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ANALYSIS OF IRON DEFICIENCY IN DIABETIC AND NON-DIABETIC PATIENTS WIT HEART FAILURE

M. Bakošová, J. Godava, E. Ozábalová, H. Poloczková, T. Honek, P. Hude, H. Bedáňová, P. Němec, J. Krejčí

rDia

RON DEFICIENCY – A COMMON COMORBIDITY N PATIENTS WITH HEART FAILURE

Iron deficiency (ID) occurs in 40% to 50% of patients with chronic heart failure and up to 80% of patients with acute heart failure.

ID worsens heart failure syndrome by affecting energy metabolism in myocardium and skeletal muscle, oxidation-reduction balance and contractile function.

There are several reasons: inflammation, neurohormonal activation, use of antiplatelet drugs, congestion in the GIT, chronic kidney disease...

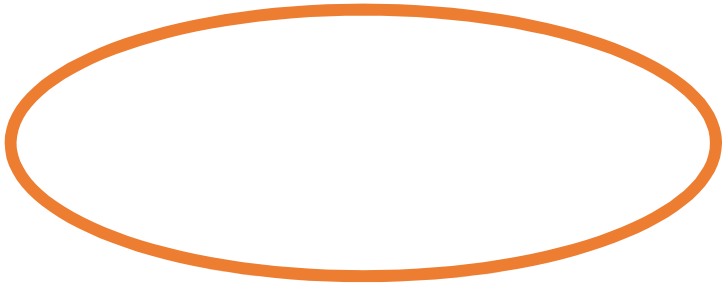
ID worsens functional status and performance, is associated with a higher degree of negative remodeling, progression of HF and a higher risk of hospitalization for HF

IEWS IN DIAGNOSE IN ESC GUIDELINES UPDATE

creening and treatment of ID in patients with heart ailure by intravenous administration of ferric arboxymaltose is recommended by the Guidelines for Diagnosis and Treatment of HF since 2016.

Indication was extended for HFmrEF in patients after cute HF decompensation in 2021.

The definition of ID was based on ferritin and T-sat -sat based orientation is now preferred because alues



flammation is present in heart failure[1] - and ferritin an acute phase parameter that may be elevated in nflammation.

ow ferritin may not always be associated with true on deficiency.

n P. Murphy, Inflammation in Heart Failure: JACC State-of-the-Art Review, Journal of the American College of Cardiology, 2020

