

Three-Year Outcomes of the ULTIMATE Trial Comparing Intravascular Ultrasound Versus Angiography-Guided Drug-Eluting Stent Implantation

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On behalf of ULTIMATE investigators

Disclosure Statement of Financial Interest

I, **Jun-Jie Zhang**, DO NOT have a financial interest/arrangement or affiliation with one or more organizations that could be perceived as a real or apparent conflict of interest in the context of the subject of this presentation.

Background

- IVUS guidance has been recommended for complex coronary lesions undergoing DES implantation.
- **ULTIMATE trial** showed fewer 1-year TVF after IVUS-guided DES implantation for all-comers compared with those after angiography guidance.
- The long-term effect of IVUS guidance beyond 2 years in the modern DES era has scarcely been reported in randomized trials.

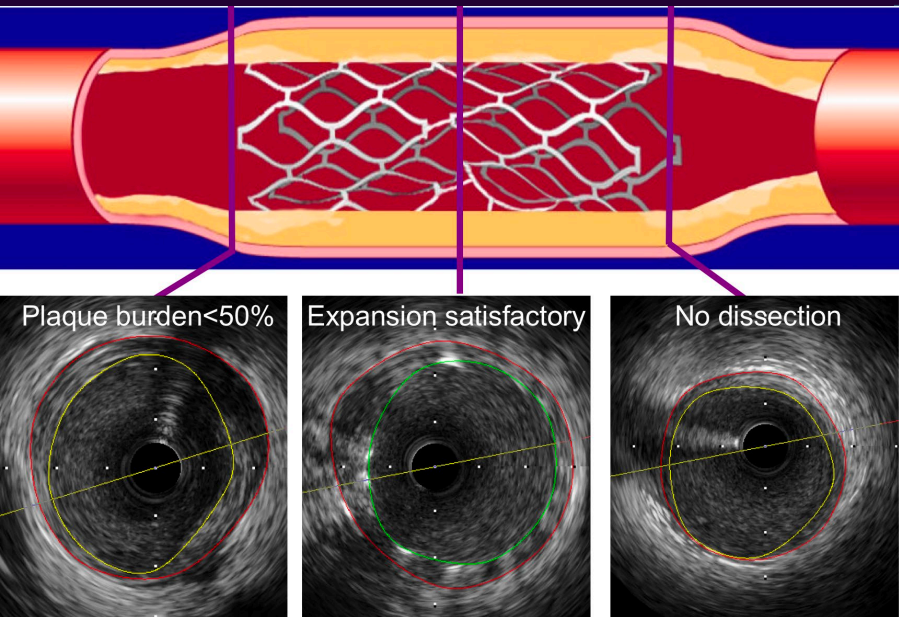
Major Inclusion Criteria

- **Silent ischemia, Stable angina or unstable angina**
- **Acute myocardial infarction >24 h**
- ***De novo* lesion**

