Traitement par clip tricuspide : **étude TRILUMINATE**

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L'étude TRILUMINATE

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Transcatheter Repair for Patients with Tricuspid Regurgitation

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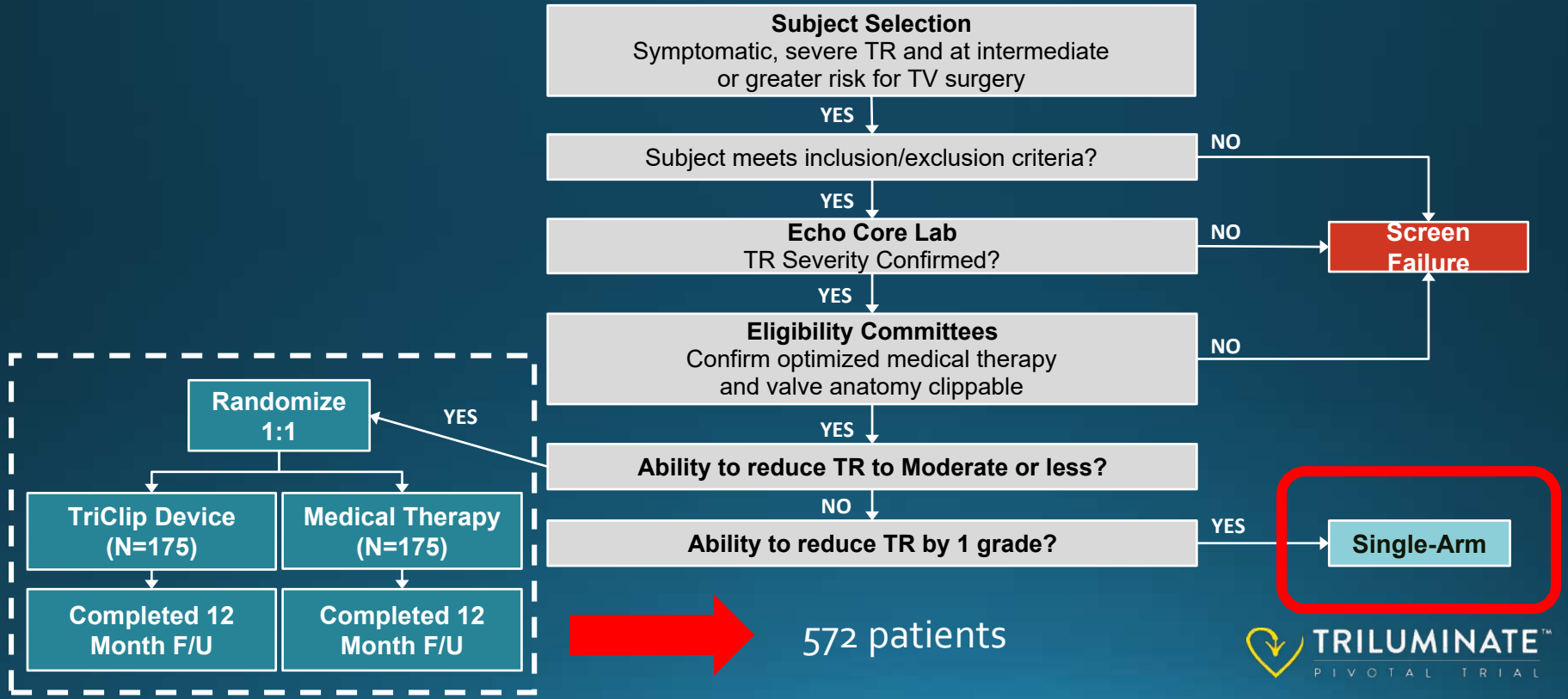
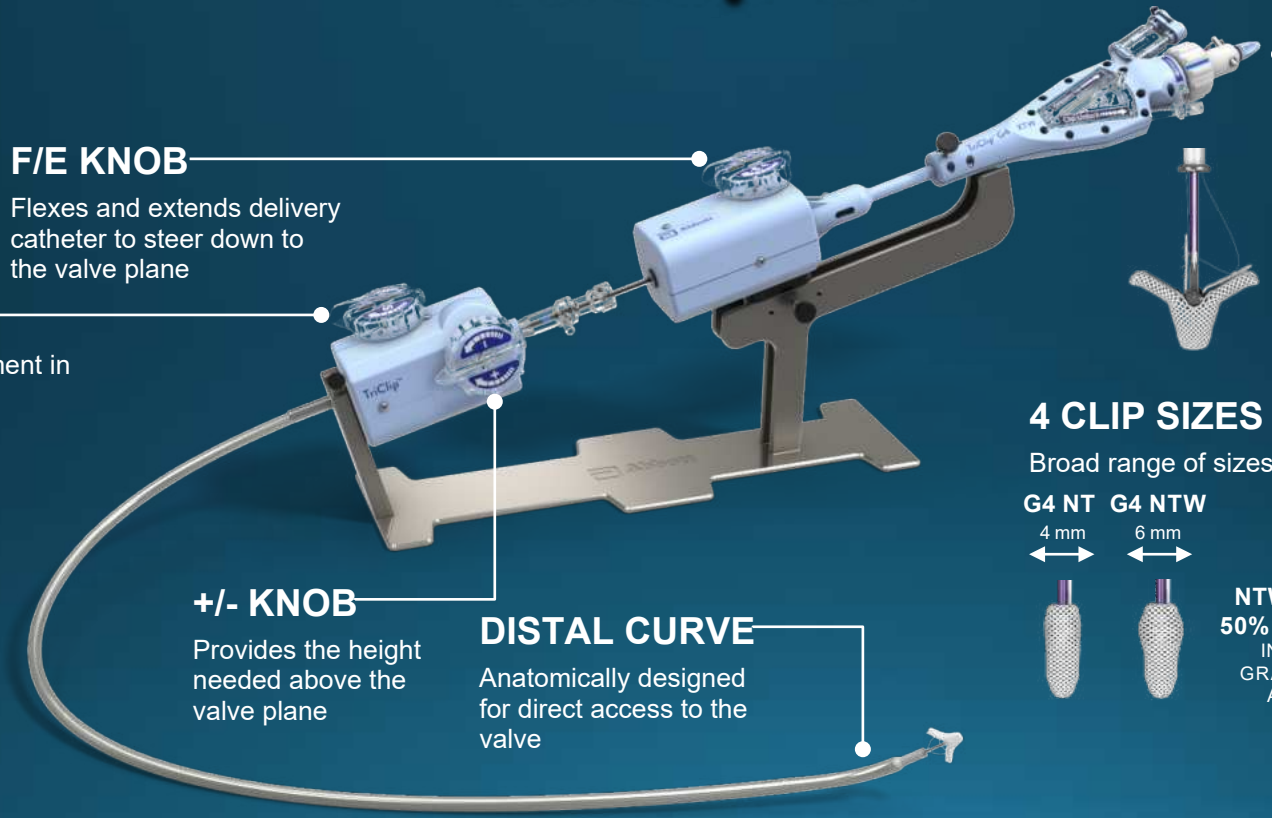
Enrollment and Treatment Pathway



