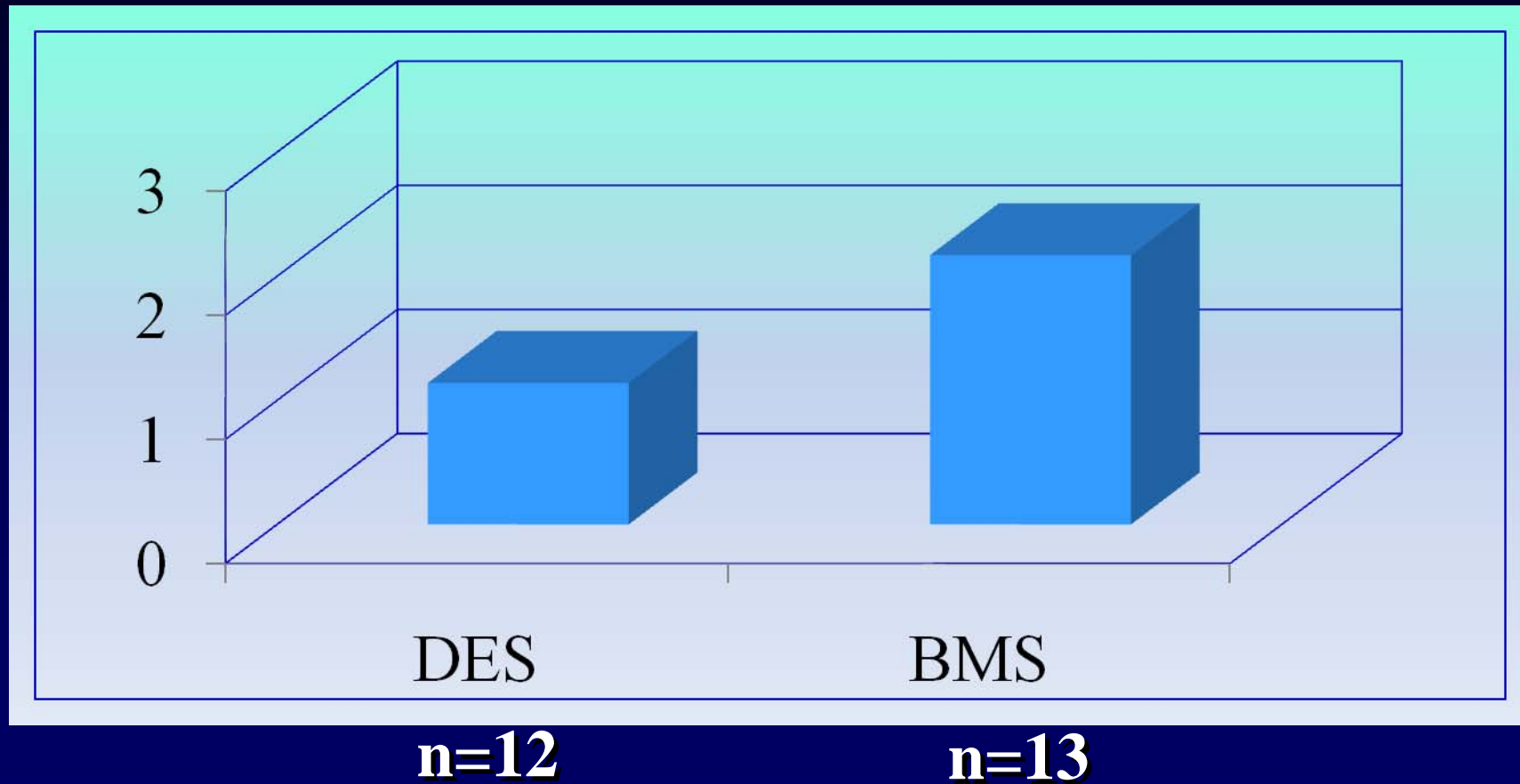
SES for in-stent restenosis **9 (7.5%)**

TLR **3 (2.5%)**

Neointimal coverage at F/U



Angioscopic classification of neointima of lesions with both BMS and SES



Neointimal coverage in lesions with SES was significantly delayed.

Relationship between neointimal coverage and yellow grading

Grade of Neointima	Yellow grading			
	Grade 0	Grade 1	Grade 2	Grade 3
Grade 0/1	43 (49%)	38 (44%)	6 (7%)	0 (0%)
Grade 2/3	20 (61%)	3 (9%)	9 (27%)	1 (3%)

The higher neointimal grade, the higher yellow grade?

Grade 2 / 3 neointima (n=10)

- **6 lesions: Acute coronary syndrome and thrombus formation at the time of SES implantation.**
- **9 lesions had white thrombus**
- **6 lesions: SES was implanted the plaques with yellow grade III**
- **Are these conditions precursor of late stent thrombosis?**

Summary

- 1. Incomplete neointimal coverage was observed at 1 year follow-up at the site of SES implantation by angioscopy.**
- 2. Neointimal coverage of SES was significantly delayed compare to bare metal stents.**
- 3. Significant increase in yellow grade with presence of thrombus was observed in lesions with higher grade of neointimal coverage.**

Conclusion

Sirolimus-eluting stent implantation may induce plaque to be vulnerable and that might be one of the cause of late stent thrombosis after SES.