Major Exclusion Criteria

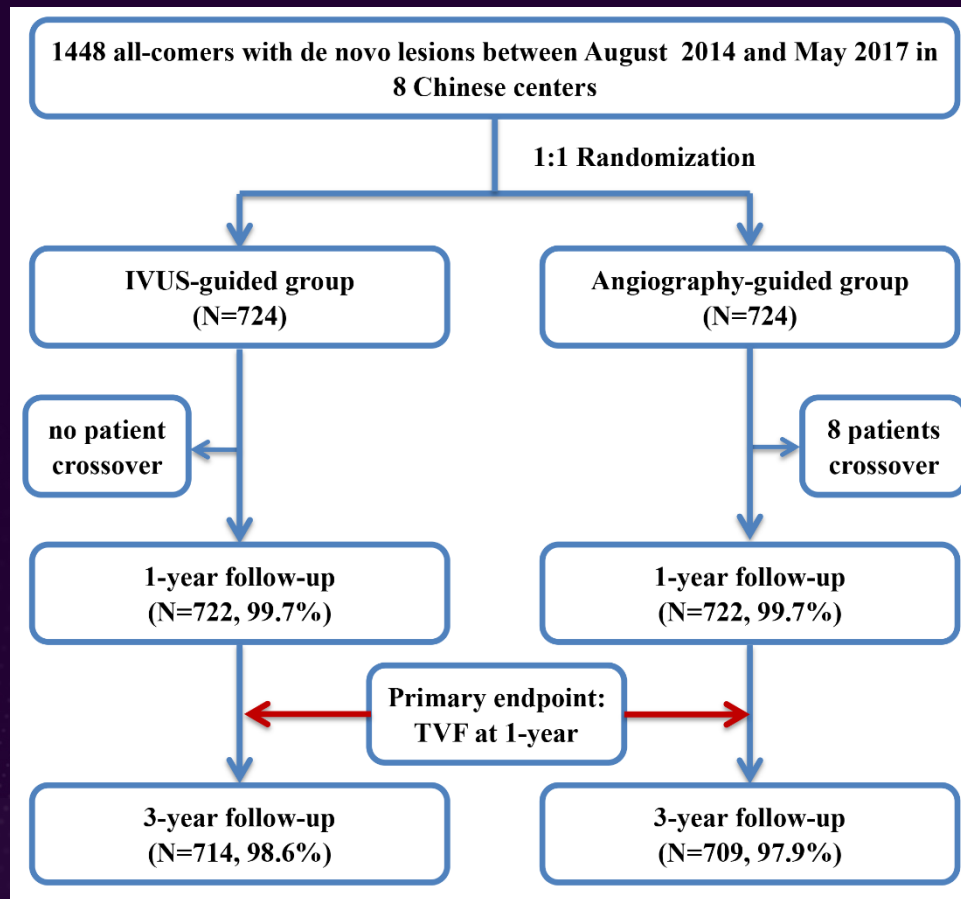
- Life expectancy <12 months
- Intolerant of DAPT
- CTO not re-canalized
- Severe calcification needing rotational atherectomy

IVUS-defined Criteria for The Optimal Stent Deployment



1. Minimal lumen CSA in stented segment **>5.0 mm²**, or 90% of distal reference lumen CSA;
2. Plaque burden at the 5-mm proximal or distal to the stent edge **<50%**;
3. no edge dissection involving media with length >3mm.

Study Flowchart



Baseline Clinical Data

	IVUS guidance (n=724)	Angiography guidance (n=724)	<i>P</i>
Age	65.2 ± 10.9	65.9 ± 9.8	0.19
Male	73.9%	73.2%	0.77
Hypertension	70.7%	72.0%	0.60
Diabetes	30.0%	31.2%	0.61
Current smoker	34.9%	31.5%	0.16
UAP	67.4%	64.4%	0.22
AMI	11.2%	14.0%	0.11
LVEF, %	60.9 ± 7.9	60.3 ± 9.3	0.19

Core Lab Lesions Data

	IVUS guidance (n=962)	Angiography guidance (n=1016)	<i>P</i>
Multi-vessel disease	52.6%	57.2%	0.08
B2/C	66.1%	67.7%	0.45
Bifurcation	23.5%	26.5%	0.13
CTO	8.8%	9.0%	0.93
Moderate to severe calcification	25.3%	24.2%	0.59

Procedural Data (I)