TRILUMINATE™ PIVOTAL TRIAL

TriClip G4



F/E KNOB

Flexes and extends delivery catheter to steer down to the valve plane

S/L KNOB

Enables movement in septal or lateral direction

+/- KNOB

Provides the height needed above the valve plane

DISTAL CURVE

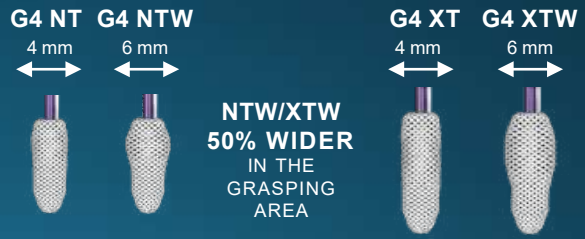
Anatomically designed for direct access to the valve

CONTROLLED GRIPPER ACTUATION

Ability to optimize leaflet grasping if needed

4 CLIP SIZES

Broad range of sizes for tailored treatment



TRILUMINATE Pivotal trial

Key Inclusion Criteria

- Severe, symptomatic TR
- Stable GDMT and/or device therapy for heart failure for ≥ 30 days
- ≥ Intermediate risk of mortality/morbidity with tricuspid valve surgery

Key Exclusion Criteria

- Indication for other valve disease intervention
- Severe pulmonary HTN
- Left ventricular ejection fraction ≤20%
- Anatomy not suitable for TriClip therapy

TRILUMINATE™
PIVOTAL TRIAL

Endpoints and Analysis

Trial Design	• Prospective, randomized, controlled, multi-center trial designed to test the superiority of TriClip™ therapy in addition to medical therapy (Device group) over medical therapy alone (Control group) • **450+** subjects enrolled at up to 80 sites in the US, Canada, Europe
Primary Endpoint	**To be assessed after the first 350 randomized subjects complete 12-month follow-up** A composite of mortality or tricuspid valve surgery, heart failure hospitalizations, and quality of life improvement ≥15 points assessed using the Kansas City Cardiomyopathy Questionnaire (KCCQ), evaluated at 12 months in a hierarchical fashion using the Finkelstein-Schoenfeld methodology
Secondary Endpoint	**Assessed hierarchically in the following order:** • Freedom from major adverse events (MAE) after procedure attempt (femoral vein puncture) at 30 days (Device group only) • Change in KCCQ at 12 months (superiority of Device vs. Control) • TR Reduction to moderate or less at 30-day post procedure (superiority of Device vs. Control) • Change in 6MWD at 12 months (superiority of Device vs. Control)

MAE defined as composite of Cardiovascular Mortality, New Onset Renal Failure, Endocarditis Requiring Surgery, and Non-Elective Cardiovascular Surgery for TriClip device-related AE post-index procedure.

