

MAGGIC-predicted mortality of $> 20\%$ at 1 year
is associated with poor prognosis in ambulatory
patients with advanced heart failure

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Disclosure statement

- I will not discuss off label use and/or investigational use of drugs/devices
- The following relevant financial relationships exist related to my role in this session:
 - No relationships to disclose



Background

- Heart transplantation and durable left ventricular assist device (LVAD) implantation are important treatment options for patients with advanced heart failure
- Patients at higher risk of death are likely to derive greater survival benefit from intervention
- Several tools may be used for prognostication in chronic heart failure
- MAGGIC score
 - Derived from 39 372 patients from 30 studies
 - Comprises 13 variables
 - May be used to predict survival in patients with chronic heart failure



Heart Failure Risk Calculator

MAGGIC

Meta-Analysis Global
Group in Chronic
Heart Failure

Patient Information

[Return to terms and conditions](#)

Patient Reference

Age

Gender

Diabetes ☐ Yes ☒ No

COPD ☐ Yes ☒ No

Heart failure diagnosed
within the last 18
months ☐ Yes ☒ No

Current smoker ☐ Yes ☒ No

NYHA Class

Receives beta blockers ☒ Yes ☐ No

Receives ACEi/ARB ☒ Yes ☐ No

BMI kg/m²
[calculate BMI](#)

Systolic blood pressure mmHg

Creatinine μmol/L

Ejection fraction %

[Calculate Risk](#)

[Clear the data](#)

Integer score: 26

Risk of dying within 1 year: 17.5%

Risk of dying within 3
years: 39.7%

The patient is in the 7-8th decile of risk in a heart failure population.

Available at www.heartfailurerisk.org

Aims and objective

- To validate the MAGGIC score in ambulatory outpatients with advanced heart failure who are being assessed for heart transplantation
- To determine its ability to predict death, urgent transplantation or MCS in this cohort of patients



