Long- term Outcome of Revascularisation with T-grafts: Is Bilateral Mammary Grafting better than Single Mammary and Radial Artery?

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Background I

Bilateral Internal Mammary (IMA) grafting is associated with improved survival. However, many surgeons are reluctant to use this revascularization technique due to the potentially increased risk of sternal infection. **especially in diabetic, elderly and obese patients**.

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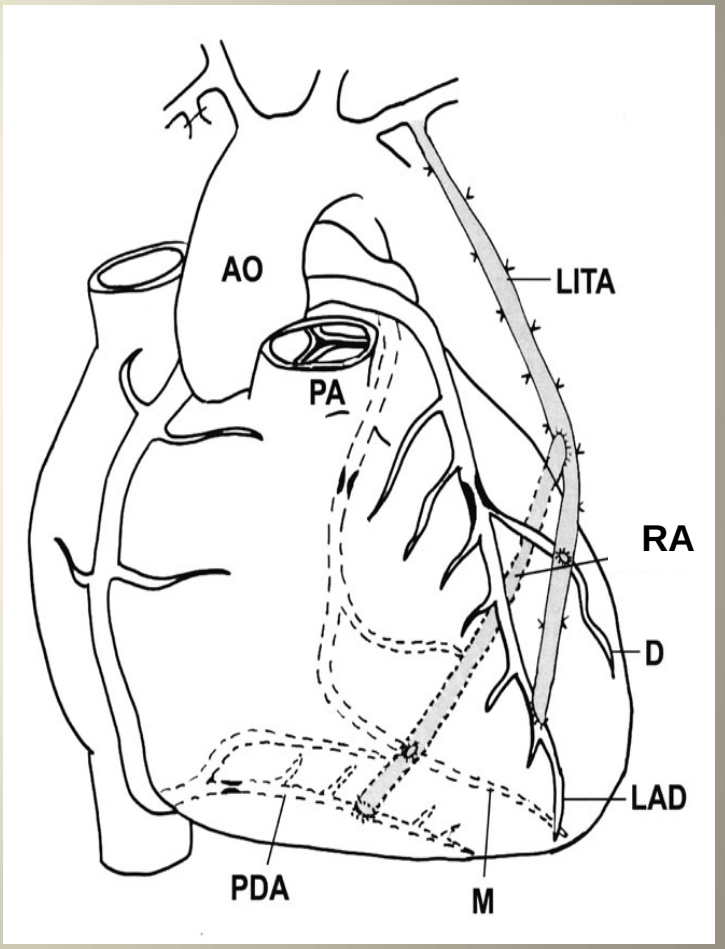
Background II

The **Composite T graft** with radial artery attached end-to-side to the left IMA provides complete arterial revascularization without the associated increased risk of sternal infection.



