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Two-year outcomes of mitral transcatheter edge-to-edge repair from the MiCLASP study

Based on the presentation at PCRLV 2024, The Top Late-Breaking Trials
24th Nov. 2024 by:

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University Hospital Tuebingen

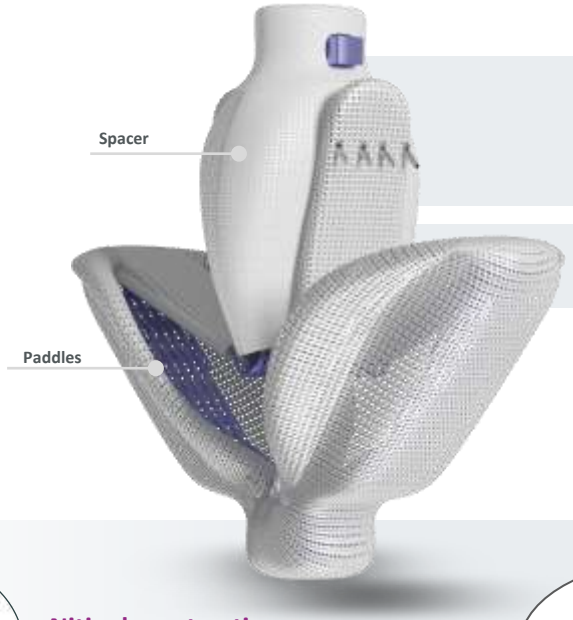
on behalf of the MiCLASP study investigators

PCR EAPCI European Society of Cardiology

THE MiCLASP STUDY

Edwards PASCAL Transcatheter Valve Repair System*

PASCAL Implant



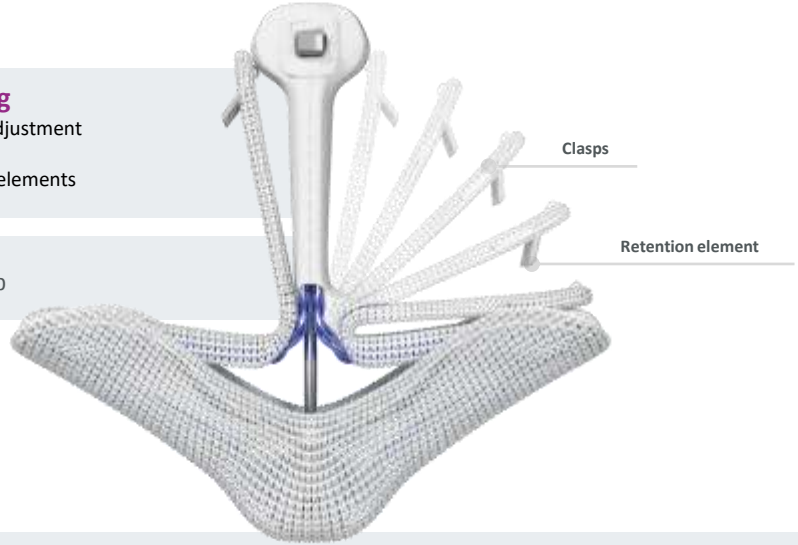
Independent grasping

- Staged leaflet capture and adjustment
- Clasp and reclasp capability with single row of retention elements

Central spacer

- Bridge the coaptation gap

PASCAL Ace Implant



Nitinol construction

Passive closure,
acute implant flexing

Elongation

Navigate in dense chordae

Two Implants

PASCAL implant with broader contoured paddles and PASCAL Ace implant with a narrow profile. Both with central spacer designed to provide multiple options for patients

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* Performance, design and simulation data on file
NOTE: Images are not actual size

MiCLASP study design

MiCLASP – transcatheter repair of mitral regurgitation with PASCAL transcatheter valve repair system

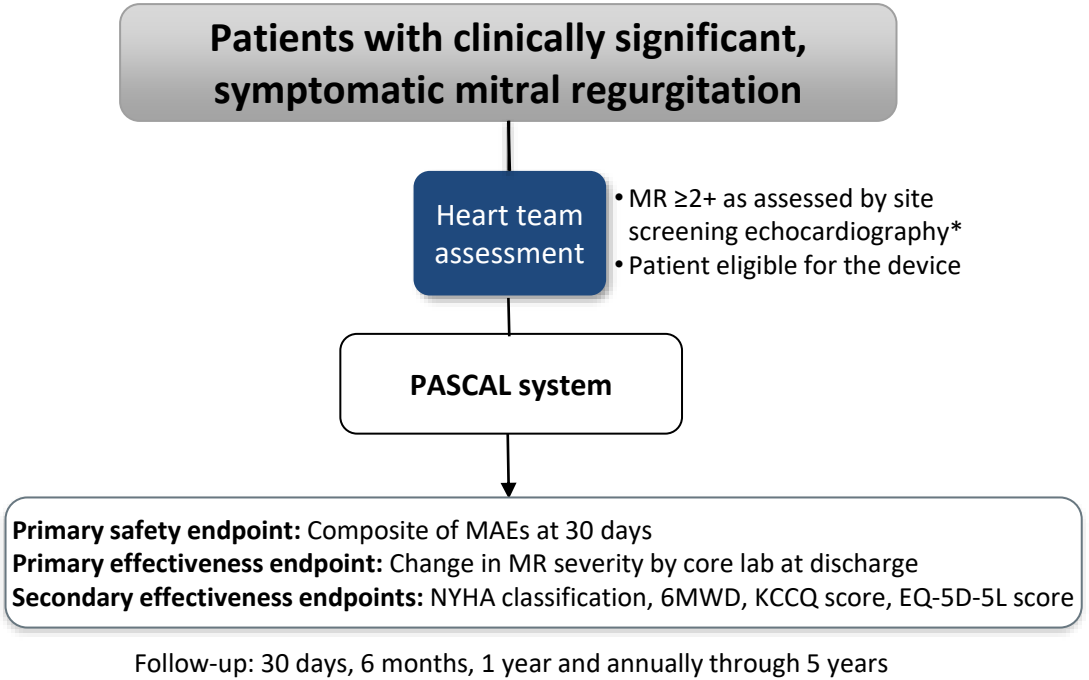
Prospective, multicentre, single-arm post-market clinical follow-up study

