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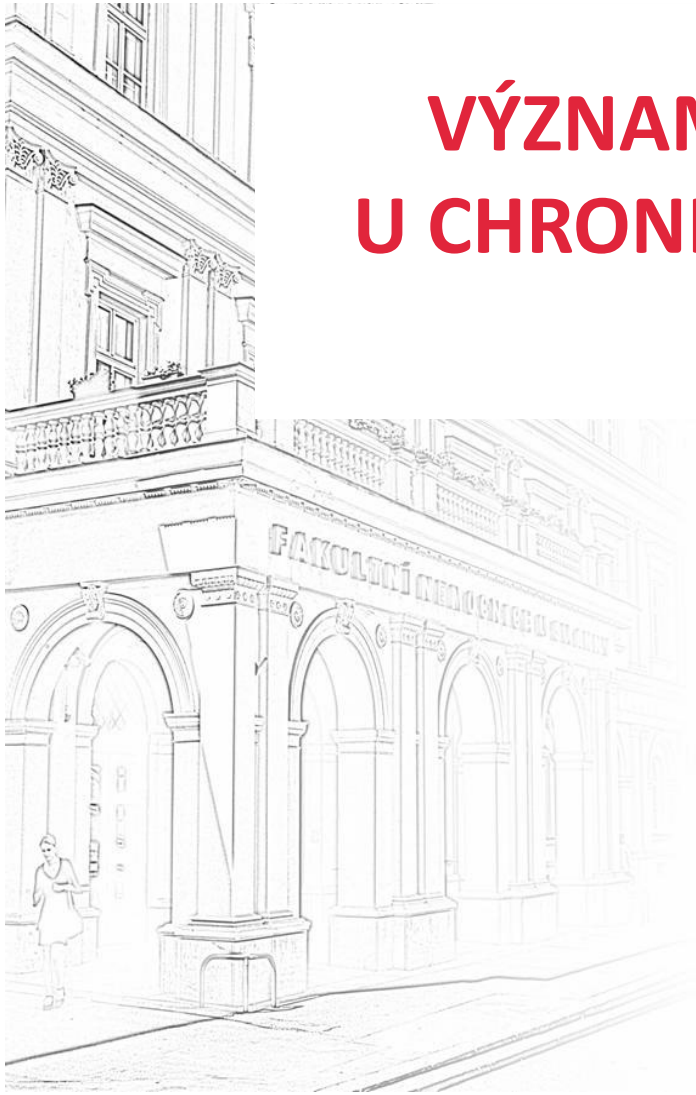


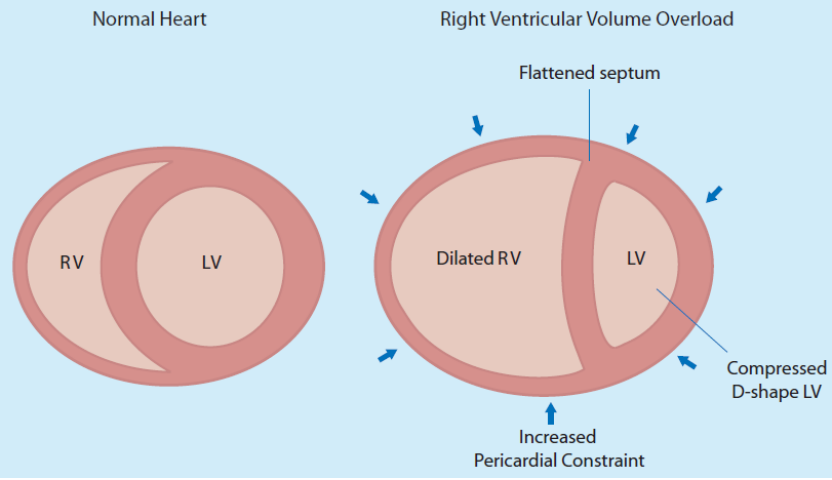
VÝZNAM FUNKCE PRAVÉ KOMORY U CHRONICKÉHO SRDEČNÍHO SELHÁNÍ

(HFrEF a HFpEF)