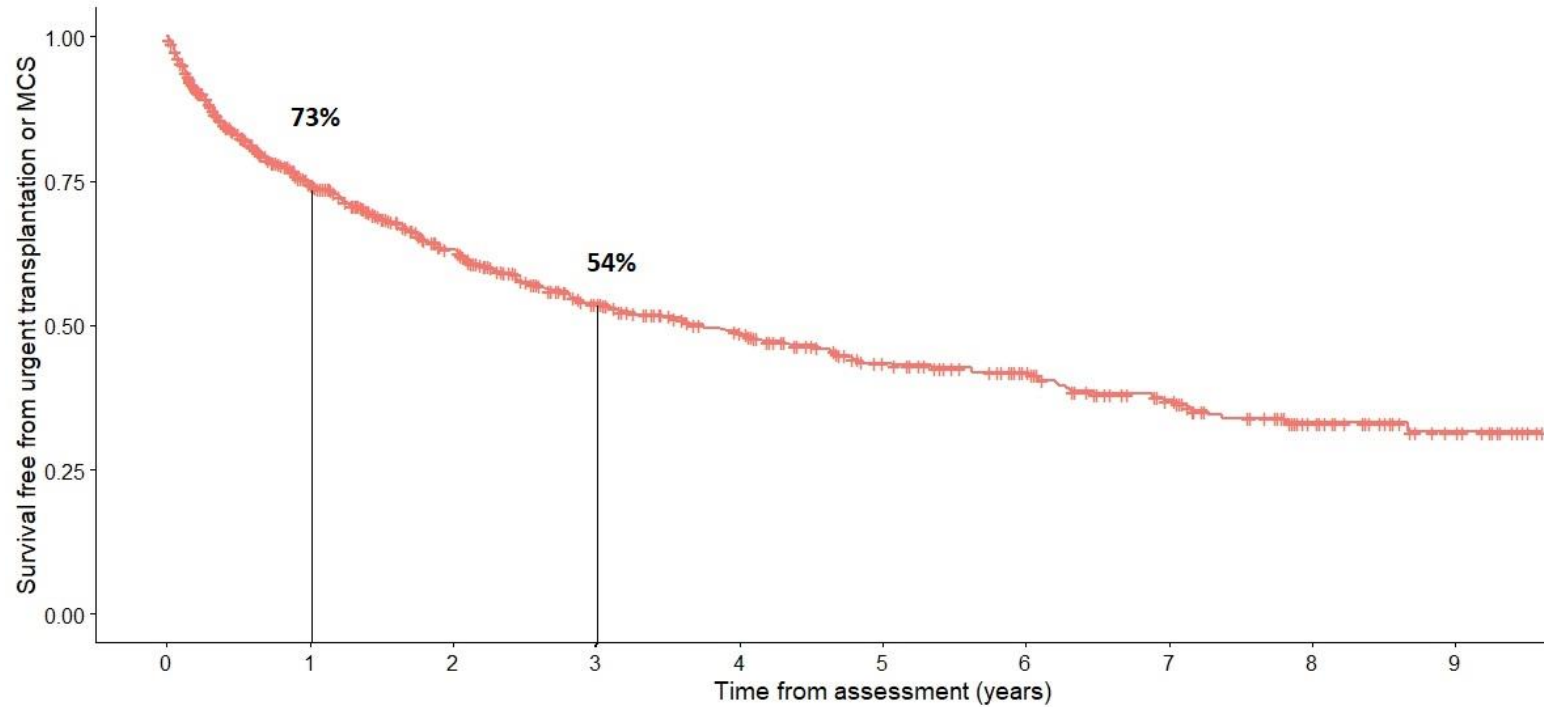
Methods

- Included consecutive outpatients referred for transplant assessment at a single UK centre
- Collected baseline characteristics for each patient
- Calculated MAGGIC score for each patient
- Primary outcome measures
 - Death
 - Urgent heart transplantation (defined by dependence on inotropic or IABP support)
 - Mechanical circulatory support with an implantable LVAD, extra-corporeal VAD or veno-arterial extra-corporeal membrane oxygenation



Study population

- 702 consecutive patients
- Median follow-up 1.5 years
- Primary outcome measures
 - 150 deaths
 - 97 urgent heart transplantation
 - 73 mechanical circulatory support
- Other outcomes (censored)
 - 107 routine heart transplantation



Study population divided into quartiles

Quartile	Predicted 1-year mortality
1	2.4 – 8.4%
2	9.3 – 12.2%
3	13.7 – 16.0%
4	17.5 – 48.5%



Baseline characteristics

	Quartile 1 N = 175 Lowest score	Quartile 2 N = 175	Quartile 3 N = 175	Quartile 4 N = 177 Highest score	p value
Age, years	48.1 (16)	51.8 (15.6)	53.5 (10.1)	59.0 (11.3)	<0.0001
Male gender, n (%)	96 (55)	116 (67)	138 (79)	148 (85)	<0.0001
Height, cm*	169.8 (10.4)	172.0 (10.0)	173.0 (9.0)	173.3 (9.0)	0.008
Weight, kg	78.1 (22.6)	80.0 (21.6)	82.2 (18.8)	75.1 (23.2)	0.77
Aetiology, n (%)					
• DCM	56 (32)	97 (55)	96 (55)	91 (51)	< 0.0001
• ICM	21 (12)	28 (16)	47 (27)	60 (34)	
• HCM	48 (28)	22 (13)	14 (8)	13 (7)	

Table 1. Baseline characteristics. Values are mean (standard deviation), unless stated otherwise.