Purpose:
Evaluate safety and effectiveness of the PASCAL system in improving MR, functional status, and quality of life in a post-market setting

Principal investigator:
Philipp Lurz, MD, PhD

Trial oversight:
- Clinical events committee
- Echocardiographic core laboratory

ClinicalTrials.gov: NCT04430075



Follow-up: 30 days, 6 months, 1 year and annually through 5 years

* Since the launch of the PASCAL Precision system, the study only enrolled patients with clinically significant, symptomatic MR ≥ 3+ as per IFU.

6MWD, 6-minute walk distance; *EQ-5D-5L,* EuroQol 5 dimensions health questionnaire; *KCCQ,* Kansas City Cardiomyopathy Questionnaire; *MAE*, major adverse event; *NYHA*, New York Heart Association; *MR, Mitral* regurgitation; *IFU:* instructions for use

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Enrolling sites

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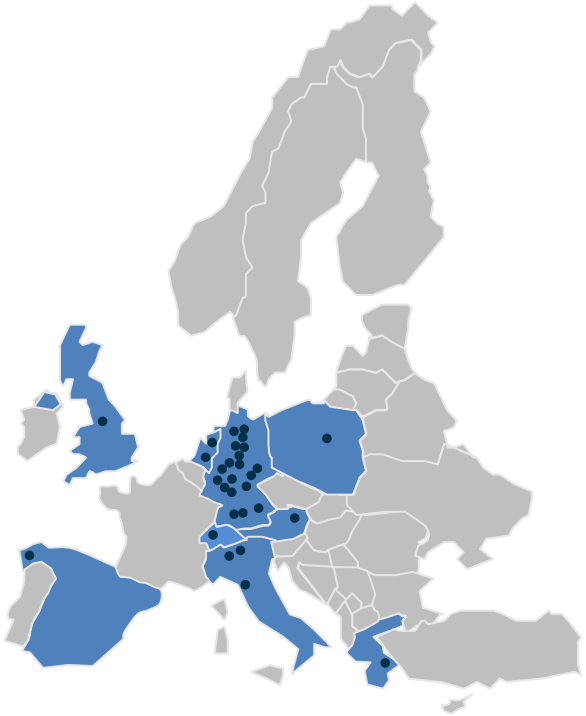
30 sites in 9 countries



Reflects patient enrolment in the current data set

Europe		
DE	•	Campus Benjamin Franklin Berlin
	•	Charité Campus Virchow Klinikum, Berlin
	•	Contilia Herz- und Gefäßzentrum, Elisabeth-Krankenhaus Essen
	•	Heart and Vascular Center, University Medical Center Mainz
	•	Heart Centre of the University Leipzig
	•	Herz- und Diabeteszentrum NRW - Bad Oeynhausen
	•	Herzzentrum der UniKlinik Köln
	•	Herzzentrum Universitätsklinik Dresden
	•	Immanuel Klinikum Bernau
	•	Kath. Marienkrankenhaus Hamburg GmbH
	•	Medizinische Klinik I- Campus Grosshadern, München
	•	St.-Johannes-Hospital, Dortmund
	•	Universitaeres Herzzentrum Goettingen
	•	Universitaetsklinikum Schleswig Holstein Campus Lübeck
	•	Universitaetsklinikum Tuebingen
	•	Universitaetsklinikum Ulm
	•	Universitätsklinikum Bonn
	•	Universitätsklinikum Giessen UKGM
	•	Westdeutsches Herzzentrum / Uniklinik Essen
AT	•	Medizinische Universität Wien/AKH Wien
CH	•	Bern University Hospital (Inselspital)
ES	•	Hospital Alvaro Cunqueiro
GB	•	Wythenshawe Hospital
GR	•	Hygeia Hospital
IT	•	IRCCS Ospedale San Donato
	•	IRCCS Ospedale San Raffaele
	•	Ospedale del Cuore, Fondazione C.N.R. Reg.
NL	•	Erasmus MC, Rotterdam
	•	St Antonius Nieuwegein
PL	•	The Cardinal Stefan Wyszyński, Institute of Cardiology

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Enrolment, baseline characteristics, procedural outcomes