IEWS IN DIAGNOSE OF ID
N ESC GUIDELINES UPDATE

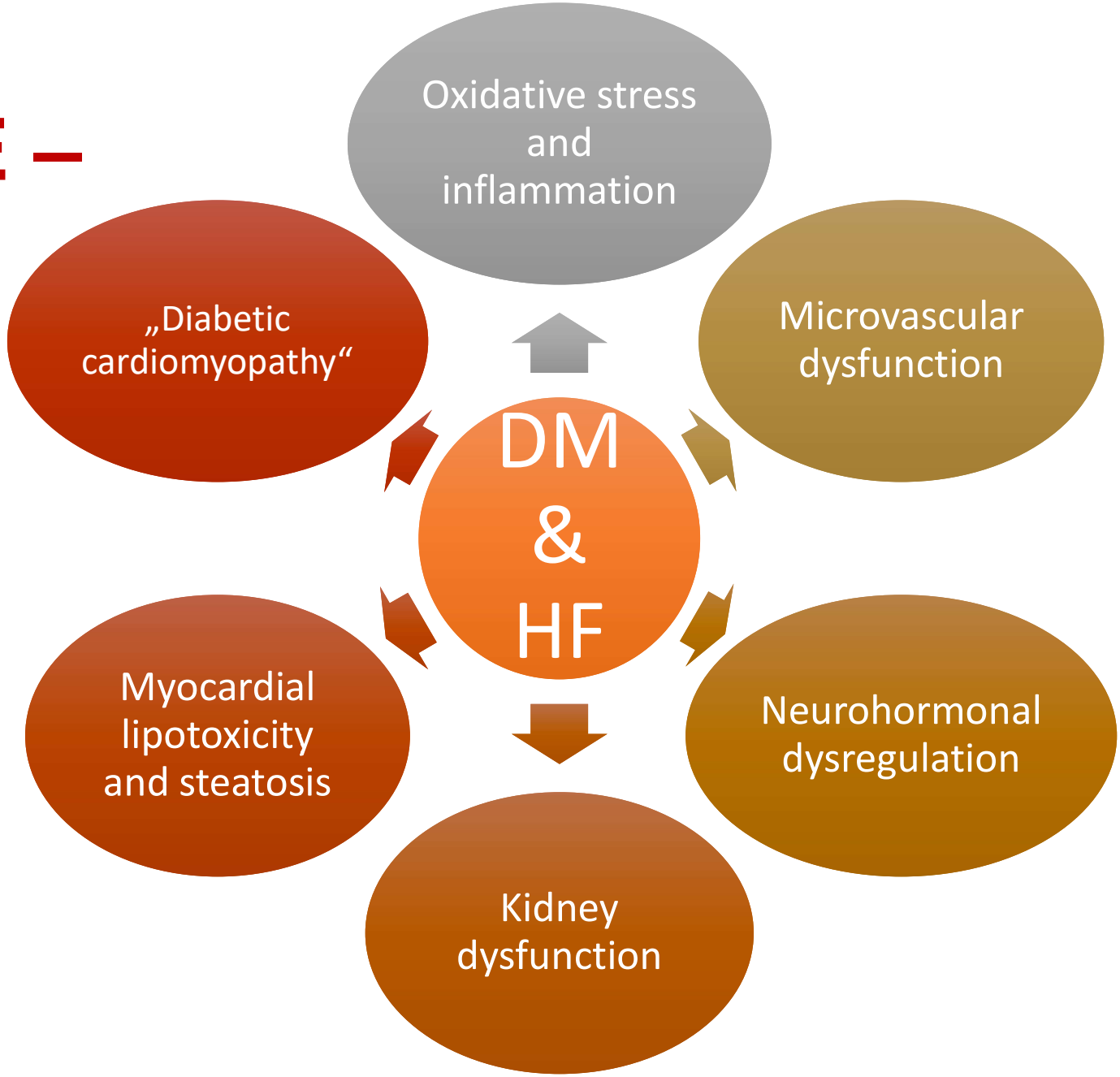
According to the
2023 Update of the Guidelines

- **indication for HFmrEF regardless of previous cardiac decompensation**
- **ID was defined as T-sat < 20% OR ferritin < 100 ng/ml**
- **level of evidence for treatment was up-graded to A**

Recommendations	Class[a]	Level
Intravenous iron supplementation is recommended in symptomatic patients with HFrEF and HFmrEF, and iron deficiency, to alleviate HF symptoms and improve quality of life.[c] [12,41,47–49]	I	A
Intravenous iron supplementation with ferric carboxymaltose or ferric derisomaltose should be considered in symptomatic patients with HFrEF and HFmrEF, and iron deficiency, to reduce the risk of HF hospitalization.[c] [12,41,43–46]	IIa	A

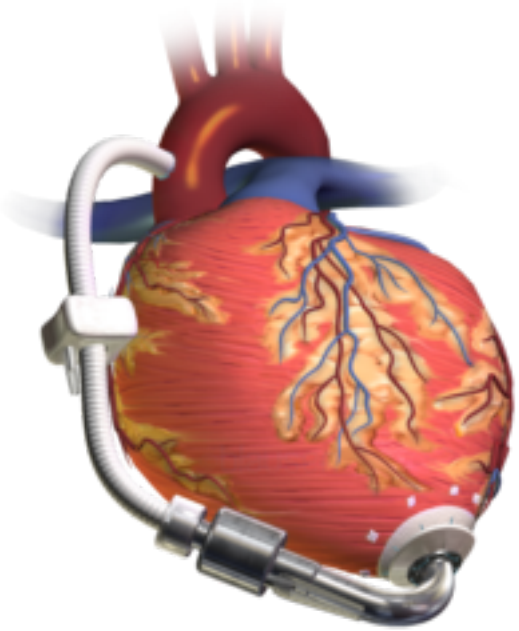
an P. Murphy, Inflammation in Heart Failure: JACC State-of-the-Art Review, Journal of the American College of Cardiology, 2020

