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HEART CENTER

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# Late stent malapposition/stent coverage in DES

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Professor of Medicine

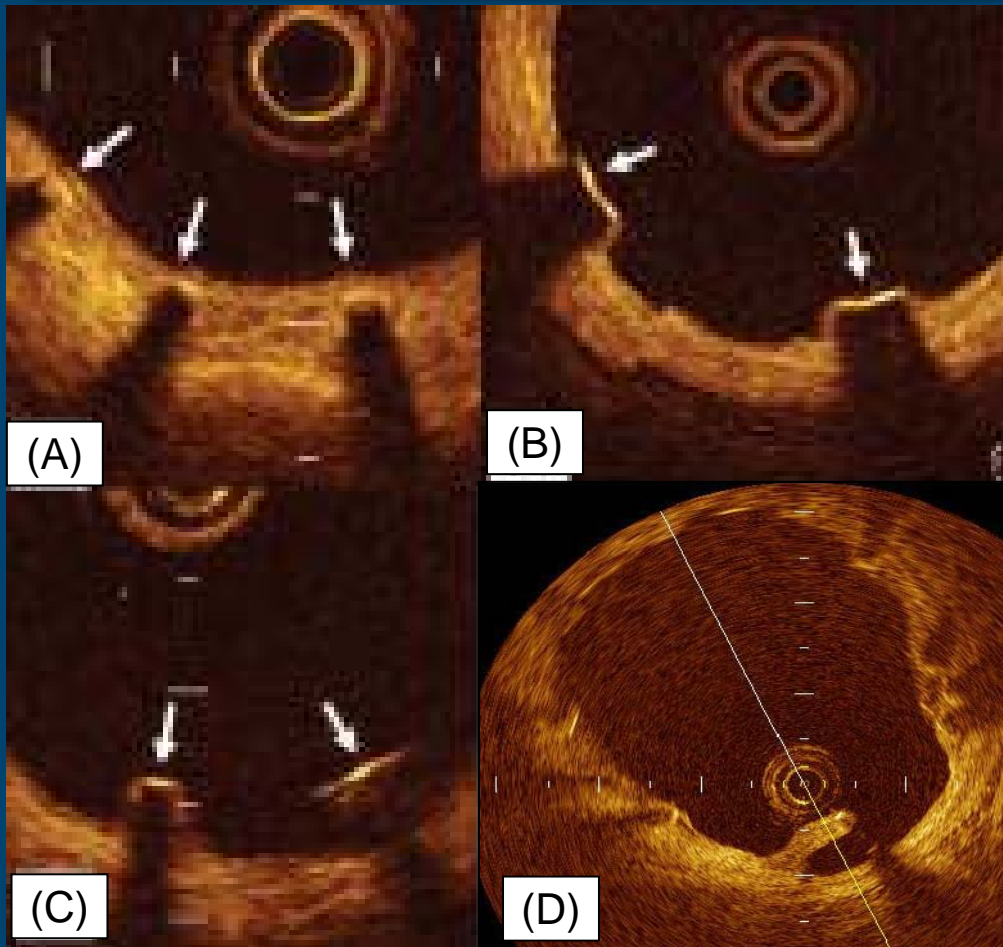
Harvard Medical School



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# DES Stent Struts Apposition/Coverage