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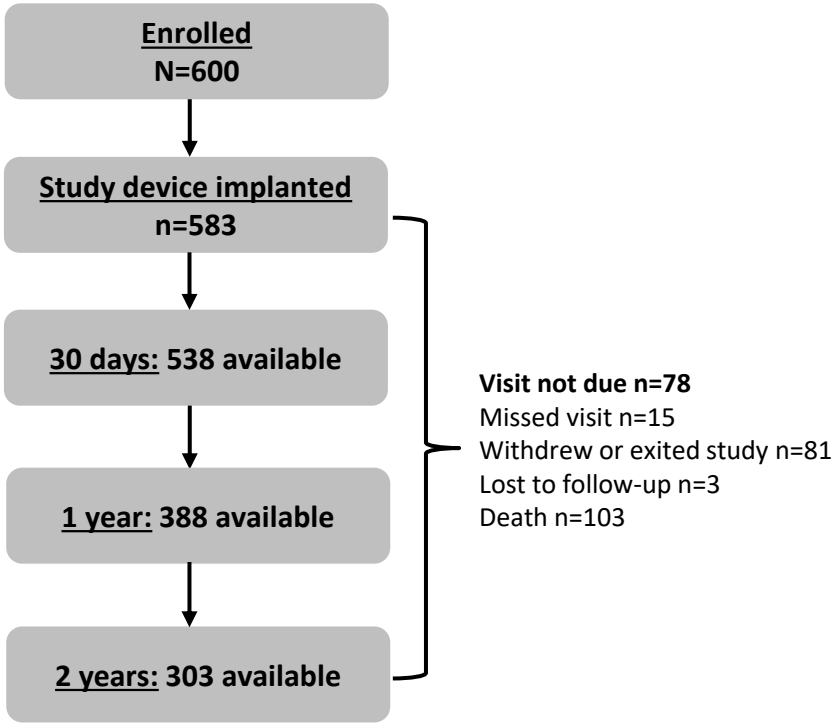
Study flow



Baseline characteristics	n=600 % (n/N), mean ± SD
Age, years	77.4 ± 9.1 (600)
Male, %	58.3 (350/600)
NYHA III/IV, %	76.1 (455/598)
STS score (mitral valve repair), %	5.1 ± 4.1
EuroSCORE II, %	7.0 ± 6.9
MR aetiology[a],%	
Functional	58.5 (351/600)
Degenerative	31.7 (190/600)
Mixed, other	9.8 (59/600)
Complex mitral valve anatomy[b], %	18.5 (111)
EROA, cm^2	0.37 ± 0.18 (262/600)
LV ejection fraction, %	48.5 ± 14.7 (574/600)
Regurgitant volume (mL)	53.8 ± 22.4 (261/600)

Procedural outcomes	n=600 % (n/N), mean ± SD, median [Q1, Q3]
Successful implant rate, %	97.2 (583/600)
Mean number of devices implanted	1.4 ± 0.5 (583/600)
Procedure time, skin to skin, mins	81.0 [86.6, 93.9]
Length of hospital stay, days[c]	4.0 [3.9, 4.5]
Patients discharged home, %	93.3 (557/600)

2-year follow-up window is 730 ± 90 days. [a]3.3% of patients had mixed aetiology and 6.5% undeterminable due to poor and or missing imaging. [b]includes commissural jets, 2 or more significant jets, mitral valve area < 4 cm^2, grasping area calcification, minimal tissue for leaflet attachment and severely degenerative leaflets. [c]Study procedure date to hospital discharge date. *EROA,* effective regurgitant orifice area; *LV,* left ventricle; *MR,* mitral regurgitation; *NYHA,* New York Heart Association; *STS,* Society of Thoracic Surgeons

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Clinical outcomes to 2 Years

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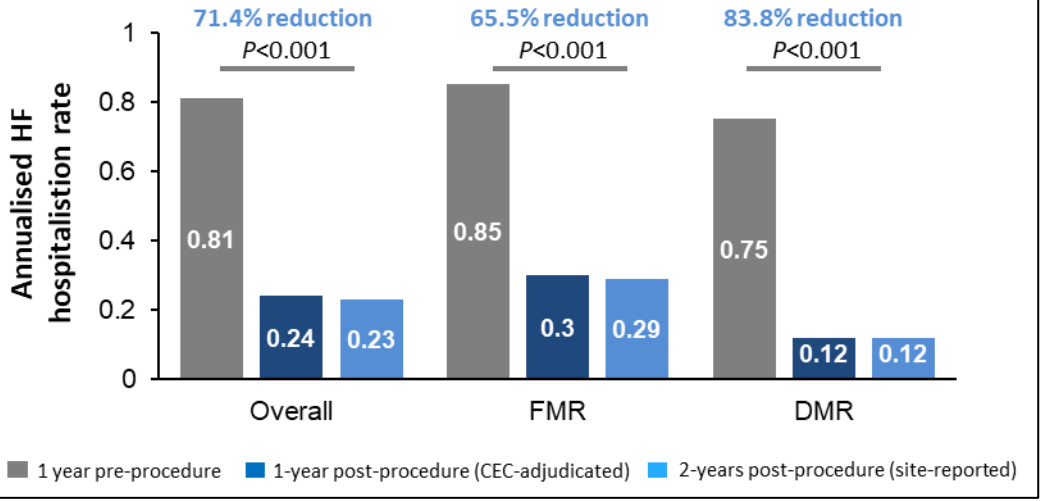
Low event rates and significant reduction in annualised HFH rate