TRILUMINATE™ PIVOTAL TRIAL

Baseline Characteristics

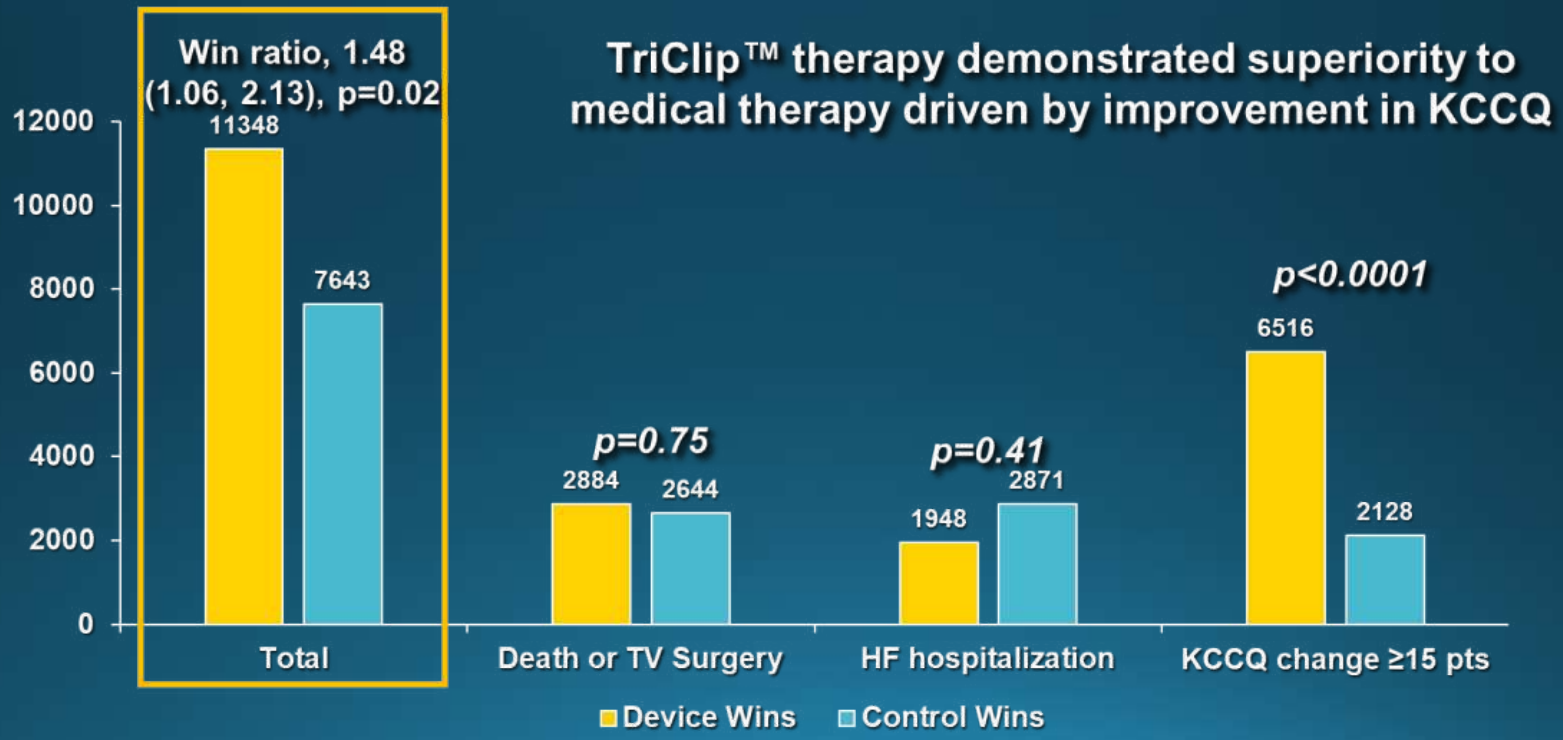
	Device N=175 # (%)	Control N=175 # (%)
Age, Mean (years)	78.0 ± 7.4	77.8 ± 7.2
Sex (Female)	98 (56.0)	94 (53.7)
NYHA class III or IV	104 (59.4)	97 (55.4)
KCCQ Score, mean	56.0 ± 23.4	54.1 ± 24.2
Hypertension	142 (81.1)	141 (80.6)
Renal disease	62 (35.4)	62 (35.4)
Liver disease	11 (6.3)	16 (9.1)
Atrial fibrillation	153 (87.4)	162 (92.6)
Diabetes	28 (16.0)	27 (15.4)
COPD	19 (10.9)	24 (13.7)
CRT/CRT-D/ICD/PPM	28 (16.0)	24 (13.7)
Prior aortic intervention	27 (15.4)	27 (15.4)
Prior mitral intervention	45 (25.7)	42 (24.0)
Prior tricuspid intervention	1 (0.6)	0 (0.0)

	Device N=175 # (%)	Control N=175 # (%)
TR Severity		
Moderate	4 (2.3)	2 (1.2)
Severe	44 (25.4)	49 (29.7)
Massive	37 (21.4)	30 (18.2)
Torrential	88 (50.9)	84 (50.9)
Etiology (functional)	165 (94.8)	158 (92.9)
Coaptation Gap, Mean (mm)	5.5 ± 1.8	5.2 ± 1.7
Heart size/function, Mean		
RVEDD (base, cm)	5.0 ± 0.8	5.2 ± 0.8
TV annulus diameter (cm)	4.3 ± 0.7	4.5 ± 0.8
RV TAPSE (cm)	1.7 ± 0.4	1.6 ± 0.4
LVEF (%)	59.3 ± 9.3	58.7 ± 10.5
CO (L/min)	4.1 ± 1.2	4.2 ± 1.1