**A: well apposed and covered**

**B: well apposed, not covered**

**C: malapposed, not covered**

**D: malapposed, but covered**

Takano.. Jang, Mizuno. AJC 2007  
Lowe, Narula, Fujimoto, Jang. Submitted

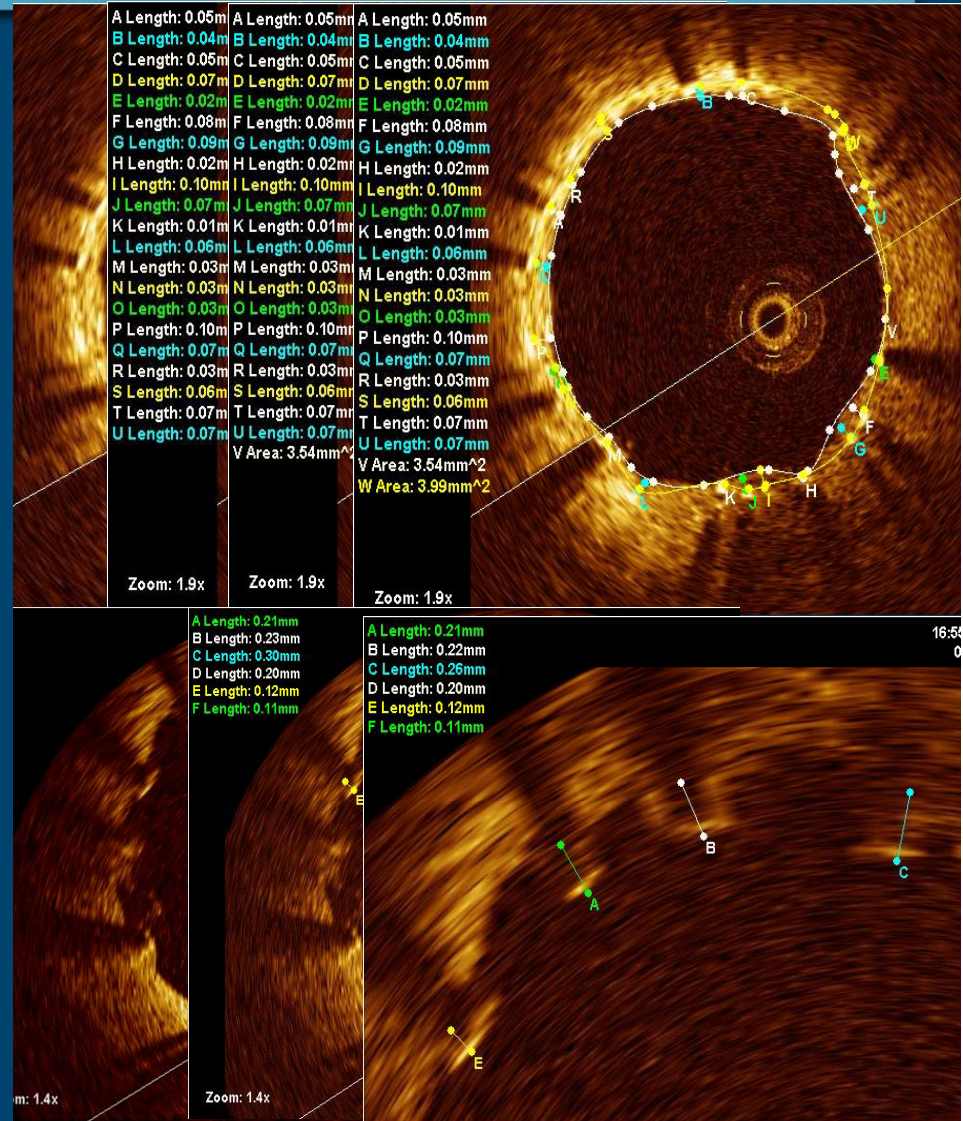
# OCT Image Analysis

## 1. Neointimal thickness

The distances between the endo-luminal surface of neointima and the strut reflection (center of the struts).

## 2. Stent apposition

The distances between the endo-luminal surface (center) of the strut reflection and the vessel wall.



# OCT for SES

|               | Takano |  | Matsu<br>moto | Yao  | Chen   |  | Yao   | Takano |
|---------------|--------|--|---------------|------|--------|--|-------|--------|
| F/U           | 3 mo   |  | 6 mo          | 6 mo | 8.6 mo |  | 12 mo | 24 mo  |
| NIH thickness | 29     |  | 53            | 42   | 120/40 |  | 88    | 71     |
| Exposed (%)   | 15     |  | 11            | 9.2  | 17     |  | 6.6   | 5      |
| Malapp (%)    | 16     |  |               | 1.3  | 2      |  | 1.4   |        |
| Expo+Mala (%) | 6      |  | 1             |      |        |  |       |        |
| Thrombus (%)  | 14     |  |               |      |        |  |       | 14     |

Takano, Mizuno. AJC 2007, Matsumoto, Shite. EHJ 2007,  
Chen. Heart 2008, Xie, Takano, Mizuno. AJC 2008, Takano, Mizuno.  
JACC 2008, Yao, Suzuki. Chinese Med J 2008.

