

# Stent, trombosi e polimeri

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# Is stent thrombosis still a problem?

**TABLE 1** Definition of Stent Thrombosis According to the Valve Academic Research Consortium

Level of Certainty	Timing
<b>Definite</b>	<b>Early</b>
Angiographic or pathological confirmation of partial or total thrombotic occlusion within the peri-stent region	Acute (<24 h)
AND at least 1 of the following additional criteria: Acute ischemic symptoms Ischemic electrocardiogram changes Elevated cardiac biomarkers	Subacute (24 h to 30 days)
<b>Probable</b>	<b>Late</b>
Any unexplained death <30 days of stent implantation	31 days to 1 yr
Any myocardial infarction related to documented acute ischemia in the territory of the implanted stent without angiographic confirmation of stent thrombosis and in the absence of any other obvious cause	
<b>Possible</b>	<b>Very Late</b>
Any unexplained death beyond 30 days	>1 yr

# Sample size for a superiority study on stent thrombosis

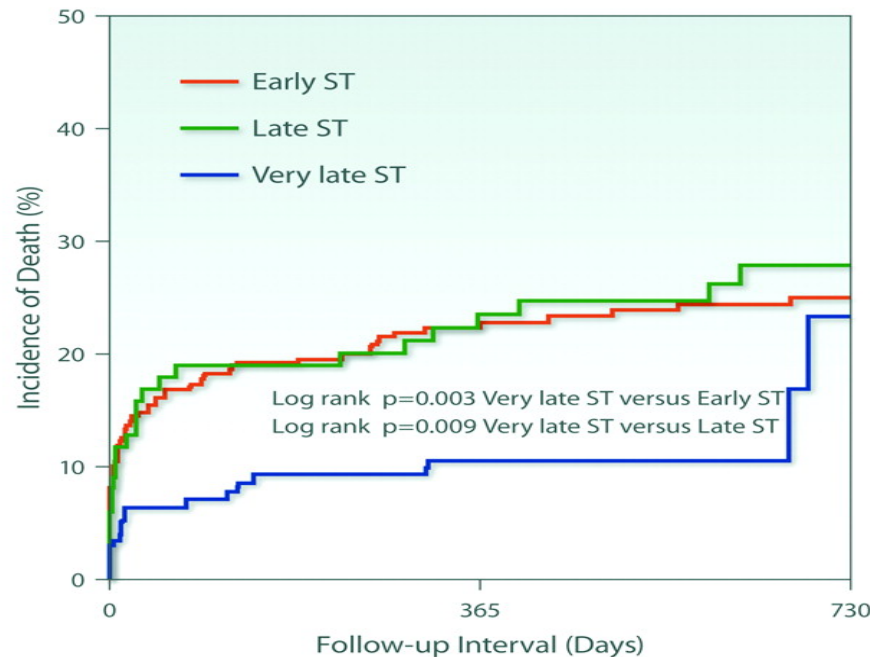
- Assuming a 1 year event rate of

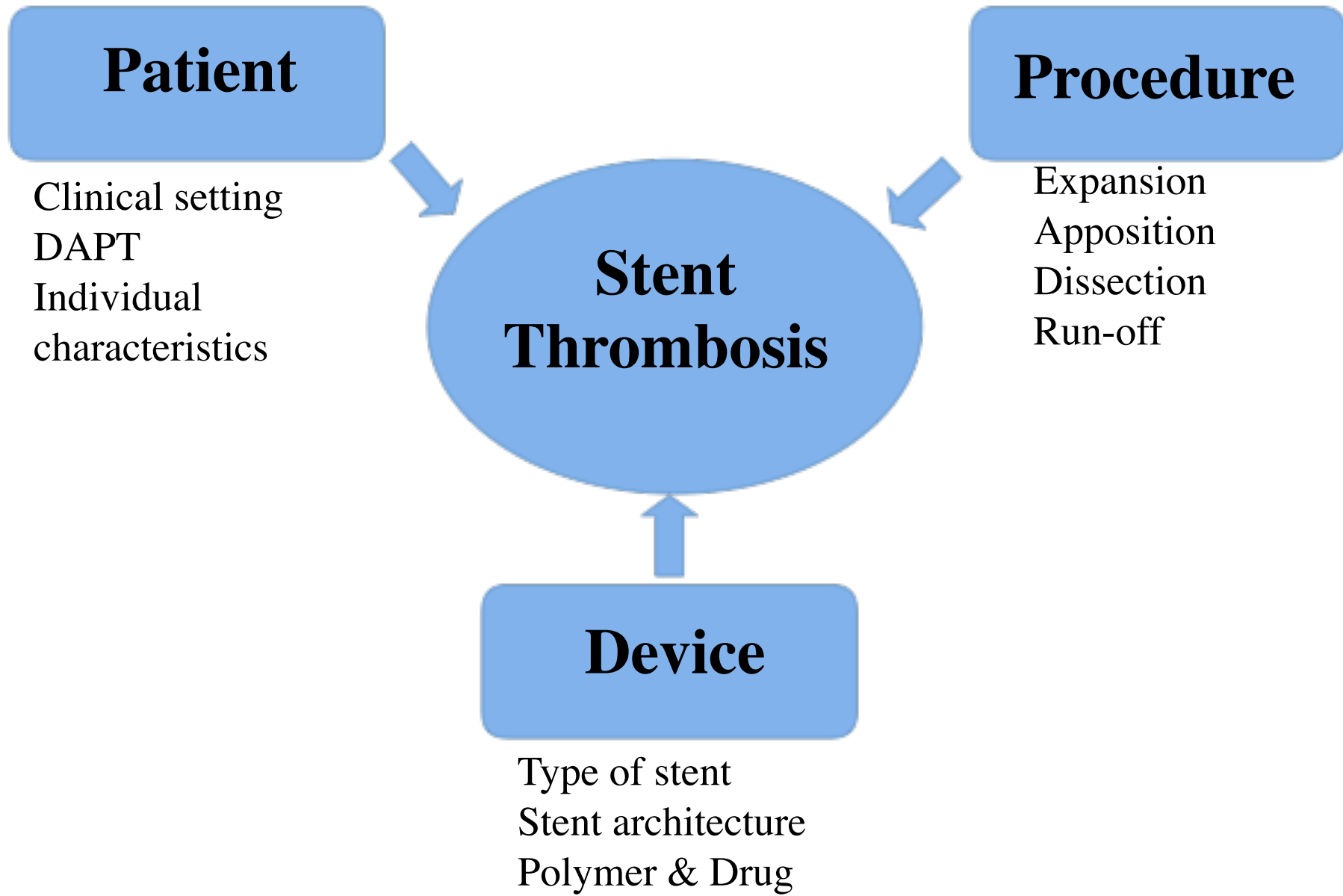
13,000 patients  