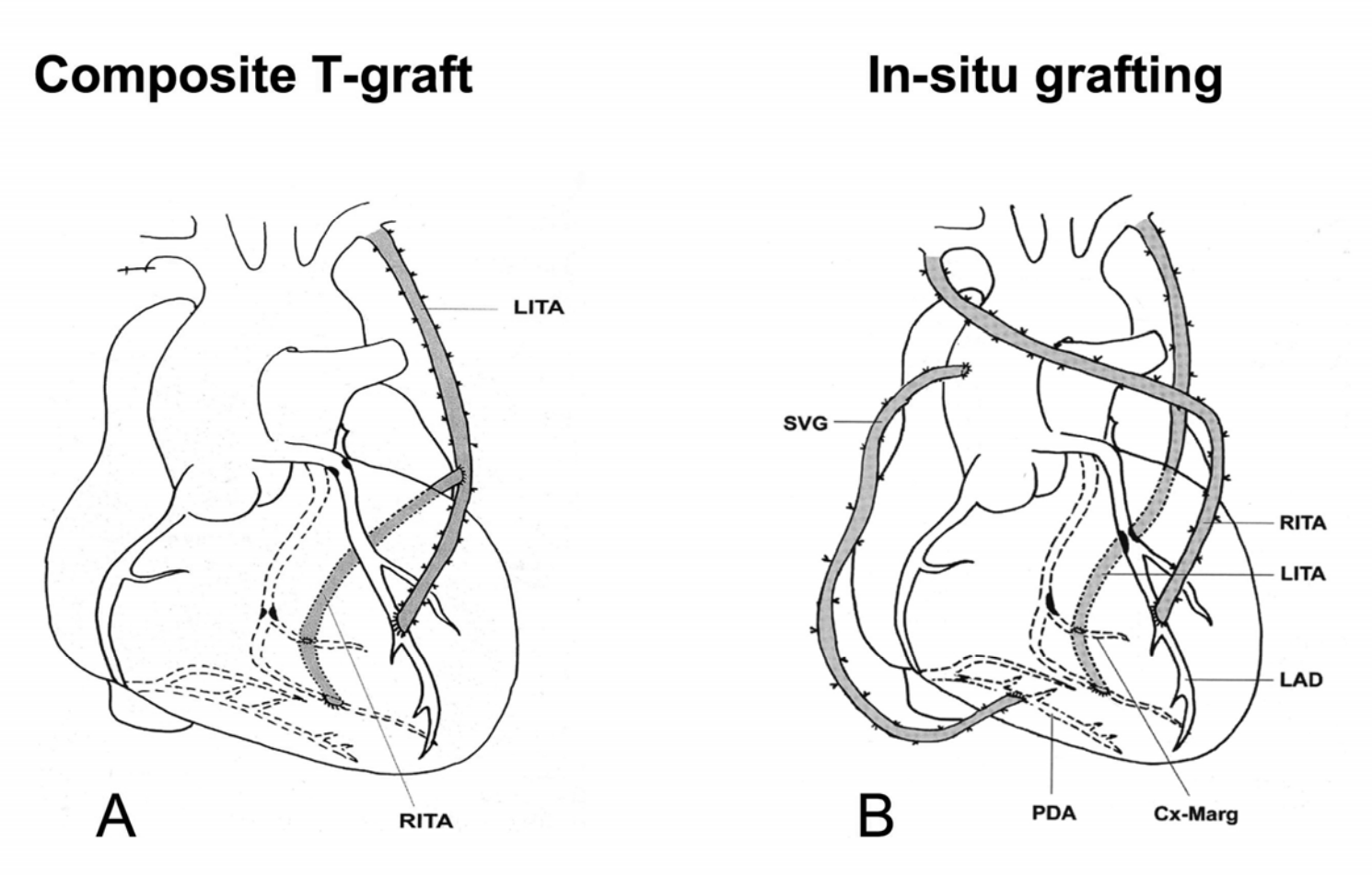
Objective

The purpose of this study is to compare early and long-term outcome of patients who underwent bilateral IMA to that who underwent single IMA and Radial artery grafting using the Composite-T-graft technique