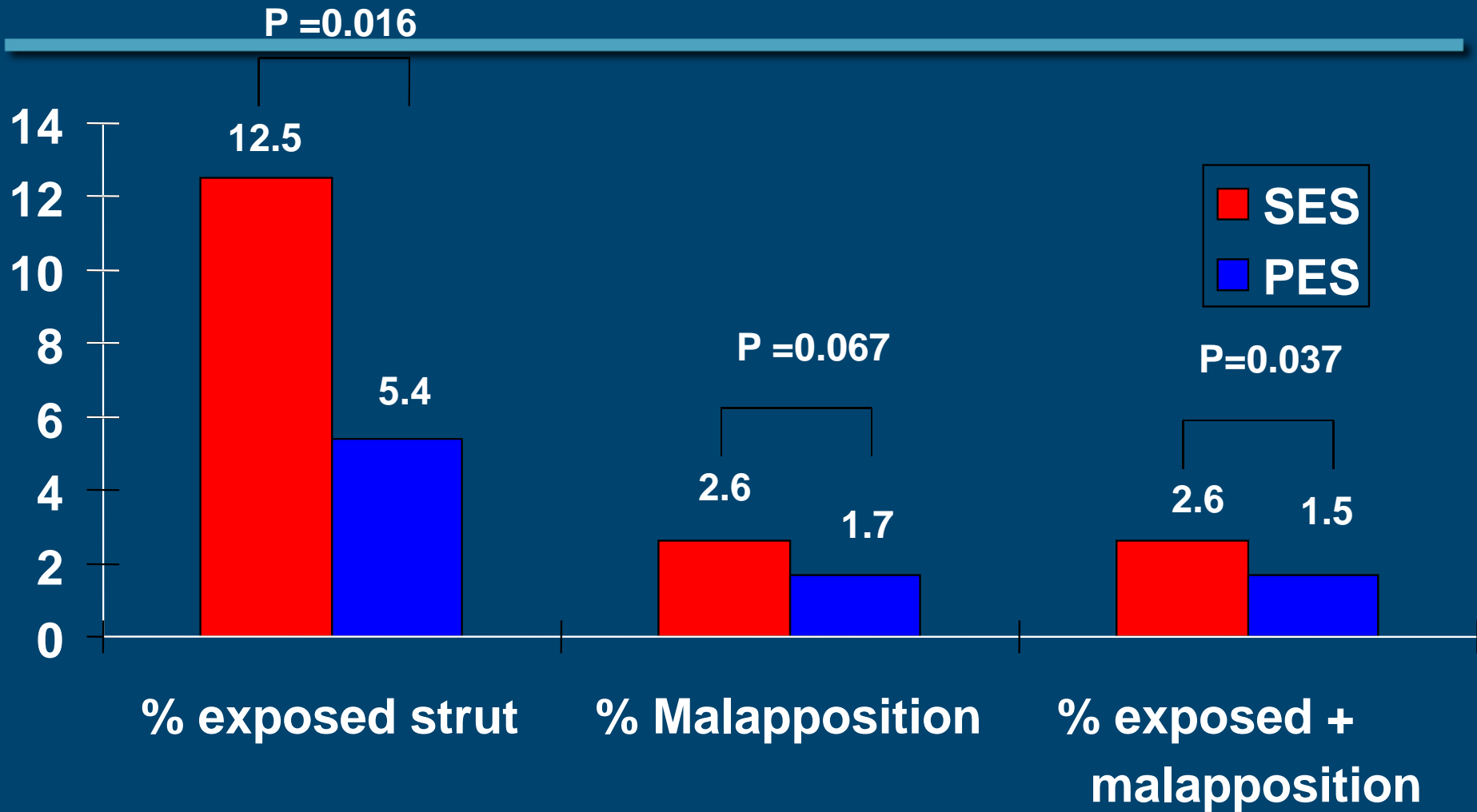


# OCT for SES

|               | Takano | Takano (BMS) | Matsu moto | Yao  | Chen   | Chen (BMS) | Yao   | Takano |
|---------------|--------|--------------|------------|------|--------|------------|-------|--------|
| F/U           | 3 mo   | 3 mo         | 6 mo       | 6 mo | 8.6 mo | 7.3 mo     | 12 mo | 24 mo  |
| NIH thickness | 29     | 351          | 53         | 42   | 120/40 | 590/200    | 88    | 71     |
| Exposed (%)   | 15     | 0.1          | 11         | 9.2  | 17     | 0.3        | 6.6   | 5      |
| Malapp (%)    | 16     | 1.1          |            | 1.3  | 2      | 0          | 1.4   |        |
| Expo+Mala (%) | 6      | 0.1          | 1          |      |        |            |       |        |
| Thrombus (%)  | 14     | 0            |            |      |        |            |       | 14     |