IABETES AND EART FAILURE – IDIRECTIONAL ELATIONSHIP



DIABETES AND LVAD

- Approximately 40% of patients with HF also have diabetes mellitus
- In LVAD, peripheral vascular disease, hypertension, renal failure, ischaemia and dyslipidemia is more frequent in DM vs. non-DM patients
- Diabetes is a predictor of long-term mortality after LVAD implantation, mortality starts to increase 3 years after surgery



Crugnola, W, *Biomedicines* **2024**

Alexander Kogan *European Journal of Cardio-Thoracic Surgery*, 2022

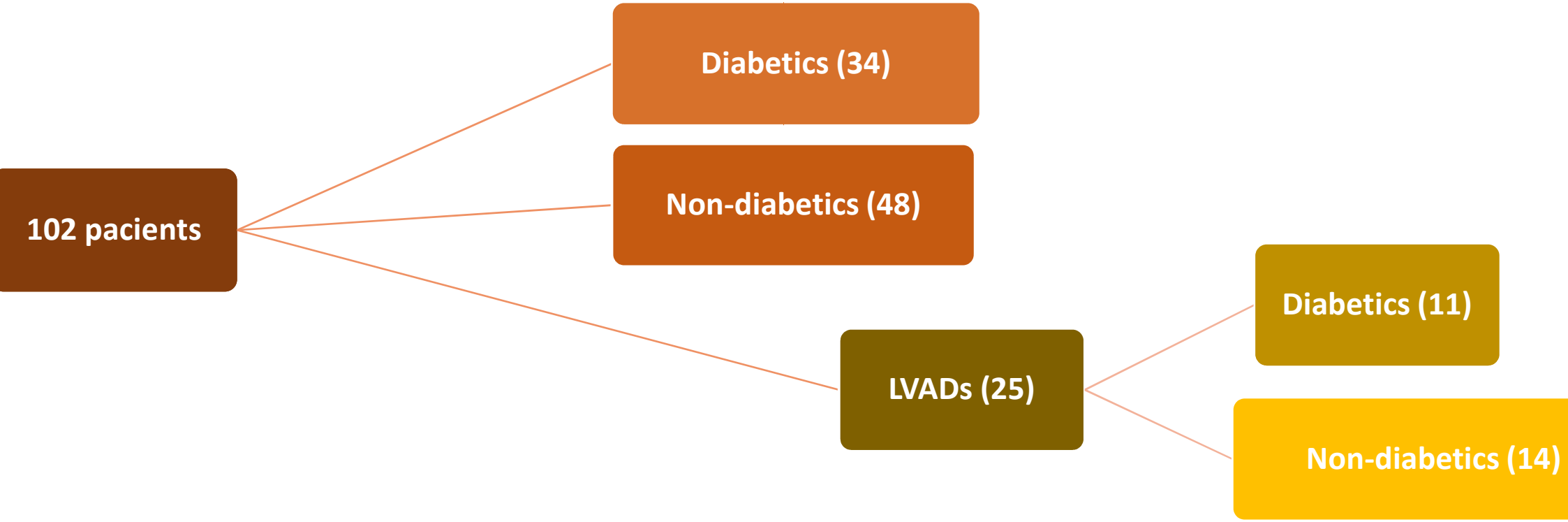
Yassin AS. Cardiovasc Revasc Med. 2019

STUDY AIM, METHODS, POPULATION

Objective: To explore the relationship between ID and diabetes in HF