TRILUMINATE™ PIVOTAL TRIAL

Primary Endpoint

Finkelstein-Schoenfeld Analysis



Individual Component Analysis

1st Component:
Mortality or TV Surgery
p=0.75

2nd Component:
Heart Failure Hospitalization
p=0.41

TRILUMINATE™
PIVOTAL TRIAL

Safety Profile

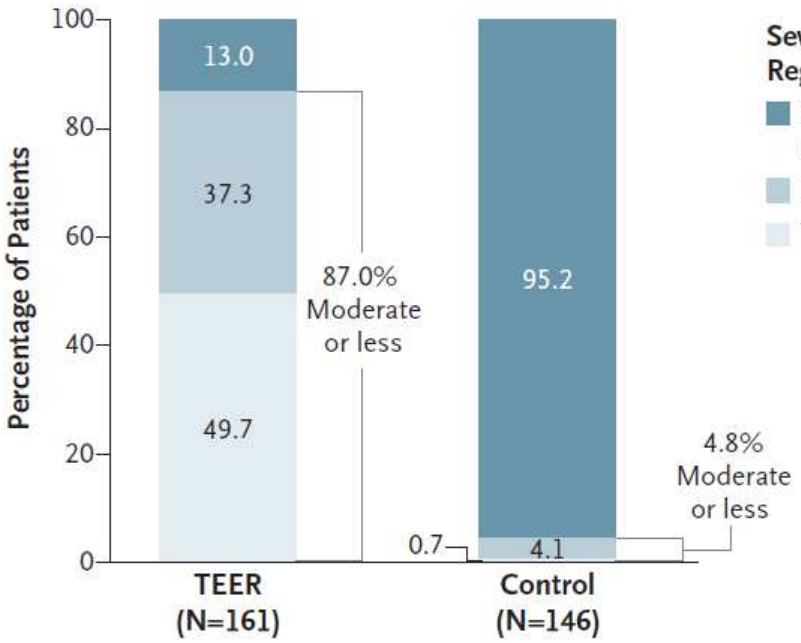
Major Adverse Event (MAE) Through 30 Days Post-Procedure – no.(%)	Device N=172†
Total	**3 (1.7%)**
Cardiovascular mortality	1 (0.6%)
Endocarditis requiring surgery	0 (0%)
New-onset renal failure	2 (1.2%)
Non-elective CV Surgery, TVRS for device-related AE	0 (0%)

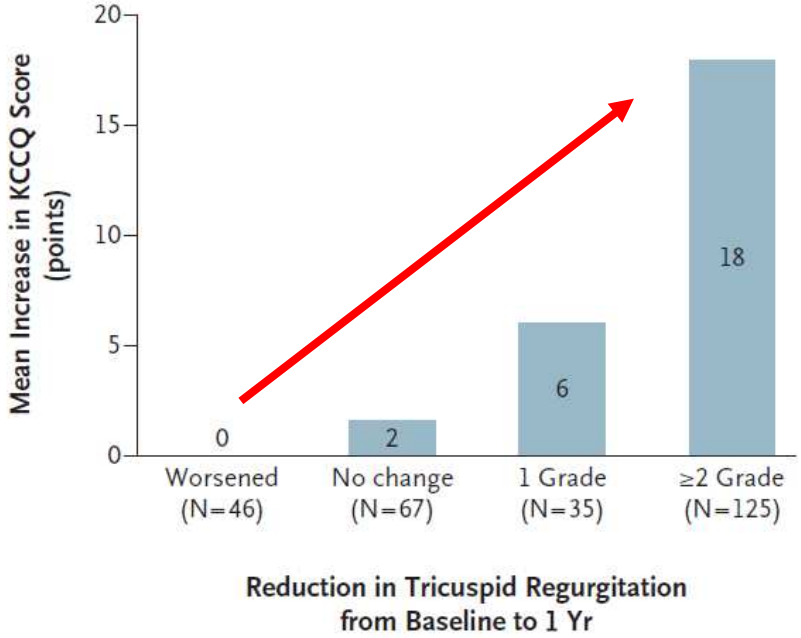
Other Clinical Safety Endpoints Through 30 Days Post-Procedure– no.(%)	Device N=172†
Any-cause mortality	1 (0.6%)
Tricuspid valve surgery	1 (0.6%)
Tricuspid valve re-intervention	3 (1.7%)
Major bleeding#	8 (4.7%)
Tricuspid mean gradient ≥ 5mmHg	8 (4.7%)
Single leaflet device attachment (SLDA)*	12 (7.0%)
Stroke	1 (0.6%)
Myocardial Infarction	0 (0%)
Embolization*	0 (0%)
Thrombosis	0 (0%)
New CRT/CRT-D/ICD/perm. pacemaker^	1 (0.6%)

†Attempted procedure population (3 subjects randomized to Device withdrew consent prior to index procedure)
#Defined as bleeding ≥ Type 3 based on a modified Bleeding Academic Research Consortium (BARC) definition
*SLDA and embolization evaluated through 30-day follow-up
^Assessed through adverse event reporting