Site-reported MAEs	2 years N=600 % (n)
Cardiovascular mortality	10.0 (60)
Stroke	4.0 (24)
Myocardial infarction	2.2 (13)
Mitral valve re-intervention	2.7 (16)
Device embolization (core lab)	0.2 (1)
Renal complications requiring unplanned dialysis or renal replacement therapy	2.8 (17)
Severe bleeding[a]	8.5 (51)
Composite MAE rate	**22.5 (135)**
Other events	
All-cause mortality	16.7 (100)
SLDA (core lab)	1.5 (9)

Annualised HF hospitalisations

Significant reduction in annualised HFH rate sustained to 2 years



Cardiovascular Core Lab at Morristown Medical Center, Morristown, NJ, USA. Values are presented as % (n). Denominator includes patients who had an MAE or did not have an MAE but were followed for at least 30 days. Patients may have had more than one event. [a]Major, extensive, life-threatening, or fatal bleeding defined by the Mitral Valve Academic Research Consortium. Pre-procedure hospitalisation is site reported; post-procedure hospitalisation is CEC adjudicated.

CEC, clinical events committee*; HFH,* heart failure hospitalisation*; MAE,* major adverse event; *SLDA,* single leaflet device attachment; *DMR*: degenerative mitral regurgitation; *FMR*: functional mitral regurgitation.

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Freedom from mortality and HFH

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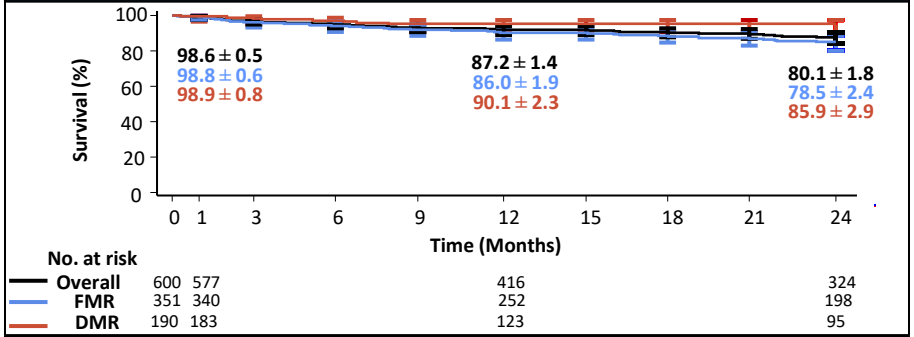
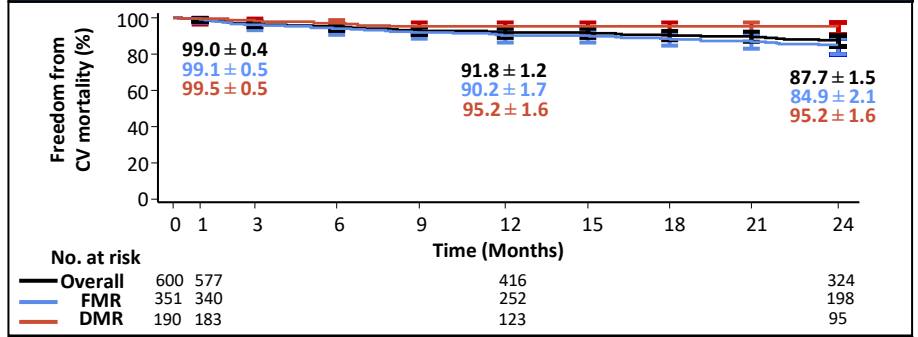
High survival and low HFH at 2 years