# SES v PES: 9 mo F/U

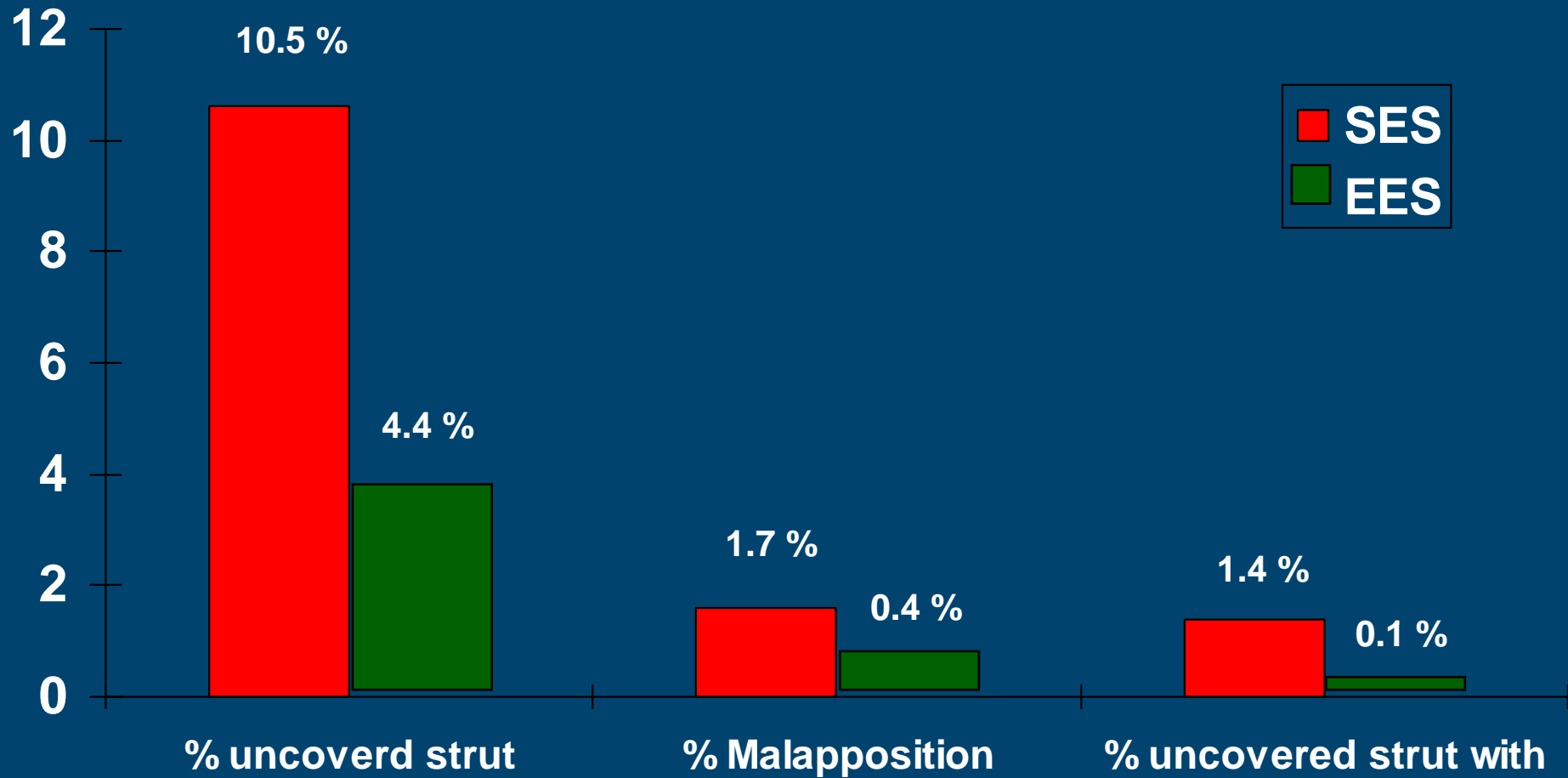


Kim JS. Circ J 2010;74:320-6



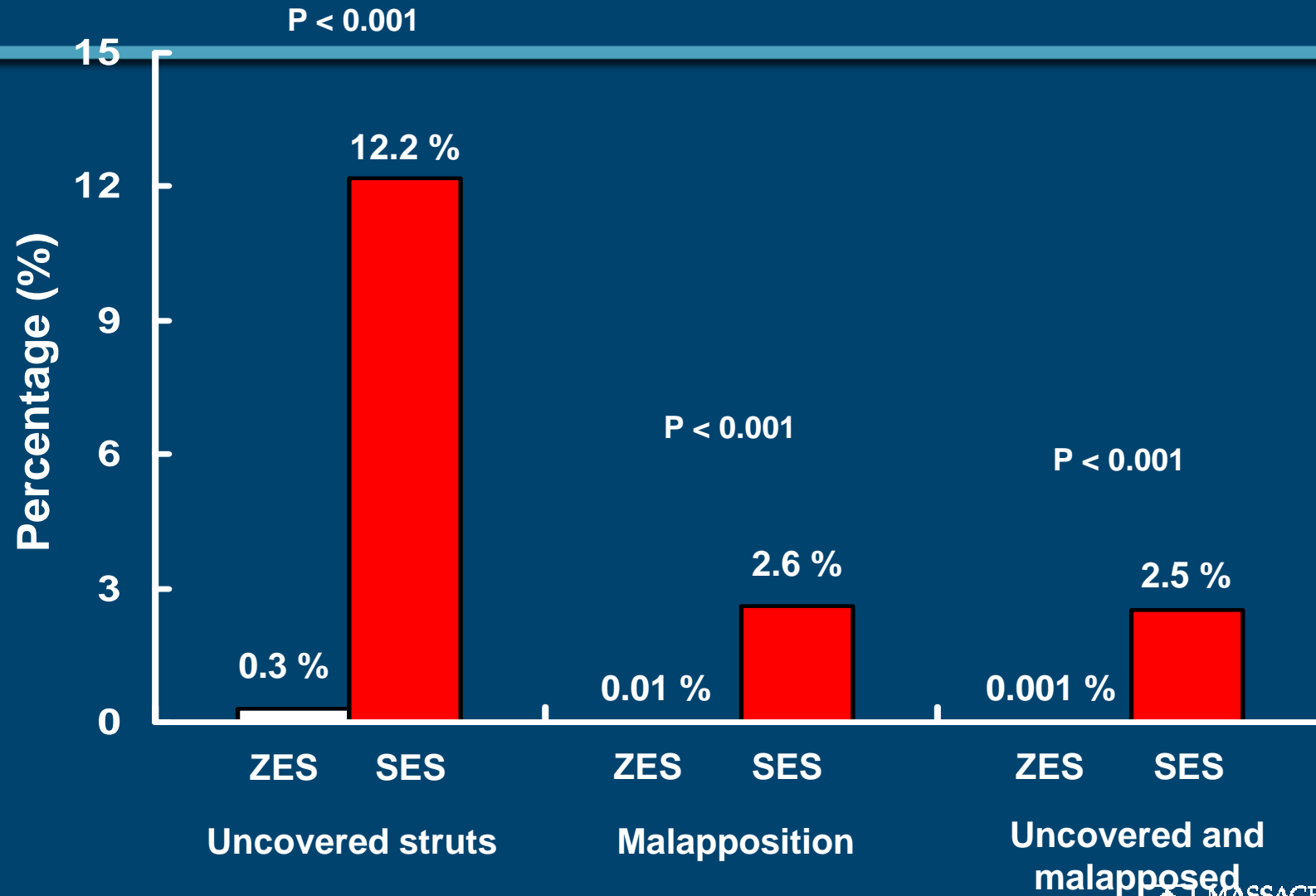
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# SES v EES: 9 mo F/U