TRILUMINATE™ PIVOTAL TRIAL

Réponse à la réduction de l'IT

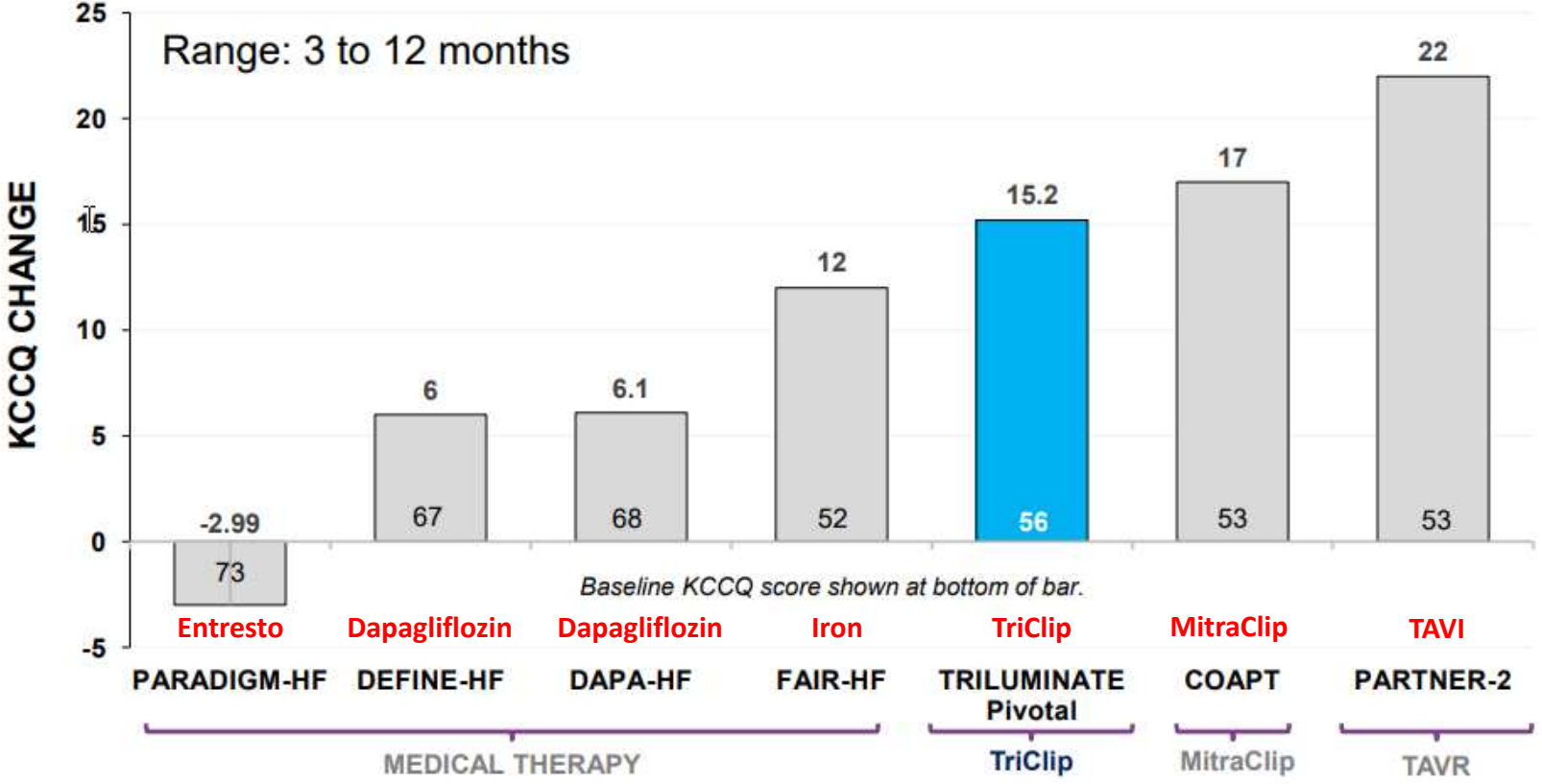




41.5% of patients alive with KCCQ improvement ≥20 points vs. 15% in the GDMT group at 1 year