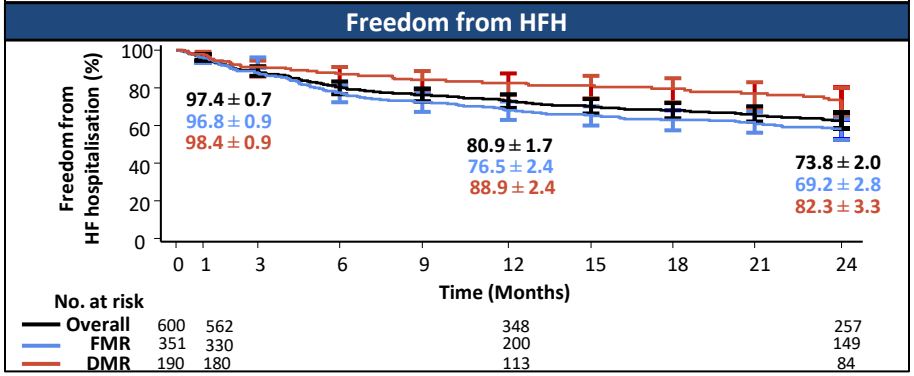
Freedom from all-cause mortality



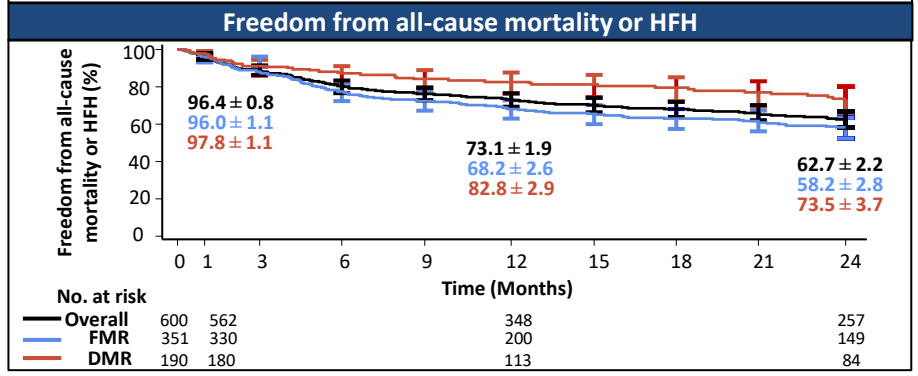
Freedom from CV mortality



Freedom from HFH



Freedom from all-cause mortality or HFH



Graphs show Kaplan-Meier analysis time to first event (KM estimate ± SE) and error bars represent 95% CI.
CV, cardiovascular; *HFH*, Heart Failure Hospitalisation; *DMR*: degenerative mitral regurgitation; *FMR*: functional mitral regurgitation.

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MR reduction by core laboratory

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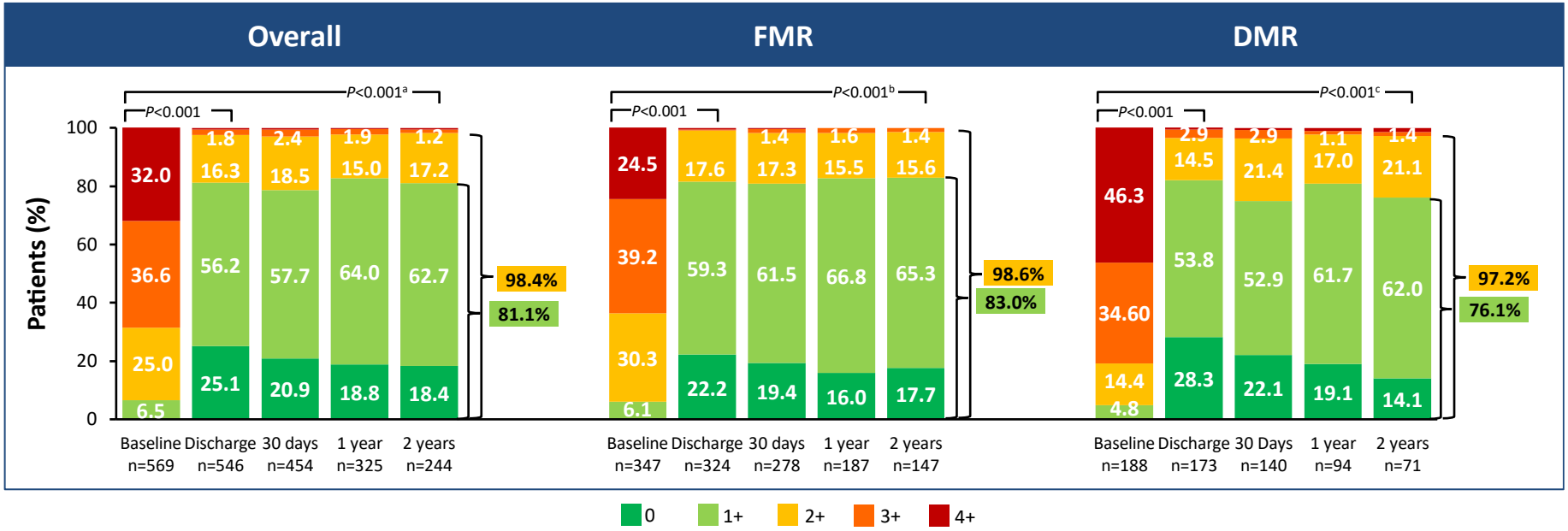
Significant and sustained MR reduction at 2 years



81.1% of patients with MR ≤1+ at 2 years

Cardiovascular Core Lab at Morristown Medical Center, Morristown, NJ, USA. Graphs show unpaired analysis. *P* values calculated from paired analysis relative to baseline using Wilcoxon signed rank test, [a]baseline vs. 2 years (n=228; MR≤1+=80.7%; MR≤2+=98.3%), [b]baseline vs. 2 years (n=145; MR≤1+=82.8%; MR≤2+=98.6%) and [c]baseline vs. 2 years (n=70; MR≤1+=75.7%; MR≤2+=97.1%).