Choi HH. ACC 2010

# ZES v SES: 9 mo F/U



Kim JS. Heart 2009;95:1907-12

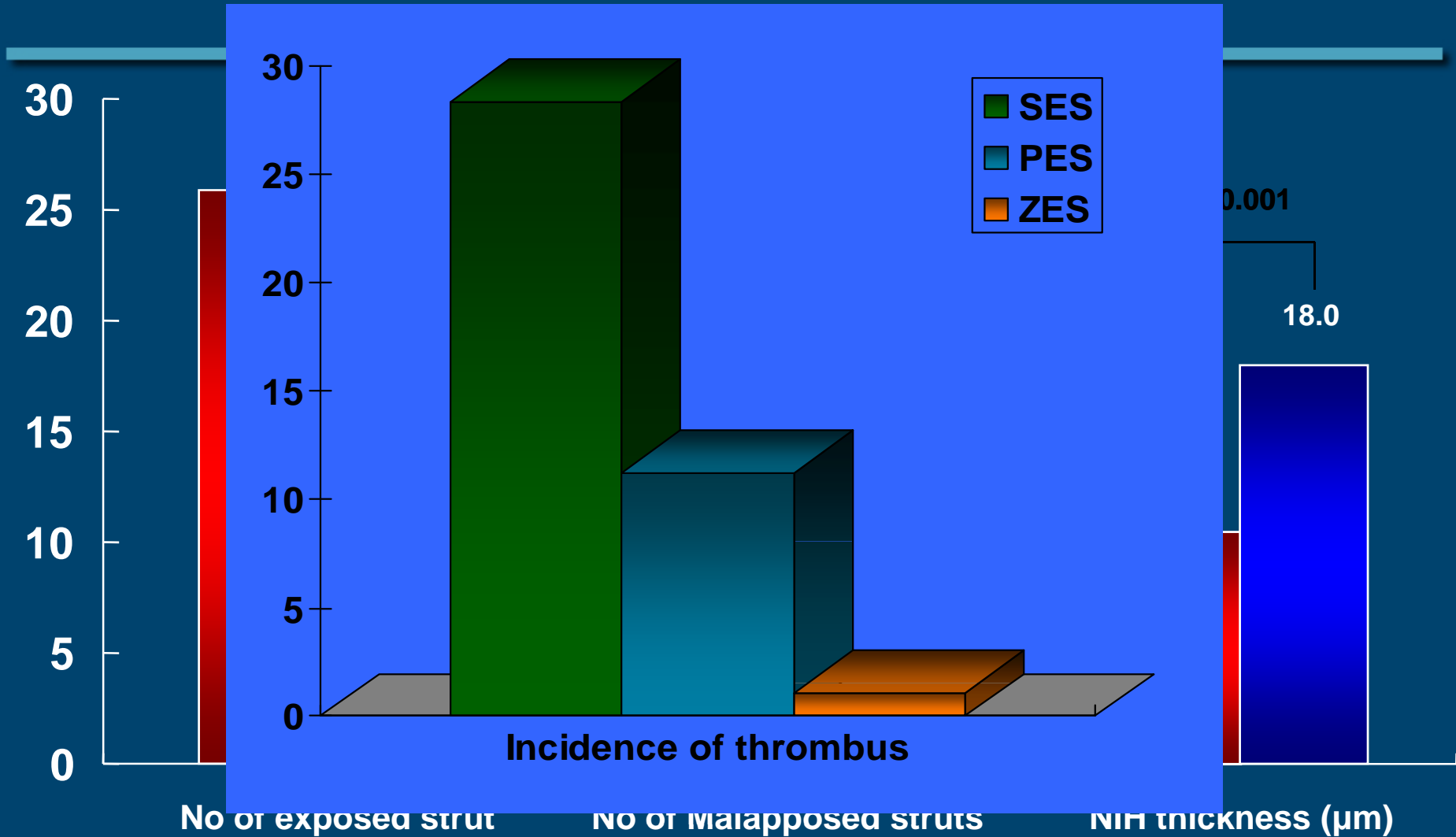


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# Intracoronary Thrombus

35 stents (14.3 %) in 244 stents (216 patients)



# Strut Coverage and Thrombus

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- 17 pts underwent 2 angioscopic procedures at 2 and 5 yrs after SES
- Total 6 thrombi at 2 and 5 yrs
  - 3 disappeared at 5 yrs
  - 3 new thrombi appeared at 5 yrs (1 on ASA, 2 on DAPT)
- Neointimal stent coverage and Thrombus
  - grade 0 (no coverage): 7/12
  - grade 1 (thin): 5/12
  - **grade 2 (complete): 0/12**



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JB Hou\*, HB Jia\*, JY Kong\*, ZG Han\*, SA Yang\*, LJ Ma\*,  
HM Liu\*, CY Xu\*\*, J Schmitt\*\*, SS Zhang\*\*, B Yu\*, and  
IK Jang\*\*\*

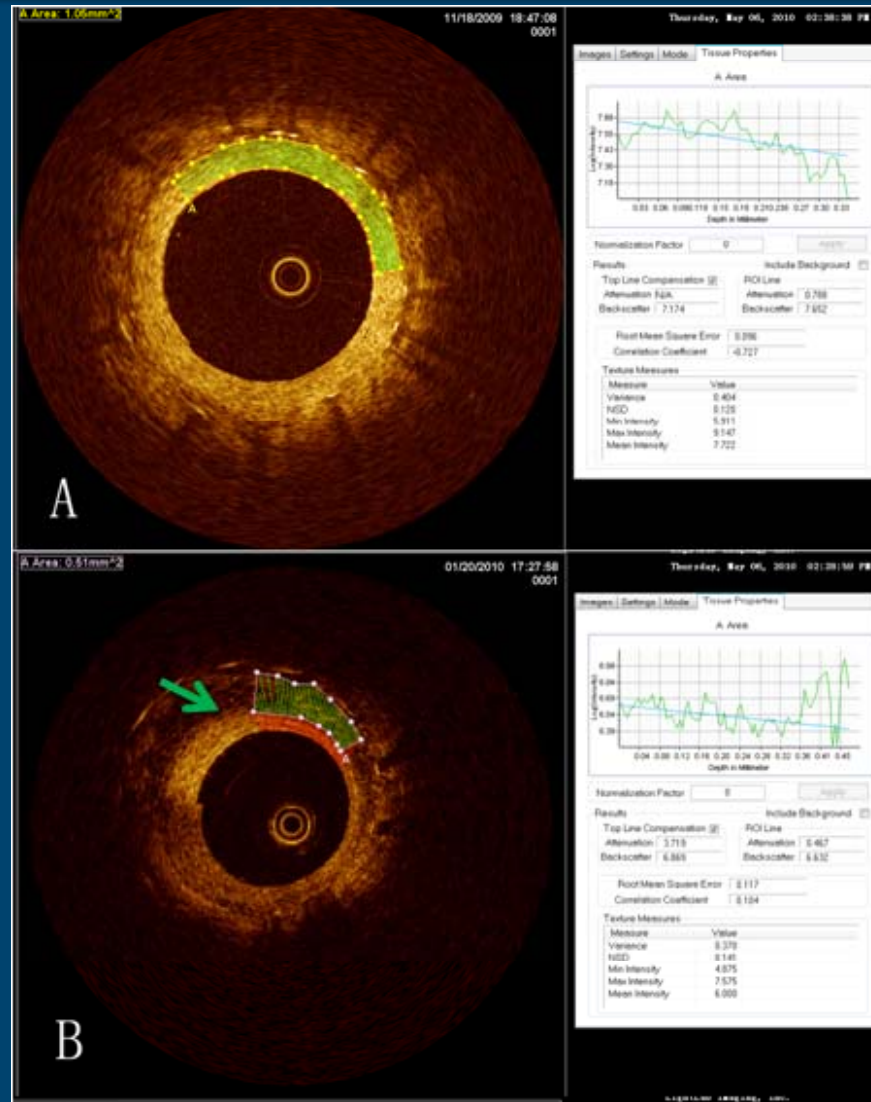
Collaboration between  
Harbin Medical University\*,  
LightLab Imaging\*\*, and  
Massachusetts General Hospital\*\*\*