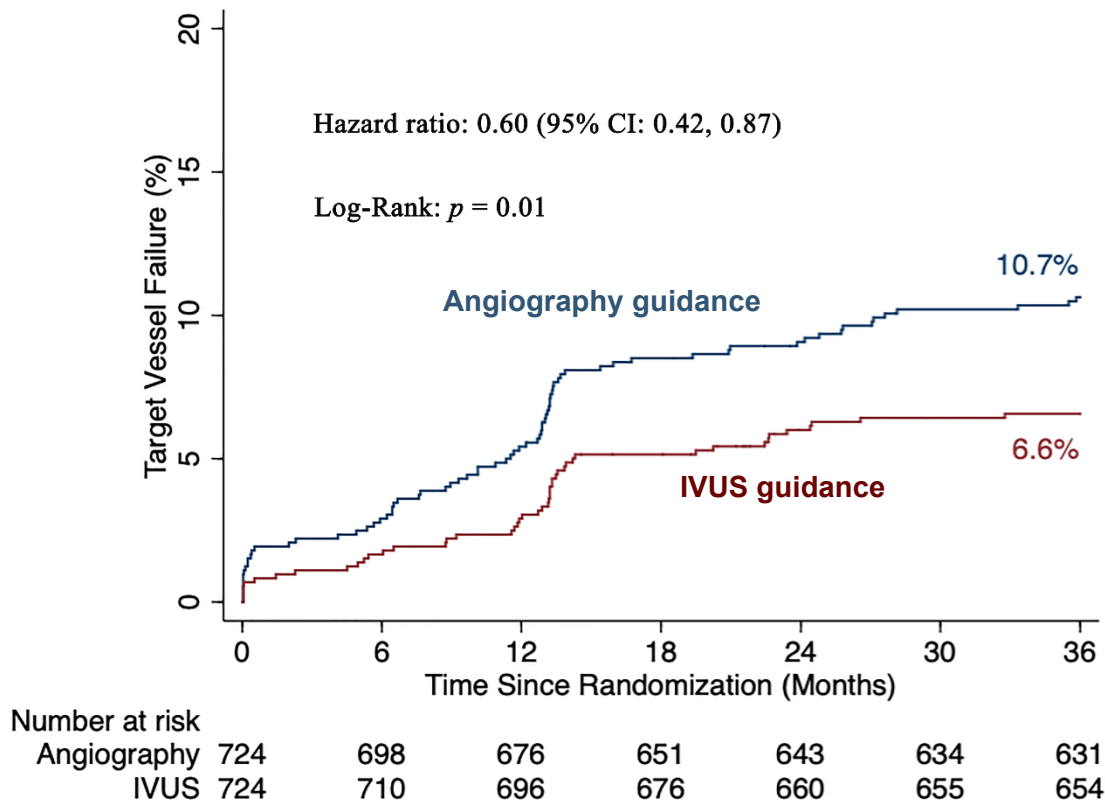
	IVUS guidance (n=724)	Angiography guidance (n=724)	<i>P</i>
Per patient, n (%)			
Stent number	2.40±1.55	2.47±1.56	0.39
Mean stent length, mm	66.42±46.17	66.49±44.36	0.98
Mean stent diameter, mm	3.15±0.42	2.99±0.38	<0.001
Max balloon diameter, mm	3.84±0.52	3.62±0.51	<0.001
Max Post-dilation pressure, atm	19.8±3.7	19.2±3.6	0.003

Procedural Data (II)

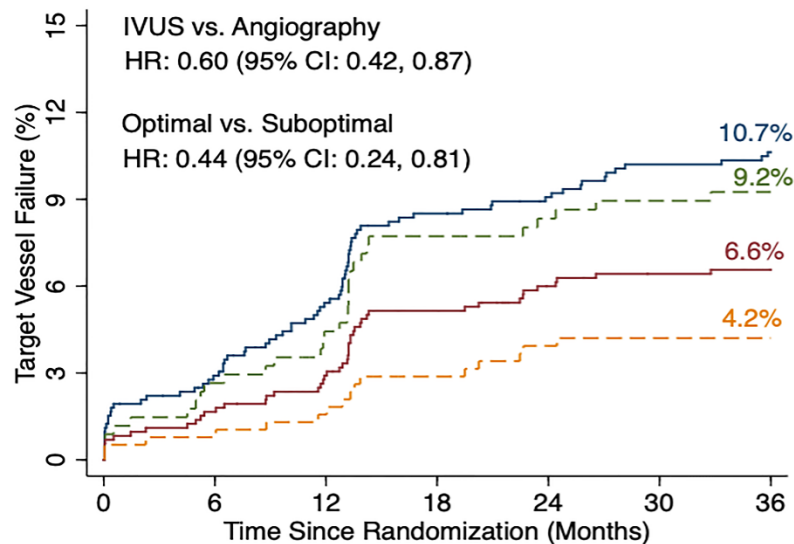
	IVUS guidance (n=724)	Angiography guidance (n=724)	P
Radial access	94.8	96.8	0.07
2 nd generation DES	99.2%	98.8%	0.44
Post-dilation	96.6%	94.9%	0.11
Procedural time, min	60.88	45.49	<0.001
Contrast volume, ml	178.29	161.96	<0.001
CIN*	7.9%	5.8%	0.12
Complete revas.	73.3%	75.0%	0.47
Angiographic success	98.0%	97.8%	0.77