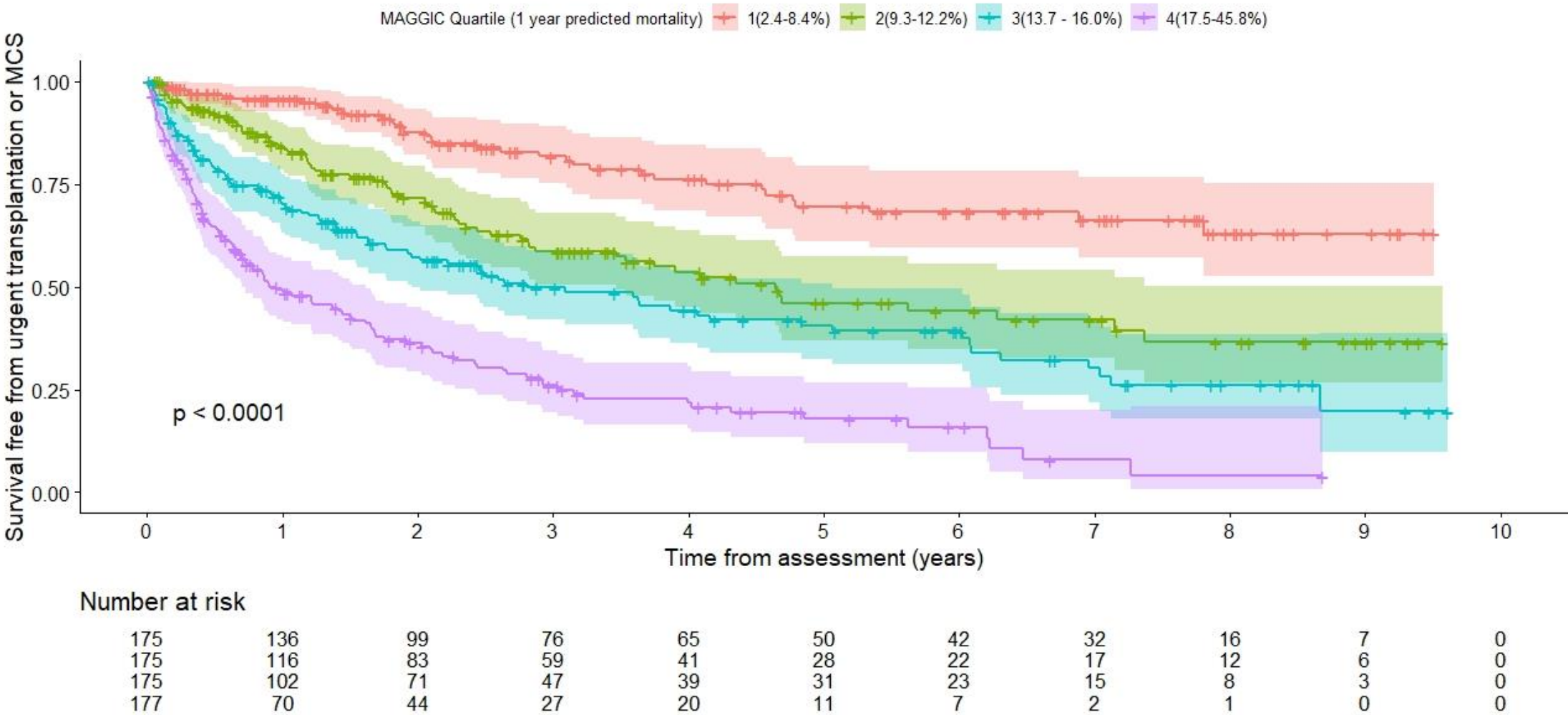
Baseline characteristics

	Quartile 1 N = 175 Lowest score	Quartile 2 N = 175	Quartile 3 N = 175	Quartile 4 N = 177 Highest score	p value
NYHA, n (%)					
• II	64 (37)	52 (30)	10 (6)	4 (2)	<0.0001
• III	108 (62)	118 (68)	157 (90)	150 (84)	
• IV	0	3 (2)	7 (4)	21 (12)	
Heart rate, bpm	69.5 (15)	70 (17)	70 (18)	70 (17)	0.36
Systolic BP, mmHg	111 (17)	104 (23)	100 (15)	98 (15)	<0.0001
LVIDd, mm*	54.8 (11.0)	63.0 (12.6)	67.0 (11.6)	67.8 (10.1)	<0.0001
LVEF, %	40.0 (22.0)	22.5 (10.3)	20.0 (10)	17.5 (24.0)	<0.0001
Haemoglobin, g/L	137.5 (15.8)	137.2 (16.9)	134.7 (17.9)	133 (17.7)	0.049
Sodium, mmol/L	139 (3)	140 (3)	139 (4)	139 (4)	0.17
Creatinine, umol/L	86.5 (27.8)	99 (33.0)	108 (41.8)	135 (56.8)	<0.0001
NTproBNP, pg/ml	1460 (2237)	1950 (2519)	2956 (3597)	4096 (4462)	<0.0001
Peak VO ₂ , ml/min/m ²	14.0 (7)	13.9 (6)	12.6 (4)	11.0 (4.0)	<0.0001