Material and Methods

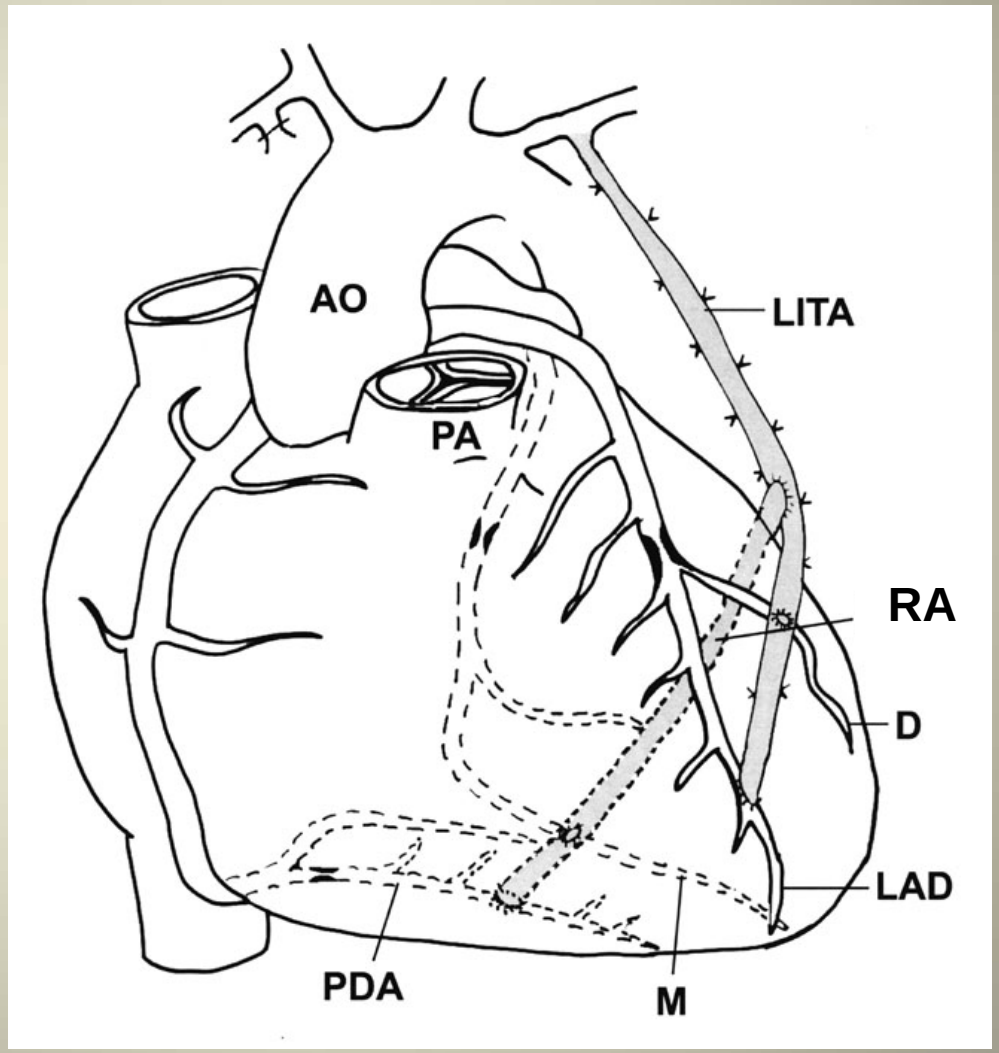
- Between 1996 and 2002, 1310 consecutive patients (1072 bilateral IMA and 238 single IMA and radial artery) underwent arterial revascularization using the composite T graft technique .
- Mean follow-up is : 12.1 $\pm$ 5 years

SURGICAL TECHNIQUE
BILATERAL IMA



SURGICAL TECHNIQUE

SINGLE IMA + RADIAL



Patient Characteristics before matching I

	Bilateral ITA (n=1072)	Radial (n=238)	P
Age ≥75	184(17.2%)	74(31.0%)	0.000
Female	249 (23.2%)	94 (39.5%)	0.000
IDDM	22(2.1%)	22 (9.2%)	0.000
NIDDM	341(31.8%)	98(39.1%)	0.000
DM+EOD	21 (1.6%)	43(43.3)	0.000
COPD	60(5.6%)	38 (16%)	0.000
CRF (Cr>1.8)	81 (7.6 %)	21(8.8%)	0.293

IDDM=insulin dependent diabetes mellitus; NIDDM= Non-insulin dependent diabetes mellitus COPD=chronic obstructive pulmonary disease; CRF=chronic renal failure (CR>1.8)

Patient Characteristics before matching II

	Bilateral ITA (n=1072)	Radial (n=238)	P
CHF	294 (27.4%)	28(11.8%)	0.000
Recent myocardial infarction	378(35.3%)	29 (12.2%)	0.000
Acute MI (7 days)	254 (23.7%)	32 (13.4%)	0.000
Prior PCI	138(13.6%)	28(11.8%)	0.010
Ejection Fraction <30%	92 (8.6%)	13 (5.5%)	0.115

Patient Characteristics before matching III

	Bilateral ITA (n=1072)	Radial (n=238)	P
Unstable angina	630 (58.8%)	173 (72.7)	**0.000**
Emergency	163 (16.1%)	41(17.2%)	0.698
Repeat Operation	27 (2.5%)	6(2.5%)	1.000
Peripheral vascular disease	189 (17.7%)	41(17.2%)	0.432
IABP	62 (5.8%)	14(5.9%)	0.526
Euroscore	**5.9±3.2**	**6.6±3.4**	**0.050**

; IABP=intra-aortic balloon pump.