*CIN, contrast induced nephropathy

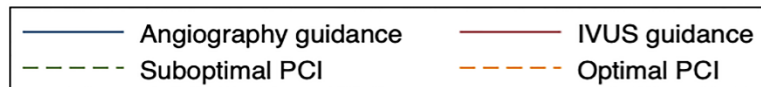
Three-year Clinical FU



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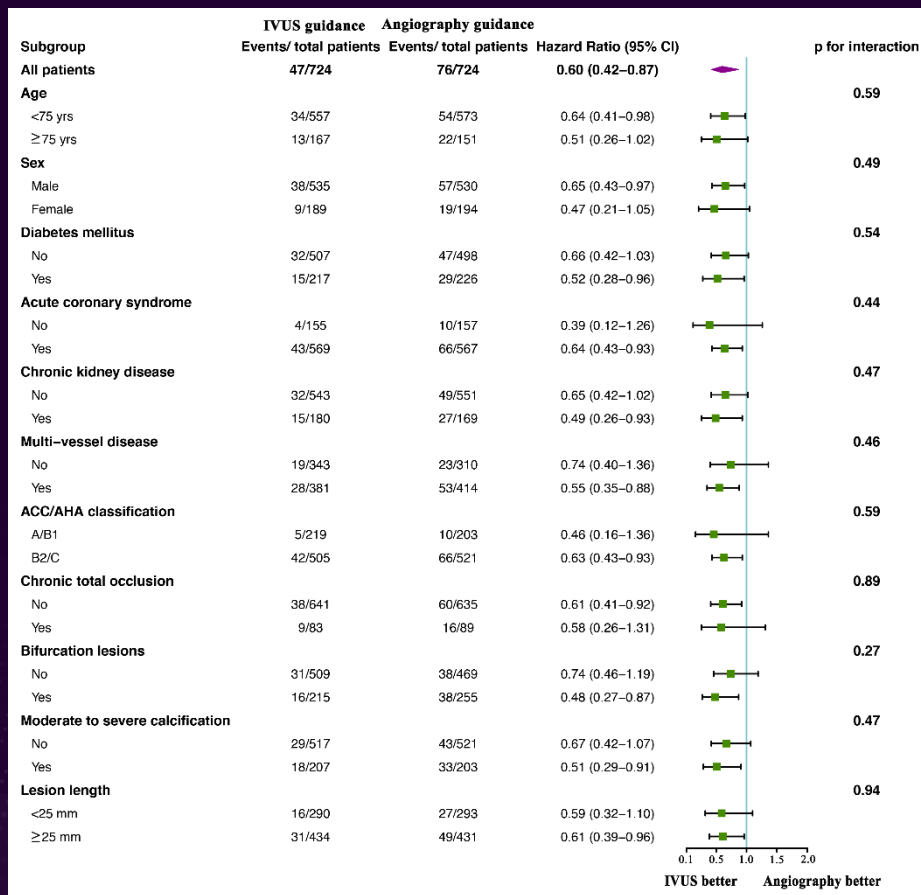
Number at risk							
Angiography guidance	724	698	676	651	643	634	631
IVUS guidance	724	710	696	676	660	655	654
Suboptimal PCI	340	329	320	309	300	296	295
Optimal PCI	384	381	376	367	360	359	359



Three-year Clinical FU

	IVUS guidance (n=724)	Angiography guidance (n=724)	<i>p</i>
Target vessel failure	47 (6.6)	76 (10.7)	0.01
Cardiac death	13 (1.8)	19 (2.7)	0.28
Target vessel MI	7 (1.0)	15 (2.1)	0.09
Clinically driven TVR	32 (4.5)	49 (6.9)	0.05

Subgroup Analysis



Conclusion

- In the present multicenter randomized trial, IVUS guidance was associated with a lower risk of 3-year TVF, particularly for patients with an IVUS-defined optimal procedure, compared with angiography guidance in all-comers undergoing second-generation DES implantation.

Thanks for your attention!