Method: collecting ID parameters and statistical analysis

Analysis of ID prevalence betw diabetic and non-diabetic grou

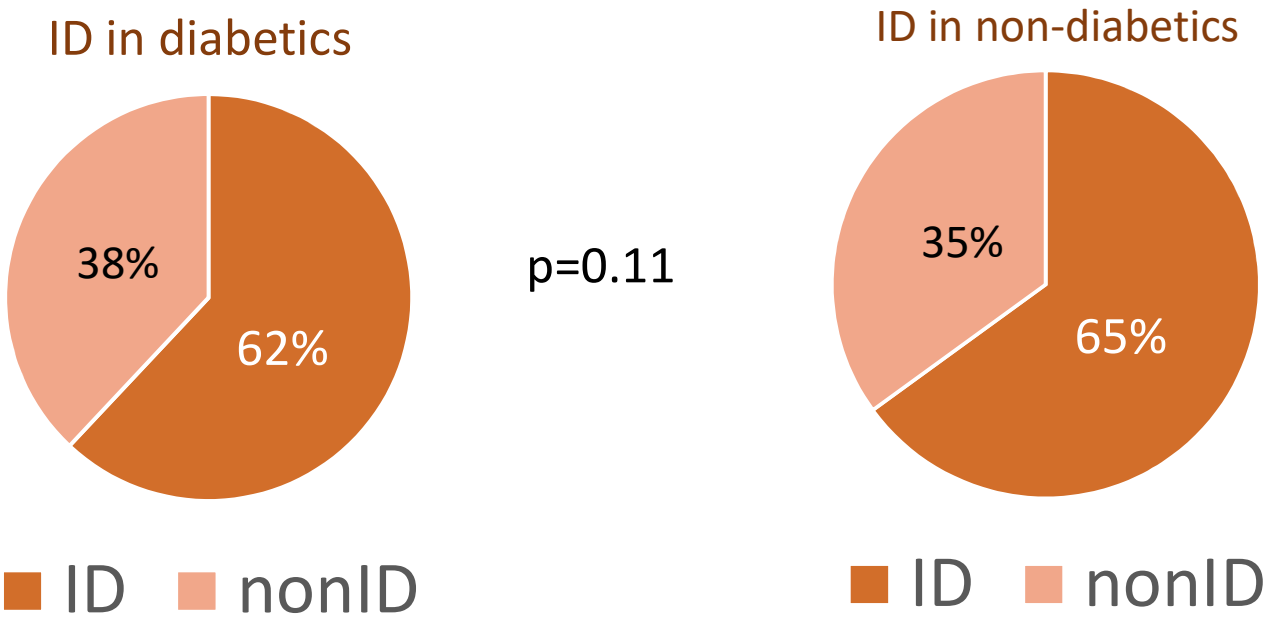


CHARACTERISTICS

Variables	All patients (102)	Diabetics (34)	Non-diabetics (68)	P-value
Age at inclusion, years	60	63	59	0.19
Gender, women, n (%)	22 (21%)	3 (8%)	19 (28%)	0.001
Cardiovascular parameters				
NYHA Class III-IV, n (%)	58 (56%)	20 (59%)	38 (55%)	0.23
LVEF, (%)	23	20	20	0.25
Laboratory parameters				
CRP (mg/L)	4.50	7.60	3.40	0.16
NT-proBNP (pg/mL)	1788	1605	1889	0.18
GFR (ml/s/1,73m^2)	0.98	0.77	1.05	0.004
Creatinine (µmol/l)	115	126	110	0.07
Haemoglobin (g/l)	142	143	140	0.25
Glycated Haemoglobin (mmol/mol)	43	60	40	<0.001