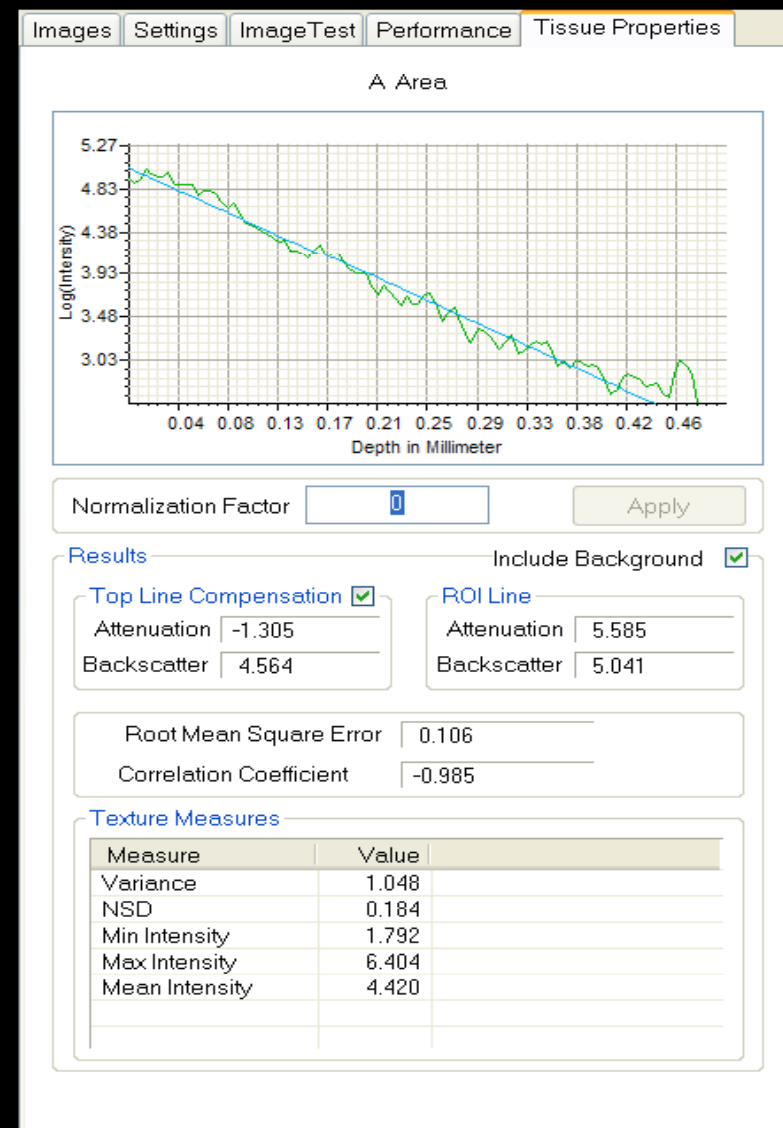
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# Tissue Property Analysis



# Tissue Property Analysis



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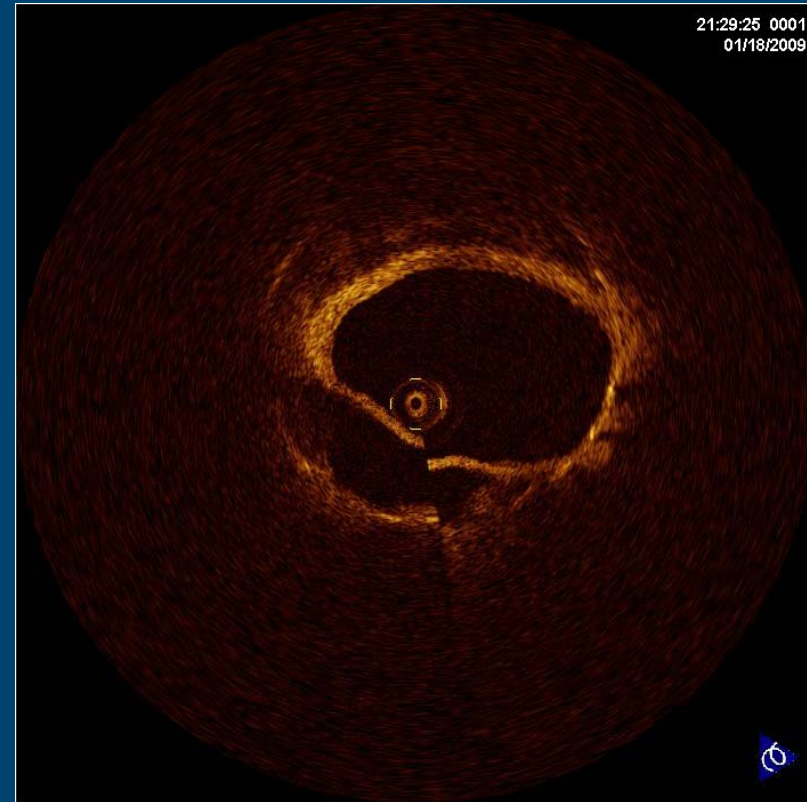
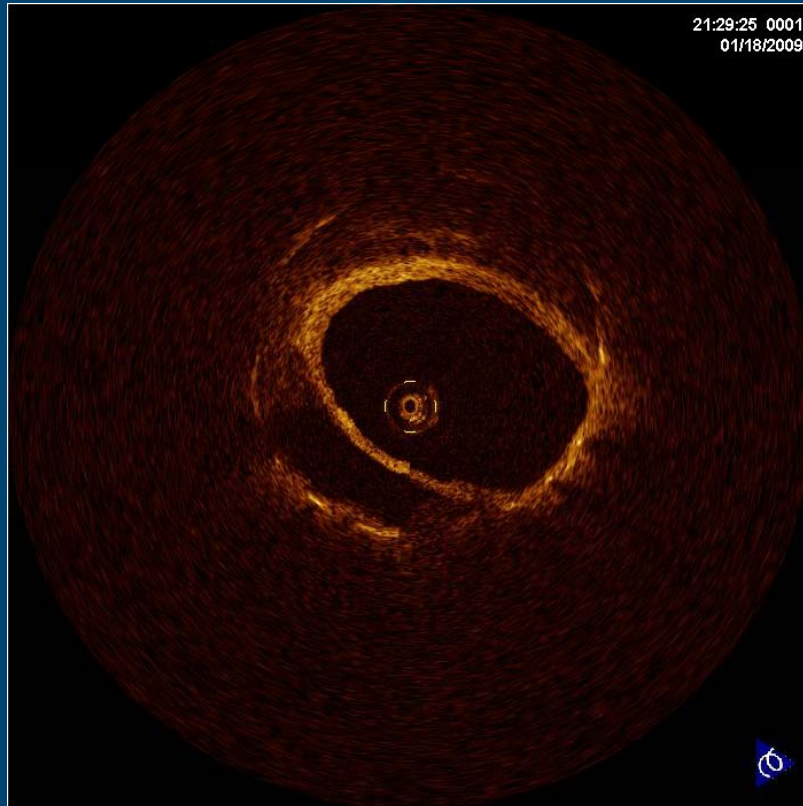
# Results