DMR, degenerative mitral regurgitation; *FMR,* functional mitral regurgitation

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MR reduction in patients with complex anatomy

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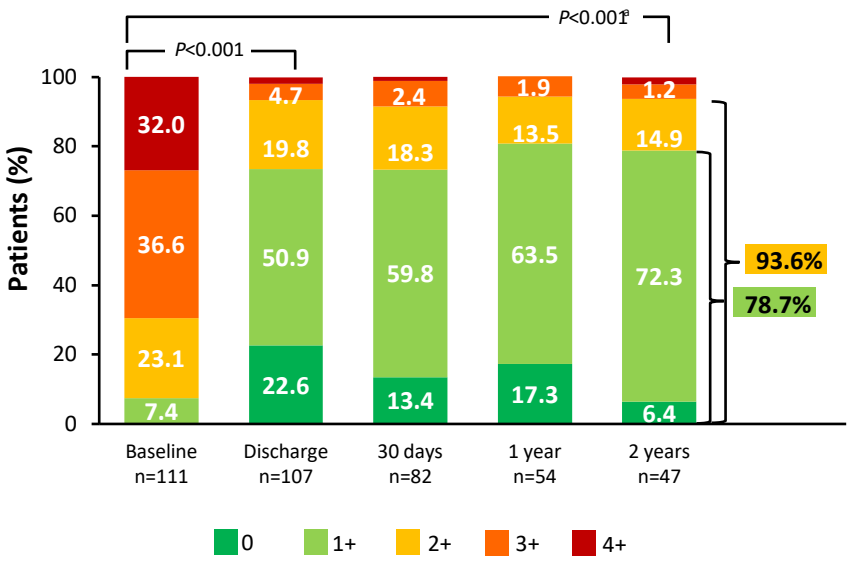
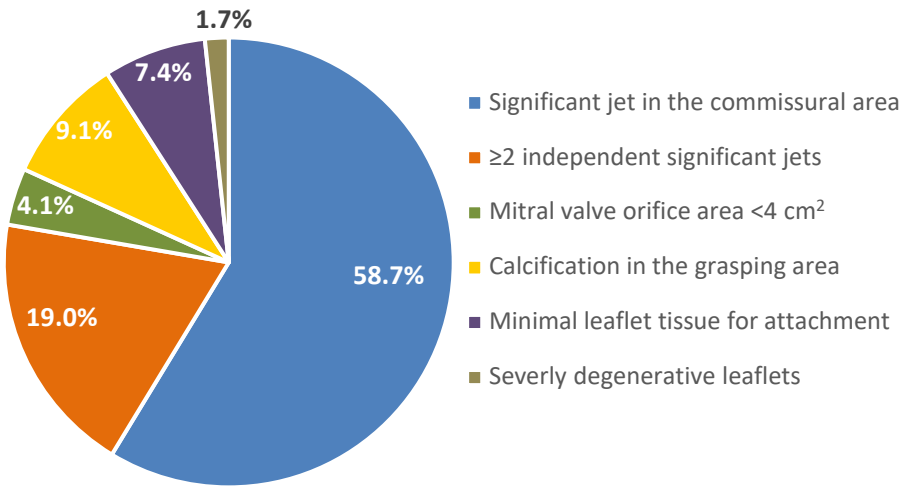
78.7% of patients with MR ≤1+ at 2 years

Overall



Complex anatomy distribution



Cardiovascular Core Lab at Morristown Medical Center, Morristown, NJ, USA. Graphs show unpaired analysis. *P* values calculated from paired analysis relative to baseline using Wilcoxon signed rank test, [a]baseline vs. 2 years (n=46; MR≤1+=78.3%; MR≤2+=93.5%).

MR: mitral regurgitation

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LV remodelling by core laboratory

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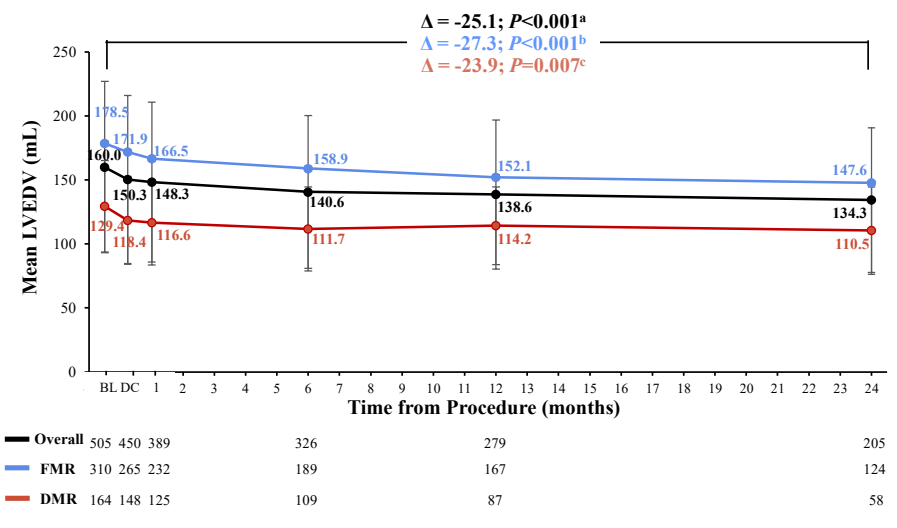
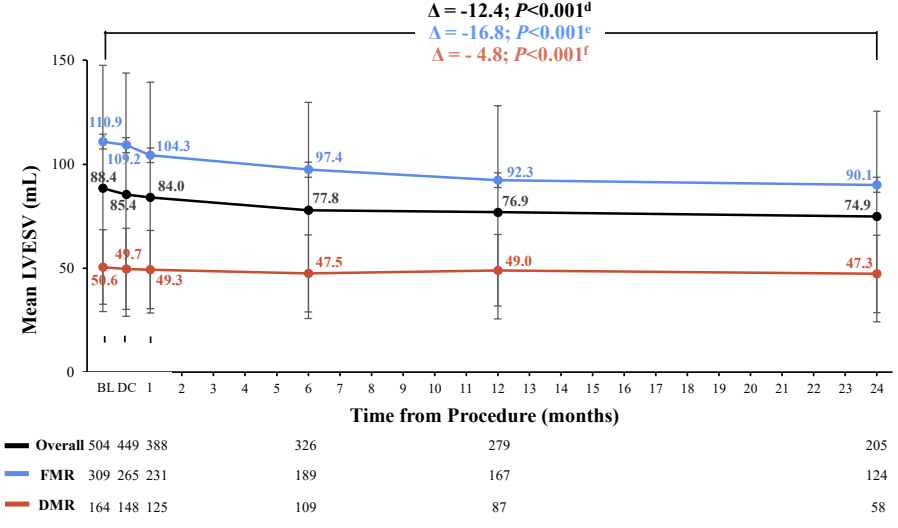
Significant and sustained reduction in LVEDV and LVESV at 2 years