Jan Krejčí

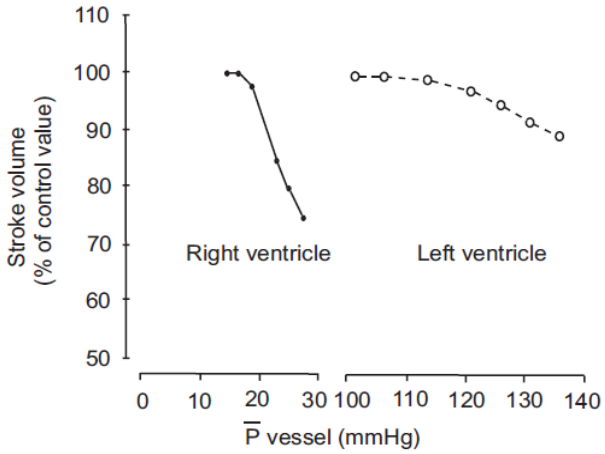
Prognóza nemocných se srdečním selháním

- EF LK je nejvýznamnějším prediktorem prognózy u nemocných s HFrEF
- U nemocných s nízkou EF LK již ale ztrácí prognostický význam
- V této skupině nemocných se ukazuje jako významný prediktor mortality i morbidity funkce PK



Pravá komora srdeční

- PK je afterload dependentní
- nejčastější příčinou dysfunkce PK je plicní hypertenze
- dysfunkce LK je nejčastější příčinou PH a tím i selhání PK
- může se objevovat u HFpEF i HFrEF



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Význam funkce pravé komory u srdečního selhání

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Right Ventricular Function in Cardiovascular Disease, Part II

Pathophysiology, Clinical Importance, and Management of Right Ventricular Failure

François Haddad, MD; Ramona Doyle, MD; Daniel J. Murphy, MD; Sharon A. Hunt, MD

…mnoho prací…negativní prognostický význam dysfunkce PK

Table 4. Selected Studies Assessing the Prognostic Value of RV Function in HF

Study	Population	NYHA Class (%)	n	RV Dysfunction Criteria	Main Findings (Significant Findings)
Polak et al,[42] 1983	CAD	II–IV	34	RVEF <35%	23% survival (RVD) vs 71% survival at 2 y
Di Salvo et al,[39] 1995	CAD, IDC	III–IV	67	RVEF <35%	RVD and % Vo_2-independent predictors of survival at 2 y
De Groote et al,[38] 1998	CAD, IDC	II–III	205	RVEF <35%	RVD, maximal Vo_2, NYHA-independent predictors of survival at 2 y
Ghio et al,[41] 2001	CAD, IDC	III–IV (70)	377	RVEF <35%	Incremental value of PAP and RV function in predicting event-free survival
Sun et al,[44] 1997	IDC	III–IV (74)	100	RV area/LV area >0.5	RV enlargement independent predictor of survival
Meluzin et al,[43] 2005	CAD, IDC	II–IV	140	RVMPI >1.20, IVA <2.52 cm/s, TAV <10.8 cm/s	RVMPI and TDI indexes were predictive of mortality or event-free survival

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Independent and Additive Prognostic Value of Right Ventricular Systolic Function and Pulmonary Artery Pressure in Patients With Chronic Heart Failure

Stefano Ghio, MD, FESC,* Antonello Gavazzi, MD, FESC,* Carlo Campana, MD,* Corinna Inserra, MD,* Catherine Klersy, MD,† Roberta Sebastiani, MD,* Eloisa Arbustini, MD,‡ Franco Recusani, MD,* Luigi Tavazzi, MD, FESC, FACC*

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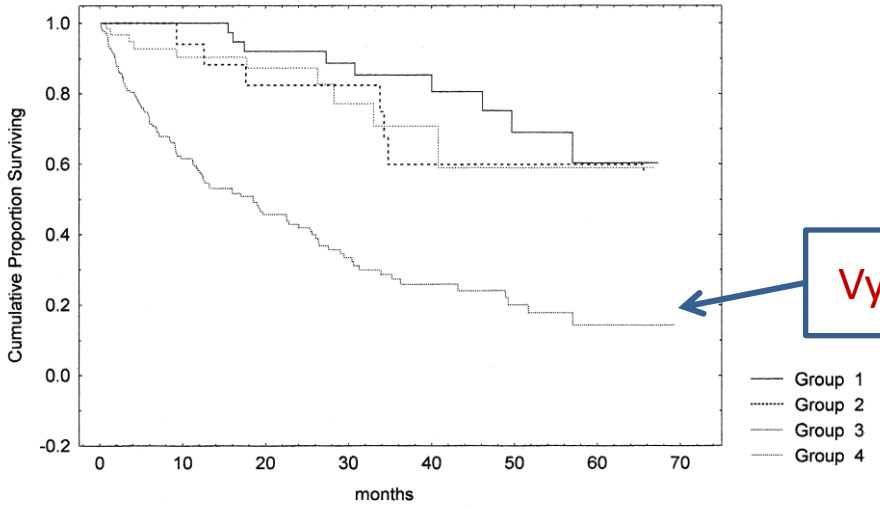

Vysoký PAP + nízká RVEF

Figure 3. Survival rates without urgent heart transplantation in patients grouped according to the coupling between mean pulmonary artery pressure (PAP) and right ventricular ejection fraction (RVEF). Group 1 = normal PAP/preserved RVEF (n = 73); group 2 = normal PAP/low RVEF (n = 68); group 3 = high PAP/preserved RVEF (n = 21); and group 4 = high PAP/low RVEF (n = 215).