Sorajja P et al., NEJM 2023
Arnold SV et al, JACC 2023

Amélioration de la qualité de vie en perspective



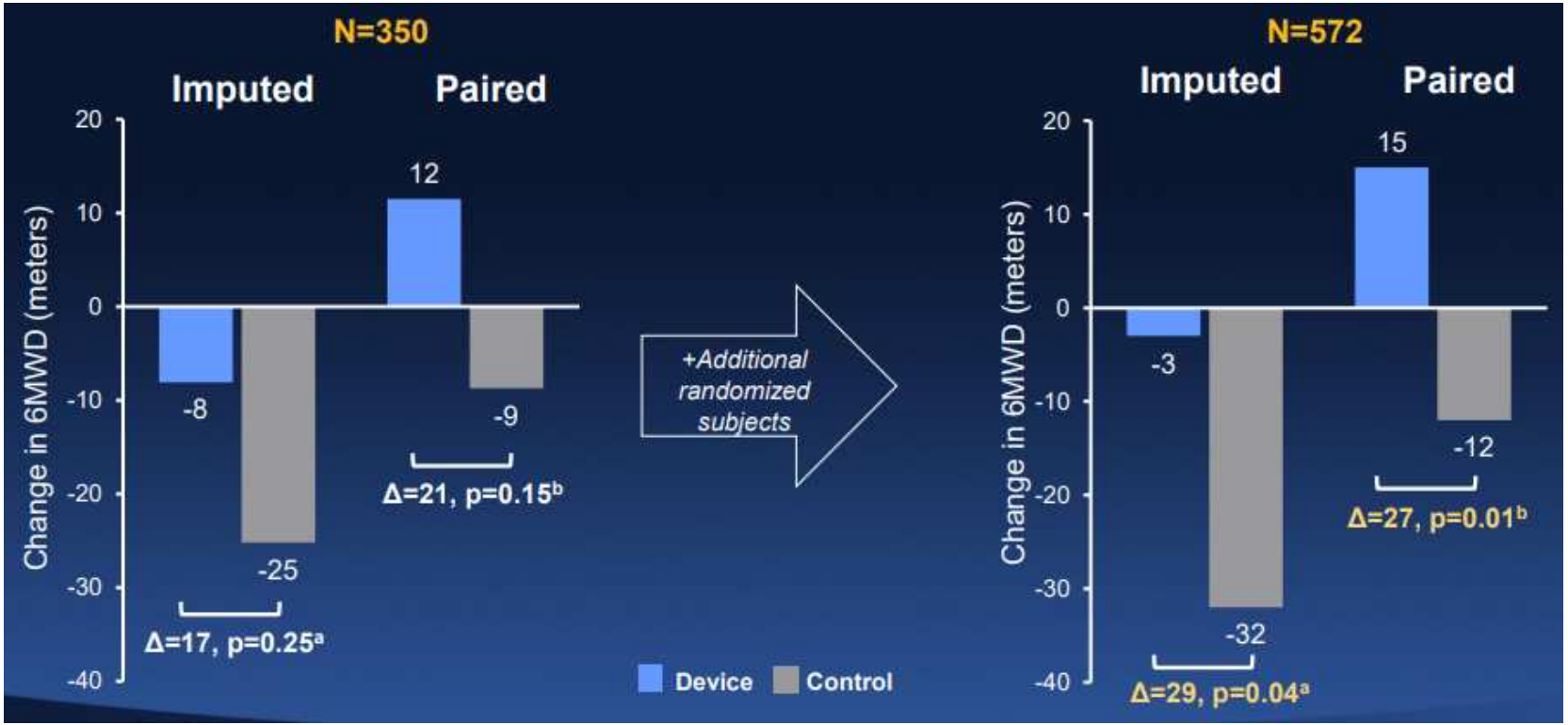
Le spectre de l'insuffisance tricuspide

	VARIABLE	bRIGHT Study n=511	Tri.fr n=300	TRILUMINATE Pivotal Randomized Cohort n=350	TRISCEND study n=176
Demographics	Age, mean (years)	78.9 ± 7.1	78.5±6.3	77.9 ± 7.3	78.7±7.3
	Male/Female	44 %/56 %	36.3%	45%/55%	29%
Symptomatic History	**NYHA Class III/IV**	**80 %**	**42.5%**	**57.5%**	**75.4%**
	KCCQ score, mean	44.52 ± 22.56	NOT YET	55.1 ± 23.8	ND
	Prior Heart Failure Hospitalization (1 Year Pre-Index Procedure)	**40.3%**	**40%**	**25.1%**	**40.9%**
Medical History	Hypertension	86.7%	69.3%	80.9%	84.1%
	Atrial Fibrillation	86.3 %	95%	90.0%	92%
	Mitral Regurgitation (≥ Moderate)	6.0%	14%	3.0%	ND
	Prior Aortic Intervention	9.2%	10%	15.4%	18.8%
	Prior Mitral Intervention	26.8%	1%	24.9%	26.1%
	Prior CABG	11.5%	-	19.1%	-
	Diabetes	22.3%	16%	15.7%	20.5%
	Renal Disease	39.5%	6.6%**	35.4%	58.5%
	Chronic Obstructive Pulmonary Disease	13.1%	6.7%	12.3%	-
	Peripheral Vascular Disease	11.0%	9.3%	9.7%	11%
	Prior Stroke	8.0%	14.7%	8.6%	13.6%
	Permanent Pacemaker/ICD	22.5%	7%	14.9%	32.4%