needed

- Power= 90%

# Is stent thrombosis still a problem?

## Mortality after ST





```
graph BT; Device[Device] --> ST(Stent Thrombosis);
```

**Stent  
Thrombosis**

**Device**

Type of stent  
Stent architecture  
Polymer & Drug

# PCI & stent evolution

Open  
the  
vessel

Keep  
the  
vessel  
open

Modulate  
healing  
DAPT

Improve stent  
architecture,  
drug release,  
polymers

Reduce  
DAPT  
duration  
Eliminate  
late events

**POBA**

**Stent  
(BMS)**

**old Gen  
DES**

**new Gen  
DES**

*Dissection  
Acute  
occlusion*

*Restenosis  
Thrombosis*

*Late stent  
thrombosis*












*Future  
needs?*

**Last 40 years**



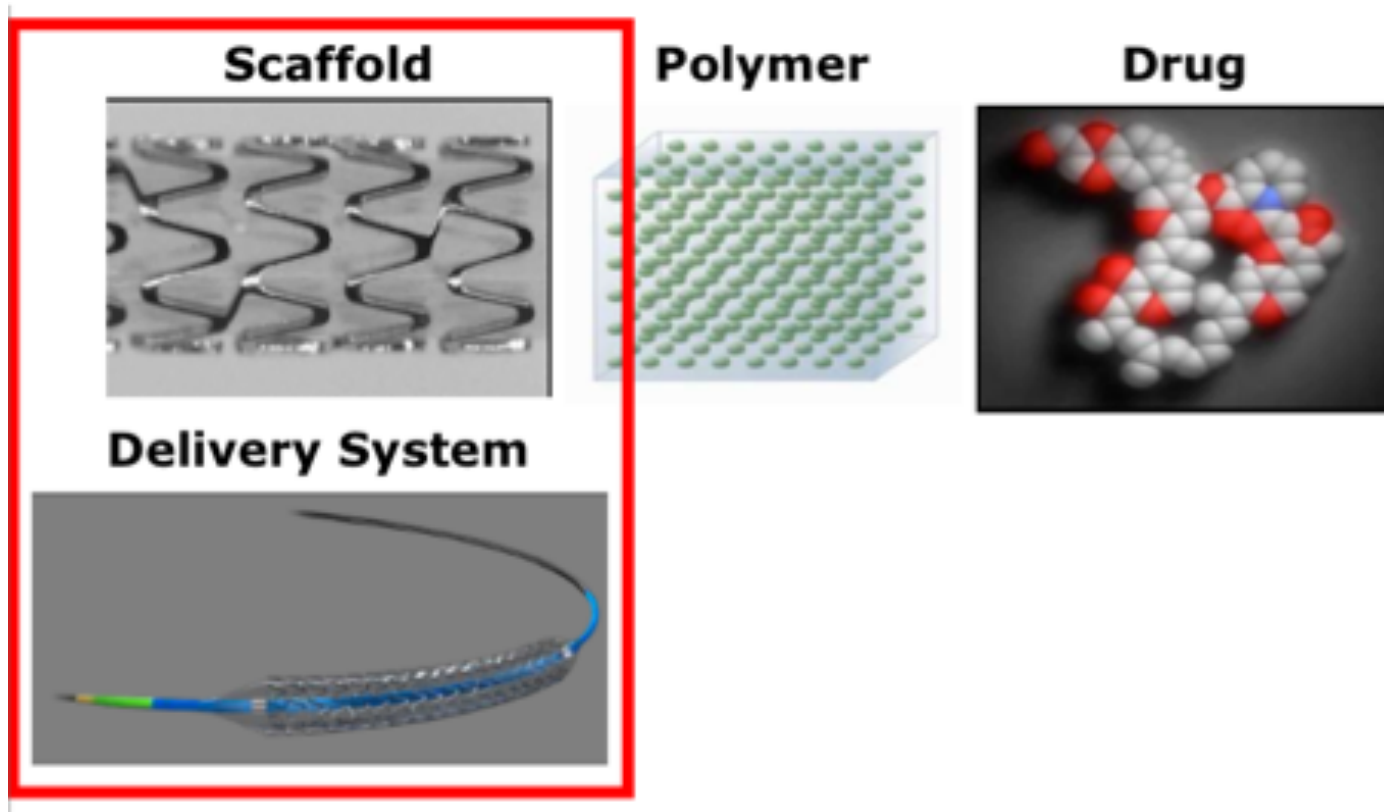
# Differences among DES: materials, structure, polymers,

1

	Taxus	Cypher	BioMatrix Nobori	Endeavor	Yukon PC	Xience Promus	Resolute	Synergy	Orsiro	DESyne	Combo	Mistent	Ultimaster
													
Platform material	SS	SS	SS	CoCr	SS	CoCr-PtO	CoCr	PtO	CoCr	CoCr	SS	CoCr	CoCr
Strut thickness (µm)	132	140	120	91	87	81	91	74	60	81	100	64	80
Polymer type	Durable	Durable	Biodegradable	Durable	Biodegradable	Durable	Durable	Biodegradable	Biodegradable	Biodegradable	Biodegradable	Biodegradable	Biodegradable