Statistical Analysis I

Propensity score matching was used to account for differences between groups. The probability (propensity score) that a patient would receive a radial artery graft or undergo bilateral ITA, according to the preprocedural variables, was determined by using a saturated logistic regression model.

Statistical Analysis II

Kaplan-Meier and Cox adjusted curves were used to show freedom from all cause death and multivariable Cox proportional hazards model was used to identify predictors of decreased survival.

Patient Characteristics after matching I

	Bilateral ITA (n=168)	Radial (n=168)	P
Age ≥75	31(18.5%)	54 (32%)	0.015
Female	57 (62. %)	62 (36.9%)	0.324
NIDDM	53 (31%)	59 (35%)	0.281
IDDM	10 (6%)	5 (3%)	0.145
DM+EOD	8 (4.8%)	9 (5.4)	0.500
COPD	14(8.3%)	16 (9.5%)	0.424
CRF (Cr>1.8)	8 (4.8. %)	9(5.4%)	0.500

Patient Characteristics after matching II

	Bilateral ITA (n=168)	Radial (n=168)	P
Peripheral vascular disease	29 (17.2%)	28(16.6%)	0.379
Recent myocardial infarction	12(7.1%)	19 (11.3%)	0.178
Acute MI (7 days)	10(6%)	9(5.7%)	0.059
Prior PCI	22(13.7%)	18(10.7%)	0.258
Ejection Fraction <30%	2 (1.2 %)	1(0.6%)	0.359

Patient Characteristics after matching III

	Bilateral ITA (n=168)	Radial (n=168)	P
Unstable angina	125(74.4%)	121 (72%)	0.359
Emergency	24(14.3%)	21 (12.5%)	0.375
Repeat Operation	4(2.4%)	3(1.8%)	0.500
CHF	9(5.4%)	7(4.2%)	0.399
IABP	8 (4.8%)	6 (3.6%)	0.393
Euroscore	5.5±2.9	5.5±2.5	0.191

Extent of Coronary Disease before matching

	Bilateral IMA (n=1072)	Radial (n=238)	P
Left Main	274 (25.6%)	54(22.7%)	0.201
2 Vessel Disease	237 (22.1%)	49 (20.6%)	0.153
3 Vessel Disease	835(77.9%)	189(79.4%)	0.153

Extent of Coronary Disease after matching

	Bilateral IMA (n=168)	Radial (n=168)	P
Left Main	38 (22.7%)	37(22. %)	0.201
2 Vessel Disease	36 (22.4%)	33 (19.6%)	0.579
3 Vessel Disease	132(78.6%)	135(80.4%)	0.579

Surgical data after matching

	Bilateral IMA (n=168)	Radial (n=168)	P
OPCAB	70(41.7%)	66(39.3%)	0.369
Sequential grafting	98(57.8%)	140(83.3%)	**0.000**
3 or more grafts	125(74.4)	123(73.2)	0.451
SVG	28(17.4)	11(6.5)	**0.000**
R.GEA.	22 (13.7%)	1(0.6%)	**0.000**

SVG=saphenous vein grafts ,R.GEA -Right Gastroepiploic artery.