Le spectre de l'insuffisance tricuspide

Baseline of Echocardiographic Measurements	bRIGHT Study N=511	Tri.fr n=300	TRILUMINATE Pivotal Randomized Cohort N=350	TRISCEND study n=176
Baseline TR Severity				
Severe	10.0 %	0.67%	27.5%	44.7
Massive	**61.3%**	**63%**	**19.8%**	**21.1**
Torrential	**26.7 %**	**28%**	**50.9%**	**21.7**
Functional Tricuspid Regurgitation	90 %	100%	94%	68.2%
RV End Diastolic Dimension (mid), cm	3.6 ± 0.86		3.7 ± 0.7	41.4±8.8
Tricuspid Annular Diameter, cm	4.54 ± 0.76		4.4 ± 0.7	-
Right Atrial Volume, mL	151.66 ± 70.46	139±58	148 ± 84	144±54
RV fractional area change, %	39.4 ± 8.4	42.3±8.4	36.9 ± 5.9	38.7±10.1
TAPSE, cm	1.70 ± 0.44	1.8 [1.5; 2.1]	1.6 ± 0.4	1.53±0.52
Left Ventricular Ejection Fraction	55.79 ± 10.58	57.0 [50.0; 64.0]	59.0 ± 9.9	54.1±11.2
Coaptation Gap	**6.49 ± 2.7**		**5.4 ± 1.8**	-

TRILUMINATE: population complète



Adams D. TCT 2023

TRILUMINATE: résultats de la cohorte mono-bras

Variable	Single-arm N=100	All Randomized N=572
Age, mean (years)*	**80.4 ± 6.2**	**78.1 ± 7.8**
Female	53% (53)	59% (337)
NYHA Class III or IV	59% (59)	55% (315)
KCCQ Score, mean	54.5 ± 22.6	55.1 ± 23.3
Renal disease	36% (36)	33% (191)
Liver disease	3% (3)	7% (41)
Atrial fibrillation	96% (96)	88% (502)
COPD	22% (22)	14% (82)
Presence of cardiac leads*	**35% (35)**	**16% (94)**
Prior aortic or mitral intervention*	**44% (44)**	**36% (207)**
Prior tricuspid intervention	4% (4)	0.3% (2)

Adams D. TCT 2023

TRILUMINATE: résultats de la cohorte mono-bras

Variable, cont.	Single-arm N=100	All Randomized N=572
TR Severity		
Moderate	0% (0)	2% (10)
Severe	9% (9)	27% (148)
Massive	17% (16)	21% (118)
Torrential*	**74% (71)**	**50% (277)**
Functional TR	86% (85)	95% (533)
Coaptation gap, mean (mm)*	**7.4 ± 2.7**	**5.3 ± 1.8**
RVEDD (mid, cm)*	**4.0 ± 0.8**	**3.7 ± 0.7**
RAV (mL)*	**182 ± 84**	**144 ± 80**
TV annulus diameter (cm)	4.6 ± 0.8	4.3 ± 0.8
RV TAPSE (cm)	1.6 ± 0.4	1.7 ± 0.4
LVEF (%)	58.9 ± 9.5	59.6 ± 9.1
CO (L/min)	4.3 ± 1.3	4.6 ± 1.4

Adams D. TCT 2023

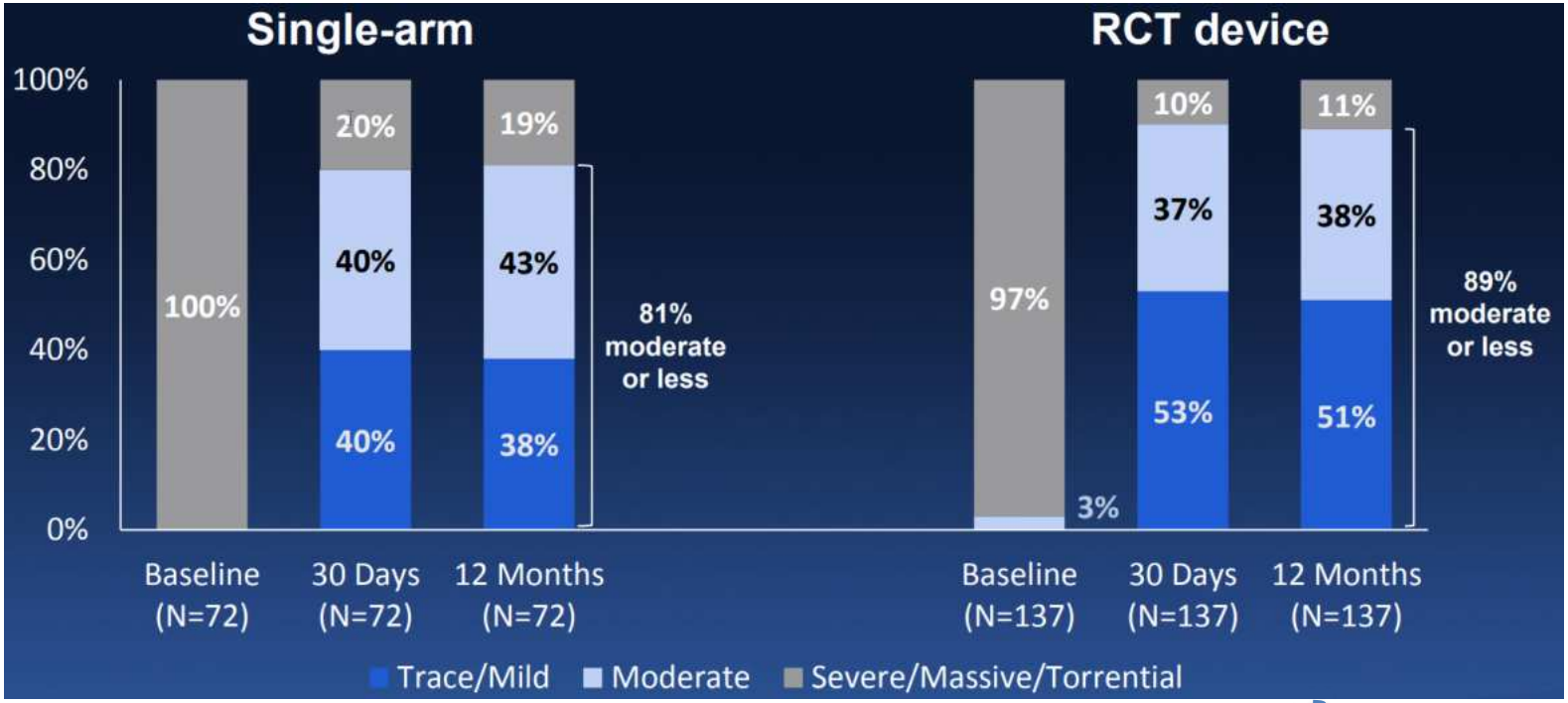
TRILUMINATE: résultats de la cohorte mono-bras