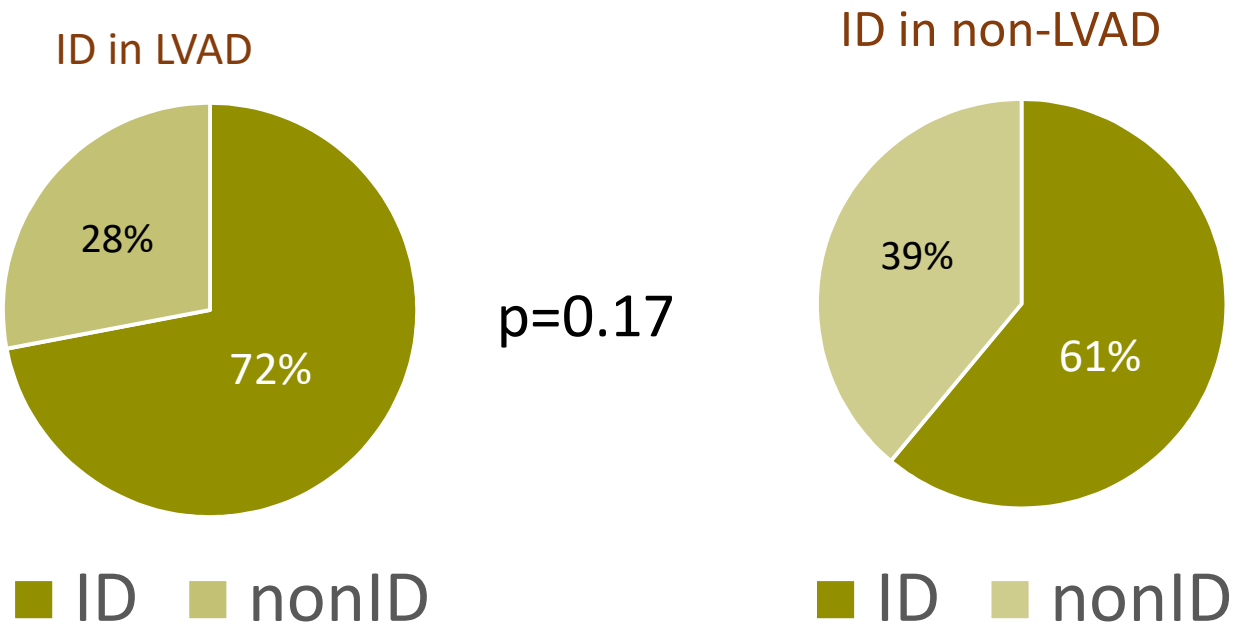
IRON PARAMETERS – DIABETICS x non-DIABETICS (regardless of LVAD)

Variables	Diabetics (34)	Non-diabetics (68)	P-value
T-sat	0.18	0.18	0.11
Ferritin (µg/L)	181.55	133	0.09
sTfR (mg/L)	1.78	1.62	0.13
Serum iron (µmol/L)	11.70	11.90	0.25



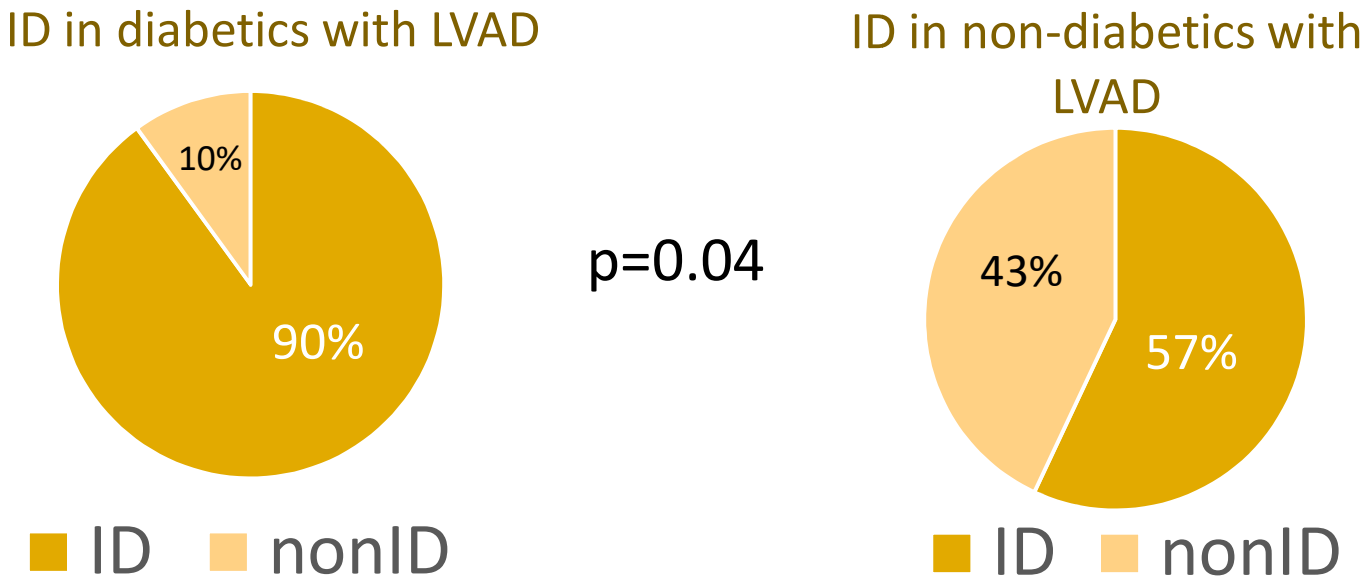
IRON PARAMETERS – LVADs x non-LVADs (regardless of DM)

