Selection of Characteristics for Matching Adjusted Indirect Comparison in a Functional Mitral Regurgitation Population

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OBJECTIVE

- Matching Adjusted Indirect Comparisons (MAICs) are a newer methodological approach within the medical device space.
- This technique allows for comparison between studies where individual patient data are available for one trial and only published aggregate data are available for the other.
- Using MAIC, we compared baseline characteristics between patients with Functional Mitral Regurgitation (FMR) etiology from the CLASP and COAPT trials for weighting.
- The aim of this study was to understand the most appropriate covariates for weighting in future planned FMR analyses.

METHODS

- Data from the FMR subset in the CLASP trial were used to compare with aggregated patient characteristics and outcomes from the COAPT trial.
- Clinicians with expertise in the disease area were consulted to determine which baseline characteristics were most appropriate for weighting in FMR patients.

Base Case Weighting Criteria

- Prior myocardial infarction
- Chronic obstructive pulmonary disease
- Stroke/transient ischemic attack
- Ischemic cardiomyopathy
- Mean left ventricular ejection fraction

Sensitivity Analysis Weighting Criteria

- Mitral regurgitation severity
- Prior MI
- Mean LVEF
- Atrial fibrillation or flutter

We measured the change in the Effective Sample Size (ESS) after the sensitivity analysis as a definition of higher sampling quality.

Table 1: Baseline Characteristics in Base Case

Indicates imbalance favorable for Weighted CLASP or COAPT arms

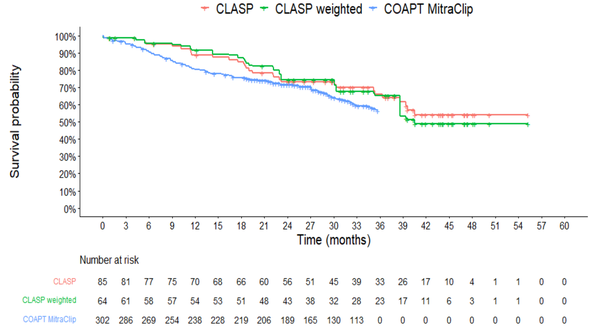
Characteristic	CLASP (PASCAL)	Weighted CLASP (PASCAL)	COAPT (MitraClip)
N/WSS;ESS	85.0	WSS=63.5; ESS=50.7	302.0
Age (mean)	72.22	70.90	71.70
Male (proportion)	0.55	0.57	0.67
BMI (mean)	26.24	26.29	27.00
MR severity 3+ (proportion)	0.56	0.57	0.49
MR severity 4+ (proportion)	0.42	0.42	0.51
Diabetes (proportion)	0.32	0.34	0.35
Prior MI (proportion)	0.42	0.52	0.52
CABG (proportion)	0.35	0.39	0.40
COPD (proportion)	0.12	0.23	0.23
CVA/TIA (proportion)	0.18	0.19	0.18
Ischemic cardiomyopathy (proportion)	0.21	0.24	0.61
NYHA III or IV (proportion)	0.65	0.57	0.57
LVEF (mean)	36.67	31.30	31.30
LVEF ≤40 (proportion)	0.67	0.87	0.82
CRT (proportion)	0.15	0.16	0.38
EROA (mean)	0.34 (n=72)	0.34 (WSS=57.4; ESS=44.1)	0.41
Atrial fibrillation or flutter (proportion)	0.58	0.50	0.57
LVESV (mean)	130.06 (n=76)	153.69 (WSS=58.5; ESS=46.0)	135.50
PASP (mean)	46.91 (n=77)	47.00 (WSS=57.8; ESS=45.2)	44.00
STS score (mean)	4.67	4.92	7.80
STS score ≥8 (proportion)	0.18	0.22	0.42
Hospitalisations for HF (proportion)	0.56	0.64	0.58
Anaemia (proportion)	0.09	0.04	0.60
KCCQ (mean)	52.98	53.60	53.20

Abbreviations WSS: Weighted Sample Size; ESS: Effective Sample Size; BMI: Body Mass Index; MR: Mitral Regurgitation; MI: Myocardial Infarction; CABG: Coronary Artery Bypass Grafting; COPD: Chronic Obstructive Pulmonary Disease; CVA: Cerebrovascular Accident; TIA: Transient Ischemic Attack; NYHA: New York Heart Association Functional Class; LVEF: Left Ventricular Ejection Fraction; CRT: Cardiac Resynchronization Therapy; EROA: Effective Regurgitant Orifice Area; LVESV: Left Ventricular End-Systolic Volume; PASP: Pulmonary Arterial Systolic Pressure; Society of Thoracic Surgeons Risk Score; HF: Heart Failure; KCCQ: Kansas City Cardiomyopathy Questionnaire

RESULTS

- In the base case, the ESS for the CLASP FMR group decreased by approximately 40% (from n=85 to ESS=50.7).
- The sensitivity analysis led to a substantially smaller matched sample (ESS=38.6) and non-matched characteristics became more dissimilar compared with the COAPT population including variables with clinical importance for the population.
- The matching allowed for comparison of MR severity, NYHA functional status, KCCQ score, and all-cause mortality.

Figure 1: Overall Survival using 3-year Data



LIMITATIONS

- Despite matching on a number of characteristics, some imbalances remained (e.g., . STS score).
- Guideline Directed Medical Therapy (GDMT) treatment within the COAPT trial may mean populations are not equal.

CONCLUSIONS

- A higher ESS in the base case compared to the sensitivity analysis gave us a positive forward direction for future planned indirect comparisons in the FMR population.