Early Results

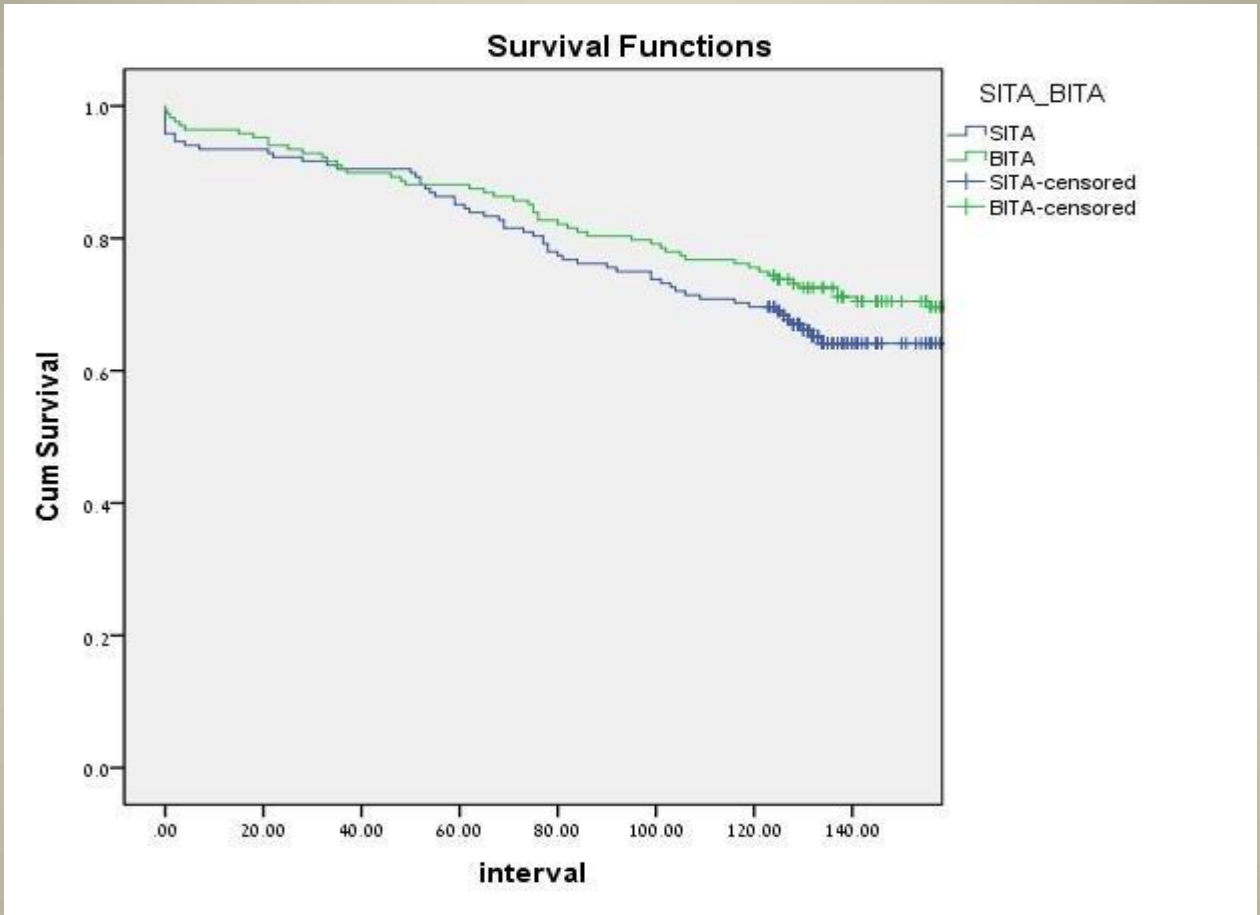
	Bilateral IMA (n=168)	Radial (n=168)	P
30 day mortality	2(1.2%)	7(4.2%)	0.174
Perioperative MI	0 (0%)	2(1.2%)	0.125
Perioperative stroke	6 (3.6%)	2(1.2%)	0.142
Wound infection	3(1.8%)	0(0%)	0.124
Revision for bleeding	2 (1.2%)	1 (0.6%)	0.272

MI=myocardial infarction

Late Results

Median Follow-Up: 12.5 years

Kaplan-Meier Survival



P=0.145 (log rank test)