Variables	LVADs (25)	Non-LVADs (77)	P-value
T-sat	0.19	0.18	0.17
Ferritin (µg/L)	105	145.5	0.18
sTfR (mg/L)	1.97	1.6	0.17
Serum iron (µmol/L)	12.5	11.6	0.17



IRON PARAMETERS
LVAD diabetics x non-diabetics

Variables	LVAD Diabetics (11 – 44%)	LVAD Non-diabetics (14 – 56%)	P-value
T-sat	0.16	0.22	0.04
Ferritin (µg/L)	105	118	0.05
sTfR (mg/L)	2.1	1.8	0.08
Serum iron (µmol/L)	10.7	14.05	0.04



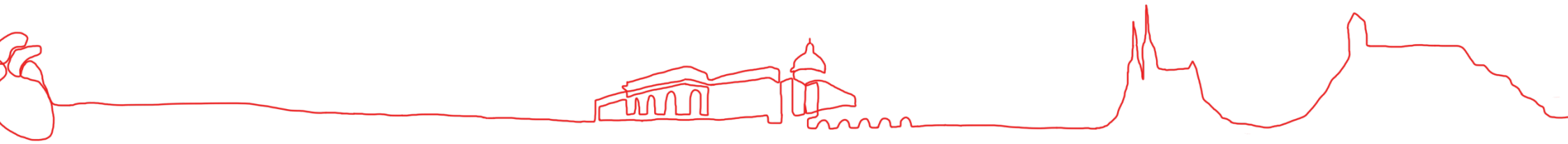
RENAL PARAMETERS
LVAD diabetics x non-diabetics

Variables	LVAD diabetics (11)	LVAD non-diabetics (14)	P-value
Creatinine	130	130.5	0.132
GFR	**0.69**	**0.82**	**0.013**
CRP	9.8	5	0.14

Correlations of renal parameters and CRP					
	Creatinine & T-sat	**Creatinine & ferritin**	**Creatinine & serum iron**	**Creatinine & sTfR**	**Creatinine & CRP**
R	0,020335691	**0,9234**	-0,289123922	-0,367	0.5
	GFR & T-sat	**GFR & ferritin**	**GFR & serum iron**	**GFR & sTfR**	**GFR & CRP**
R	0,266	**-0,925**	0,547	0,5469	**-0.7**

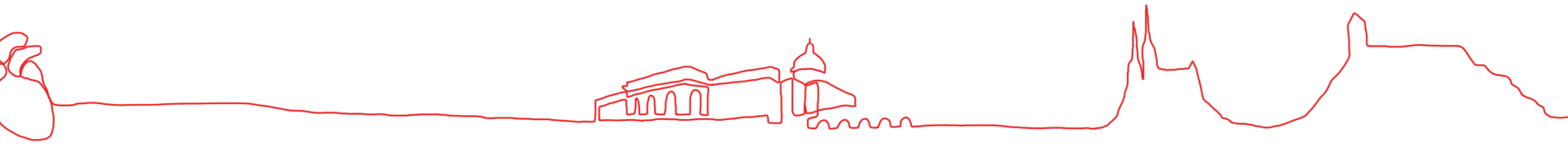
CONCLUSIONS

- The results from our clinic support studies reporting a high prevalence of ID in patients with HF.
- The prevalence of ID generally did not differ between patients with and without diabetes.
- In patients with LVAD, the prevalence of ID was higher but the difference was not statistically significant.
- In the LVAD group, the prevalence of ID was higher in diabetic patients.



CONCLUSIONS and DISCUSSION

- U diabetiků s LVAD byla významná korelace mezi ferritinem a renálními parametry (GFR a kreatinin). Jiné parametry železa s GFR a kreatininem nekorelovali.
- Lze uvažovat, že tato korelace vyjádřuje prezentaci ferritinu jakožto parametru zánětlivé odpovědi.
- Můžeme předpokládat, že tento vztah vyjádřuje zánětlivé podmínky při přítomnosti několika agens výrazně podporující zánět - srdeční selhání, diabetes mellitus a LVAD.



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bakosova.maria@fnusa

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