Variable	Single-arm N=100	All Randomized TEER Subjects N=281
Technical Success	98.0%	98.9%
Device Time, mean (min)	84 ± 59	86 ± 63
Total Procedure Time, mean (min)	154 ± 65	147 ± 72
Number of clips, mean	2.2 ± 0.8	2.1 ± 0.7
Discharge to Home	96% (96)	98% (275)
Length of Stay, mean (days)	1.8 ± 2.1	1.5 ± 1.3
In-Hospital Mortality	0% (0)	0% (0)

Single leaflet device attachment: 7.5%

Adams D. TCT 2023

TRILUMINATE: résultats de la cohorte mono-bras

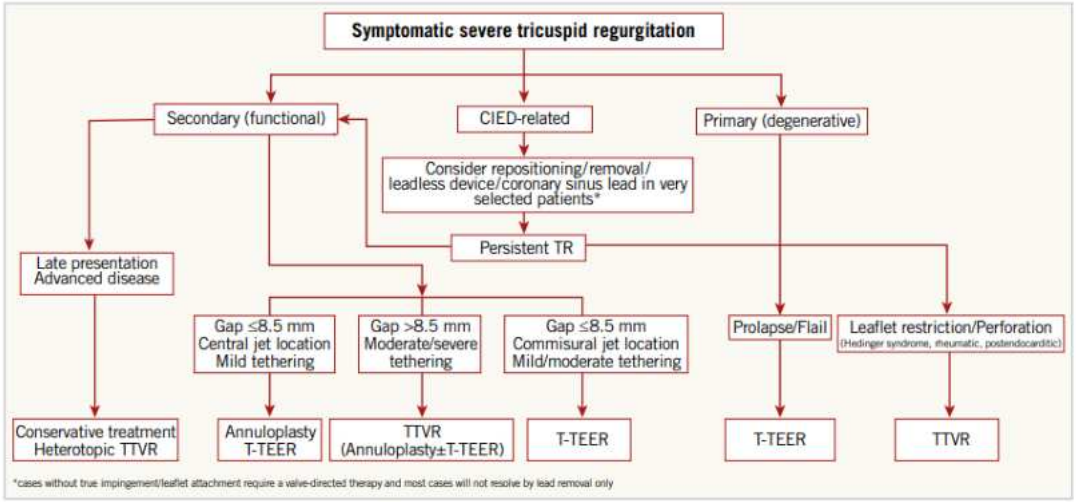


All-cause mortality	**15.0%**	**8.6%**
HF hospitalisation	**24.0%**	**14.9.%**

12 months

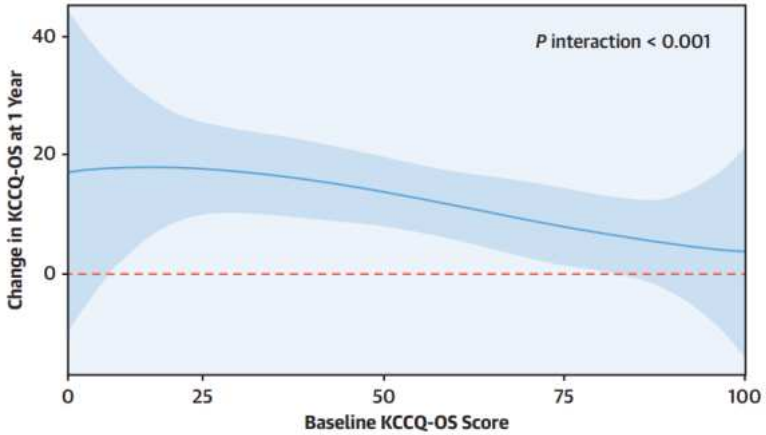
Adams D. TCT 2023

Algorithme de traitement



Praz F et al, EuroIntervention. 2021 Nov 19;17(10):791-808

Patients with HF symptoms benefit most
Cave: RV function and cardiac output!



Arnold SV et al, JACC 2023

MERCI POUR VOTRE ATTENTION