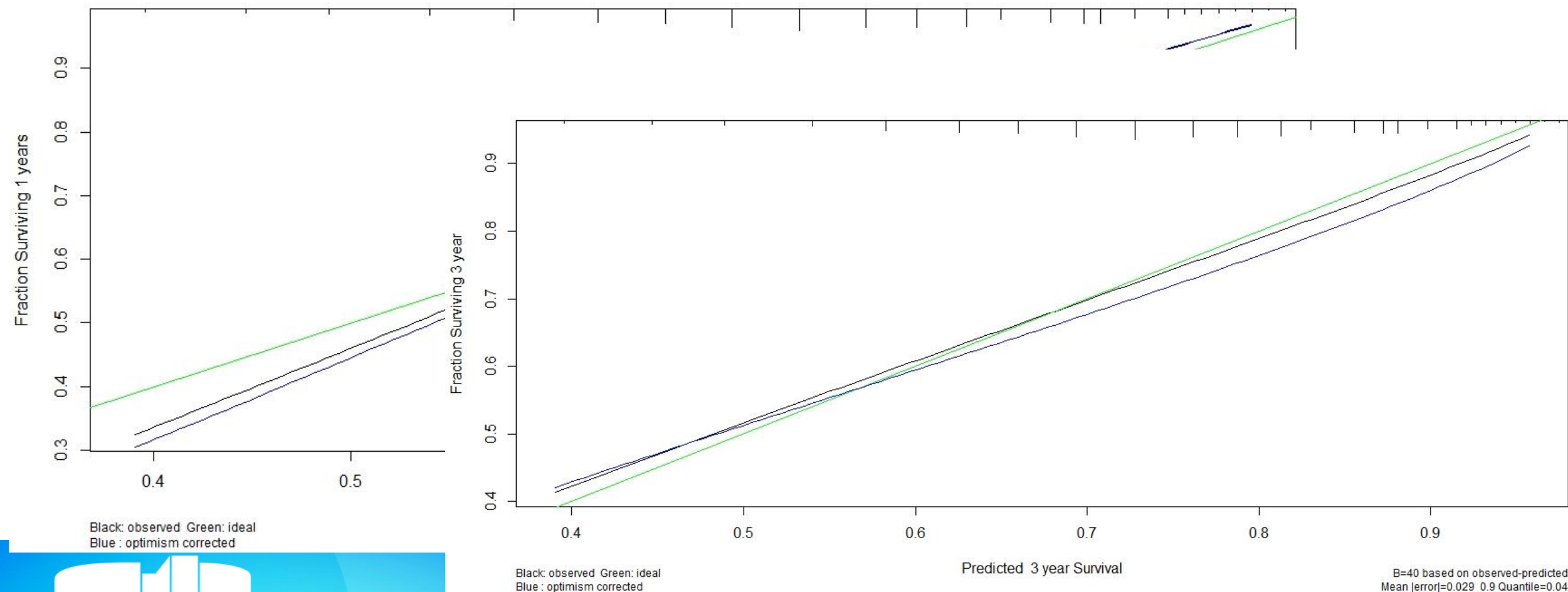
Table 1 (Contd). Baseline characteristics. Values are mean (standard deviation), unless stated otherwise. *Median, IQR