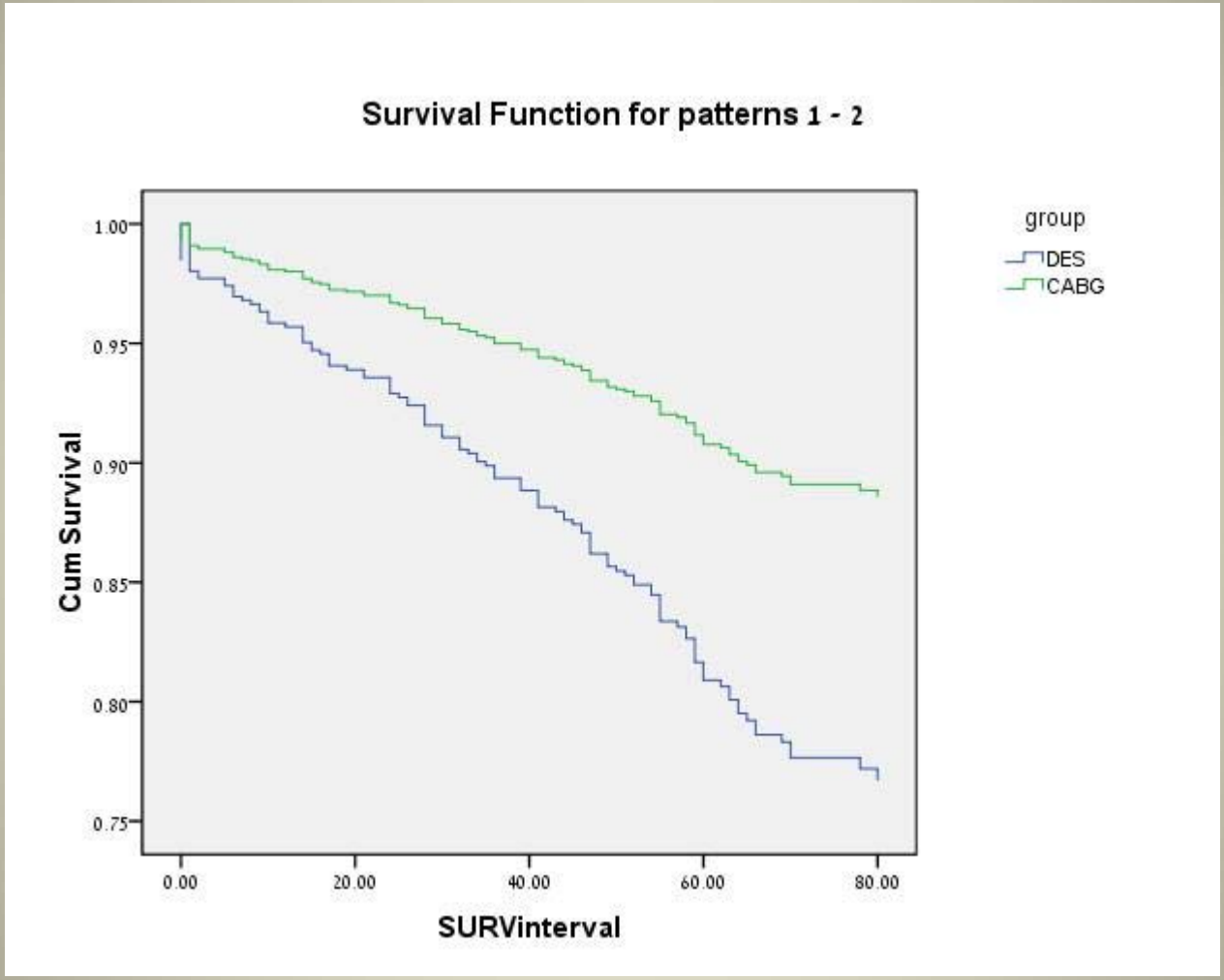
Multivariable (Cox) Analysis of Variables Affecting overall Mortality

- **AGE** **HR 1.064(95% CI 1.040-1.090)**
- **DIABETES** **HR 2.824 (95% CI 2.809-4.201)**
- **CRF** **HR 3.802 (95% CI 2.096-6.896)**
- **PVD** **HR 2.127(95% CI 1.347- 3.367)**
- **COPD** **HR 1.865(95% CI 1.010- 3.148)**

Conclusion

- This study suggests that long-term outcome of arterial revascularization with composite T-graft constructed using left IMA and radial artery is similar to that of bilateral IMA.

Cox- adjusted Survival



Assignment to DES group, HR 2.19 (95% CI 1.29 –3.71)