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- 136 SES in 96 patients:
  - Group 1: < 24 mo (98 stents in 71 pts)
  - Group 2: > 24 mo (35 stents in 25 pts)
- Group 2 had higher incidence of
  - Lipid plaque
  - Microchannels
  - Heterogenous neointima



# VP inside SES



Cho JM, Jang IK. JACC CV Img. 2011 In press



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# Conclusion

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- SES strut coverage and malapposition improve over time.
- Compared to SES, 2<sup>nd</sup> generation DES have significantly lower incidence of uncovered struts and malapposition (and thrombus).
- Angioscopic study showed no thrombus on fully covered struts.
- Neoatherosclerosis as a new mechanism for VLST.





# Issue

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**Lack of correlation between OCT  
finding and clinical outcome!**



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# MGH OCT Registry

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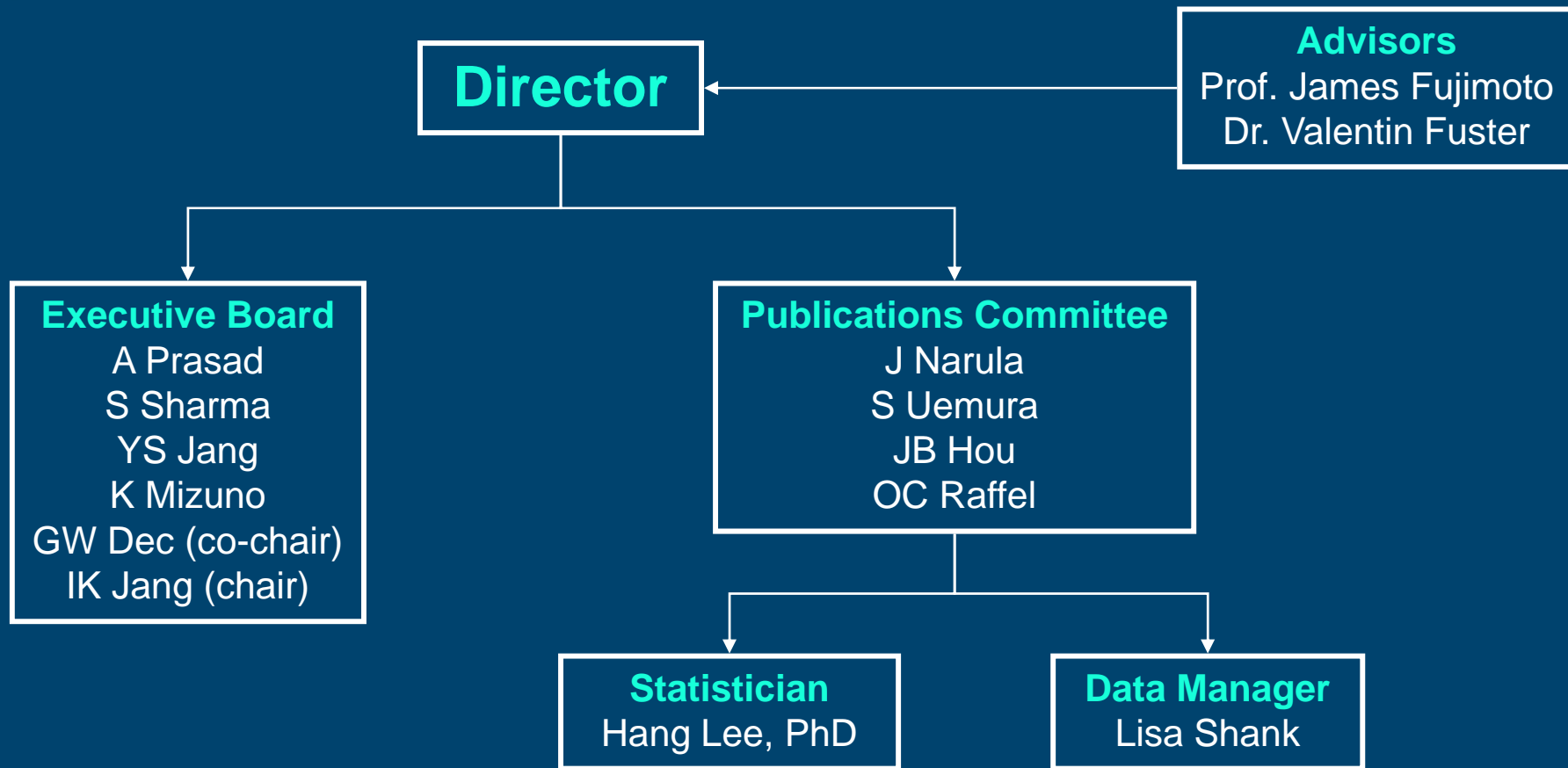
- Target 3000 - 5000 patients x 5 years
- 20 sites from Australia, China, Singapore, Japan, Korea, USA
- Data collection started in 6/2010
- As of 4/15/2011, 503 patients enrolled