Polymer material	SBS	PEVA/PBMA	PDLA	MPC/LMA/HPMA/3-MPMA	PDLA	PBMA/PVDF-HFP	PBMA/PBMA/PVH/PMA	PLGA	PLA	PLA	PDLA/PLGA	PLGA	PDLA-PCL
Coating distribution	Circumferential	Circumferential	Abdominal	Circumferential	Circumferential	Circumferential	Circumferential	Abdominal	Circumferential	Circumferential	Abdominal	Circumferential	Abdominal
Polymer thickness (µm)	22	13	10	6	5	8	6	4	7	<3	5	10	15
Additional coating	-	-	-	-	-	-	-	-	Silicon carbide	-	Anti-CD34 Antibodies	-	-
Drug released	Paclitaxel	Sirolimus	Biolimus	Zotarolimus	Sirolimus	Everolimus	Zotarolimus	Everolimus	Sirolimus	Novolimus	Sirolimus	Sirolimus	Sirolimus



# DES structure



# **Stent Thrombogenicity Early in High-Risk Interventional Settings Is Driven by Stent Design and Deployment and Protected by Polymer-Drug Coatings**

Kumaran Kolandaivelu, MD, PhD; Rajesh Swaminathan, MD; William J. Gibson, BS; Vijaya B. Kolachalama, PhD; Kim-Lien Nguyen-Ehrenreich, MS; Virginia L. Giddings, PhD; Leslie Coleman, DVM, MS, DACLAM; Gee K. Wong, BS; Elazer R. Edelman, MD, PhD

*Kolandaivelu, K. et al., Circulation 2011; 123:1400-1409*