LVEDV



LVESV



Cardiovascular Core Lab at Morristown Medical Center, Morristown, NJ, USA. Graphs show unpaired analysis. Error bars represent ± SD. 2-year Δ and p-value calculated from paired analysis relative to baseline using Student's T-test, baseline vs. 2 year, [a]Overall (n=179; mean baseline LVEDV=159.2; mean 2-year LVEDV=134.1), [b]FMR (n=114; mean baseline LVEDV=173.2; mean 2-year LVEDV=145.9) and [c]DMR (n=52; mean baseline LVEDV=136.2; mean 2-year LVEDV=112.2), [d]Overall (n=178; mean baseline LVESV=86.6; mean 2-year LVESV=74.2), [e]FMR (n=113; mean baseline LVESV=105.2; mean 2-year LVESV=88.4) and [f]DMR (n=52; mean baseline LVESV=52.7; mean 2-year LVESV=47.9).

BL, Baseline*; DC,* Discharge*; LVEDV,* left ventricular end-diastolic volume; *LVESV,* left ventricular end-systolic volume; *DMR*: degenerative mitral regurgitation; *FMR*: functional mitral regurgitation.

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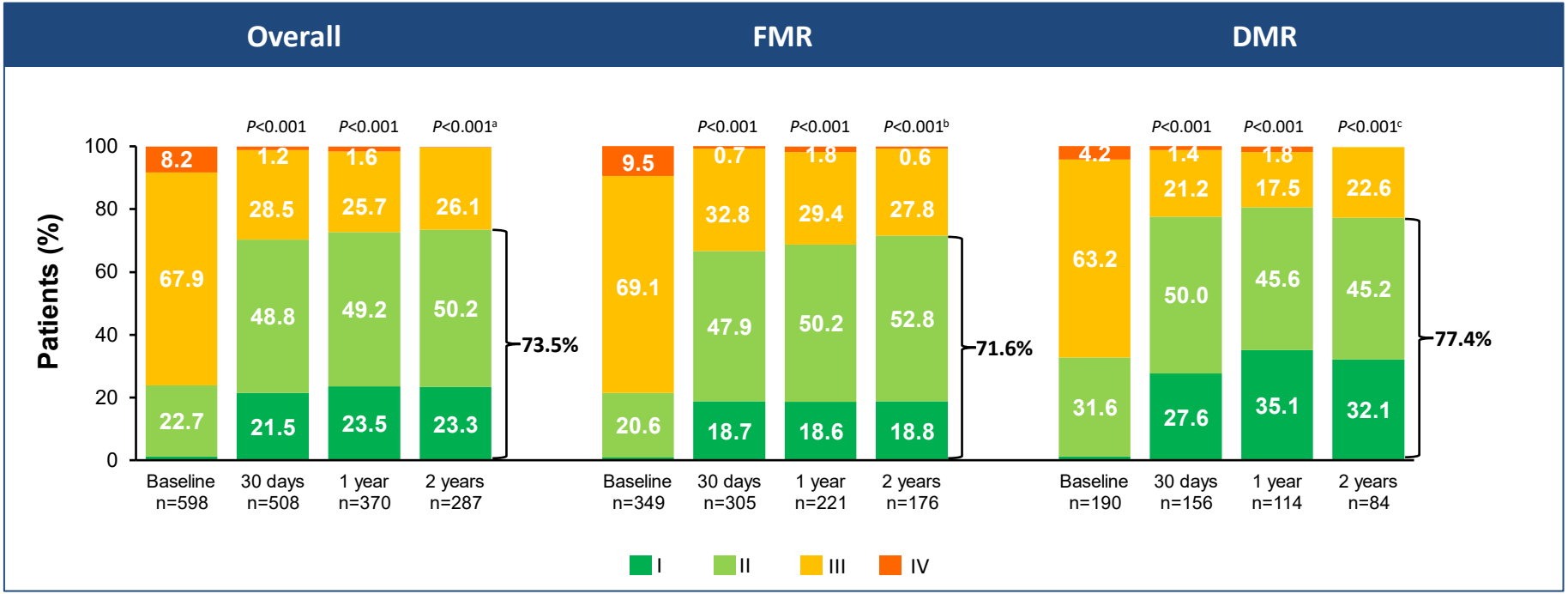
Functional outcomes at 2 years

Significant and sustained improvement in NYHA at 2 years



Graphs show unpaired analysis. *P* values calculated from paired analysis relative to baseline using Wilcoxon signed rank test, [a]baseline vs. 2 years (n=286; NYHA class I/II=73.4%), [b]baseline vs. 2 years (n=175; NYHA class I/II=71.4%) and [c]baseline vs. 2 years (n=84; NYHA class I/II=77.4%).