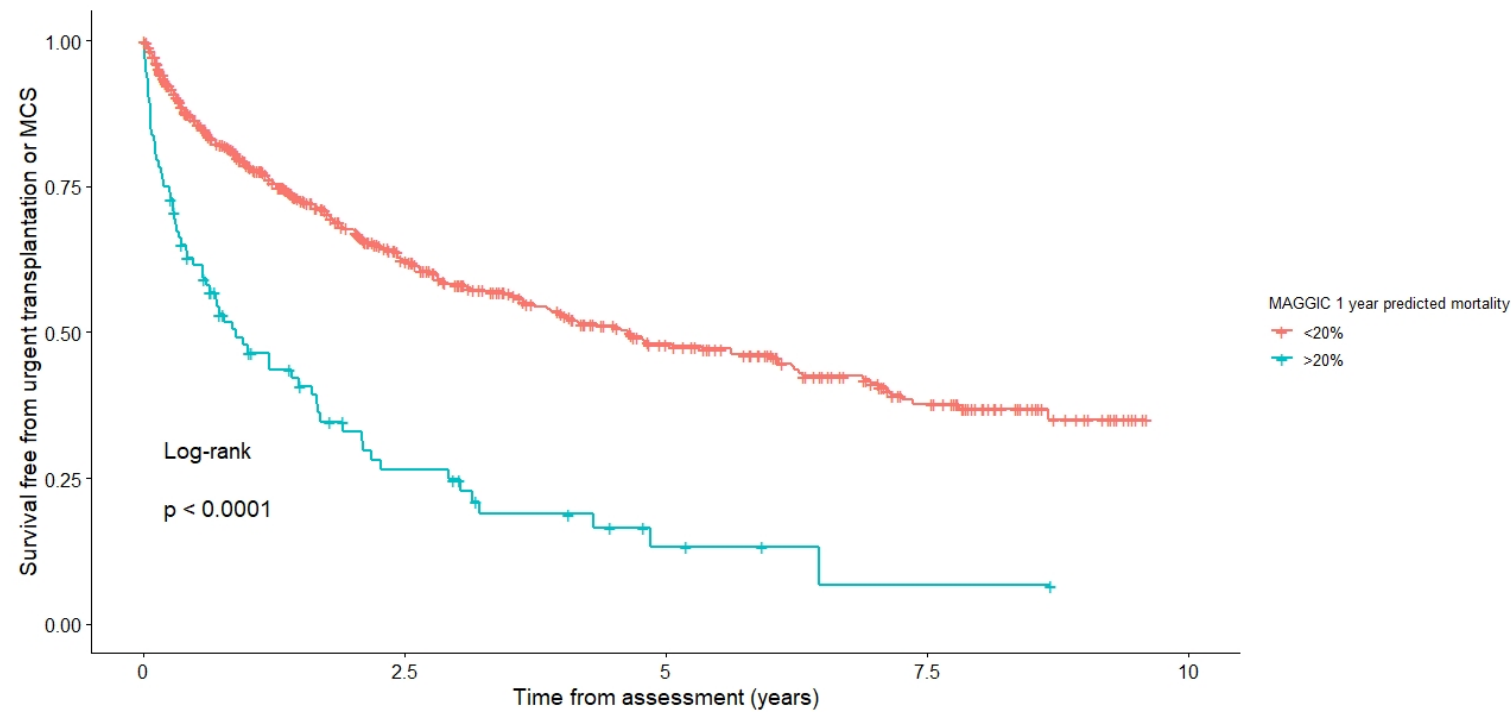
Outcomes by quartiles of MAGGIC score



Calibration at one and three years



Patients with 1-year predicted mortality of >20% are sick



Sensitivity	27.8%
Specificity	91.5%
PPV	56.1%
NPV	76.5%
Positive likelihood ratio	3.27



Limitations

- Subgroup analysis of observational data
- Impact of competing risks
- Single center data
- Missing data



Conclusions

- High MAGGIC score is associated with death, need for urgent heart transplantation or MCS in patients with advanced heart failure
- MAGGIC-predicted one-year mortality of >20% is a specific marker of adverse outcomes
- But low MAGGIC scores are not reassuring – low sensitivity
- MAGGIC scores may be used to identify patients who stand to derive prognostic benefit from early surgical treatment of advanced heart failure