<http://www.massgeneral.org/octregistry>



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# Organization



# Participating PIs and Institutions

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## Australia

- OC Raffel: Brisbane
- H Lowe: Sydney
- P Balis: Melbourne

## China

- B Yu: Harbin Med Univ.
- S Lee: Univ. of Hong Kong

## USA

- IK Jang: MGH
- A Prasad: Mayo
- S Sharma: Mt. Sinai

## Japan

- K Mizuno: Tokyo
- S Uemura: Nara Univ.
- K Kakuta: Tsuchiura Kyodo
- T Ito: Iwate

## Korea

- SY Choi: Ajou
- YS Jang: Yonsei
- SJ Kim: Kyung Hee
- JM Cho: EW
- SJ Park: Asan

## Singapore

- S Chia: National Heart Center

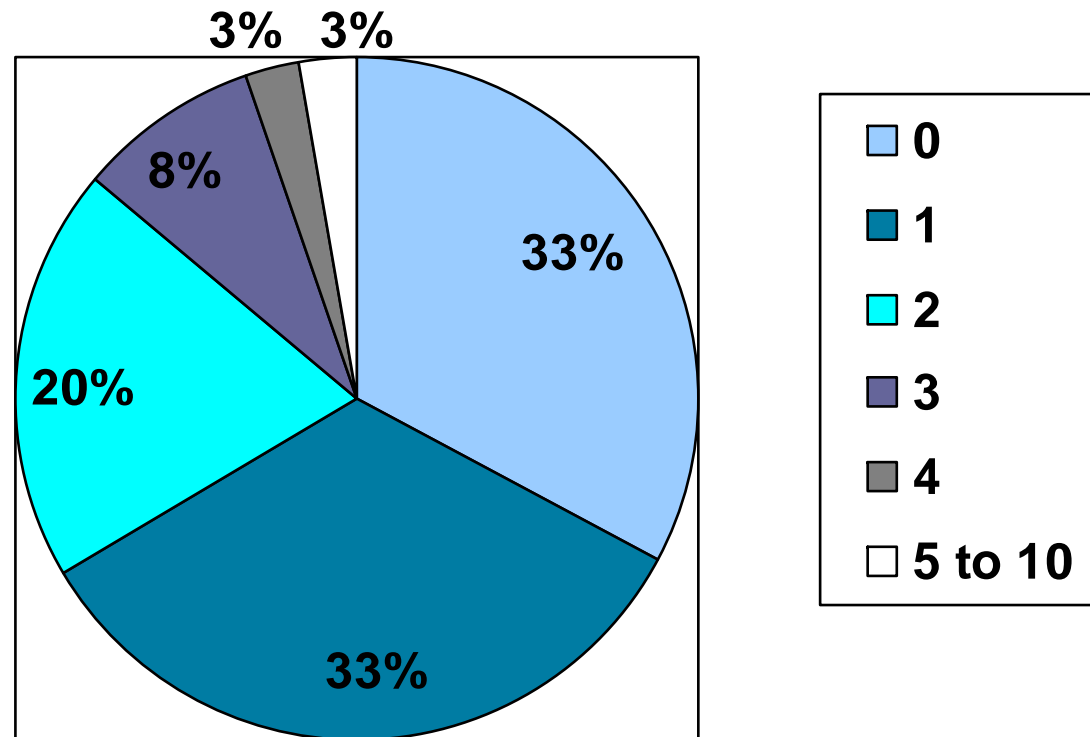


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# Previous Stents

# of Previous Stents



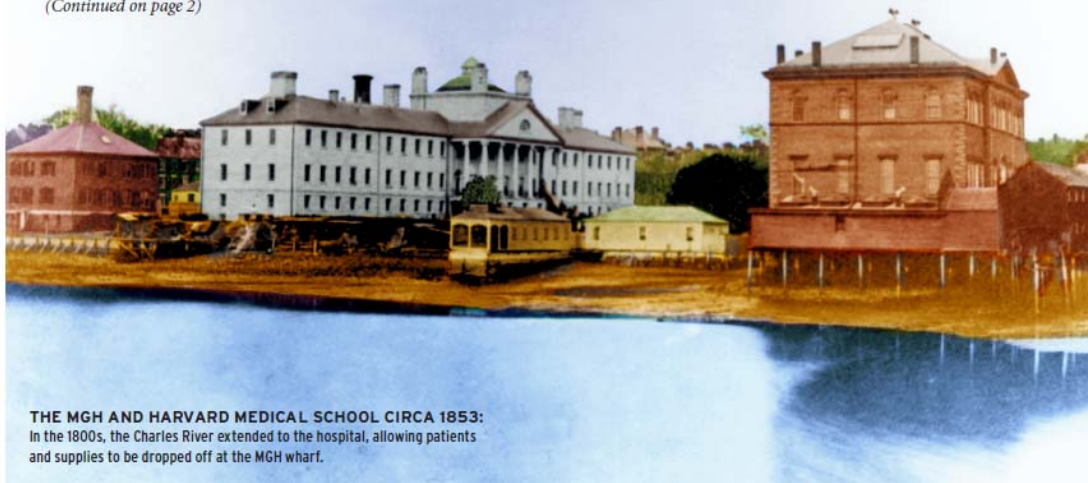
# Thank You



## *MGH history book to commemorate bicentennial*

**AS PART OF** the MGH's bicentennial celebrations, a commemorative book covering the hospital's unique beginnings and illustrious history will be published in 2011. "Something in the Ether, A Bicentennial History of Massachusetts General Hospital, 1811 to 2011," was written by author and publisher Webster Bull. Much of the content was drawn from interviews with longtime MGH staff and countless hours of research of historical records and archival material. The book is scheduled to be released in March and will be available at the MGH General Store and select booksellers.

*(Continued on page 2)*



**THE MGH AND HARVARD MEDICAL SCHOOL CIRCA 1853:**  
In the 1800s, the Charles River extended to the hospital, allowing patients and supplies to be dropped off at the MGH wharf.



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