NYHA: New York Heart Association; *DMR*: degenerative mitral regurgitation*; FMR:* functional mitral regurgitation.

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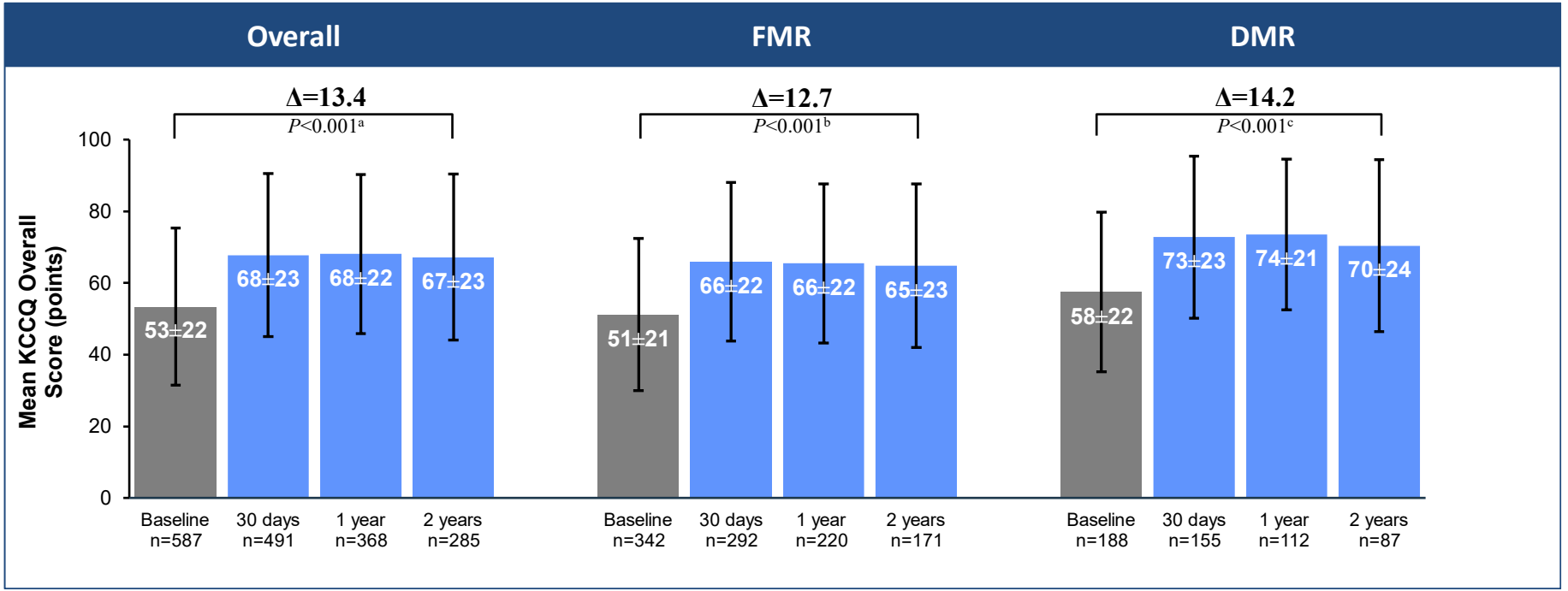
QoL outcomes at 2 years

Significant and sustained improvement in KCCQ at 2 years



Graphs show unpaired analysis. Error bars represent 95% CI. Δ and p-value calculated from paired analysis relative to baseline using Student's t-test, [a]baseline vs. 2 years (n=281; mean baseline KCCQ =53.7; mean 2-year KCCQ =67.1), [b]baseline vs. 2 years (n=168; mean baseline KCCQ =52.0; mean 2-year KCCQ =64.7), [c]baseline vs. 2 years (n=87; mean baseline KCCQ =56.3; mean 2-year KCCQ =70.4.
KCCQ: Kansas City Cardiomyopathy Questionnaire; *DMR*: degenerative mitral regurgitation*; FMR:* functional mitral regurgitation

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Conclusions

- In the post-market MiCLASP study, M-TEER with the PASCAL system demonstrated significant and sustained clinical benefits at 2 years with:
  - Robust and durable MR reduction across a wide range of mitral valve anatomies, including patients with complex anatomy
  - High survival and low rates of heart failure hospitalisation
  - Continuous and favourable left ventricular remodelling
  - Clinically meaningful improvements in functional status and quality of life

Two-year outcomes from the MiCLASP study confirm sustained safety and effectiveness of the PASCAL system in treating a broad population of FMR and DMR patients in a post-market setting

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