ZÁVĚR

Kombinace hemodynamických a funkčních parametrů PK umožňuje prognostickou stratifikaci nemocných se SS

Table 2. Results From Cox Multivariate Analysis of Survival

Variable	Hazards Ratio	95% Confidence Interval	p Value
RVEF (per each 5-U decrement)	1.26	1.10–1.46	0.001
NYHA functional class (III or IV vs. II)	2.7	1.4–5.1	0.003
LVESDI (per each 5-mm increment)	1.20	1.04–1.40	0.013
Mean PAP (per each 5-mm Hg increment)	1.10	1.0–1.21	0.047

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Prognostic Importance of the Right Ventricular Function Assessed by Doppler Tissue Imaging

J. Meluzín[1], L. Špinarová[1], L. Dušek[2], J. Toman[1], P. Hude[1] and J. Krejčí[1]

[1]*1st Department of Internal Medicine, St. Anna Hospital, Masaryk University, Brno, Czech Republic; and*
[2]*Centre of Biostatistics and Analyses, Masaryk University, Brno, Czech Republic*

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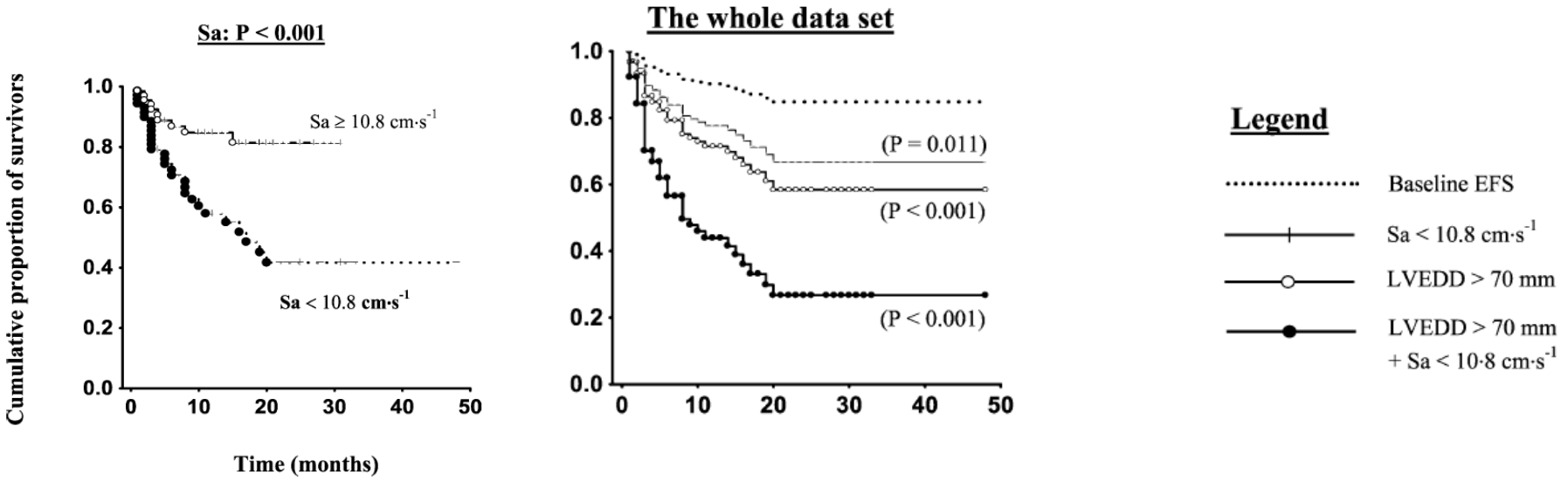

ZÁVĚR

Kombinace snížené Sa a dilatace LVEDD jsou spojeny s nejhorší prognózou u nemocných se SS

Eur J Echocardiogr. 2003 Dec;4(4):262-71

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Right ventricular dysfunction as an independent predictor of short- and long-term mortality in patients with heart failure☆

Jesper Kjaergaard [a,*], Dilek Akkan [a], Kasper Karmark Iversen [a], Lars Køber [a], Christian Torp-Pedersen [b], Christian Hassager [a]

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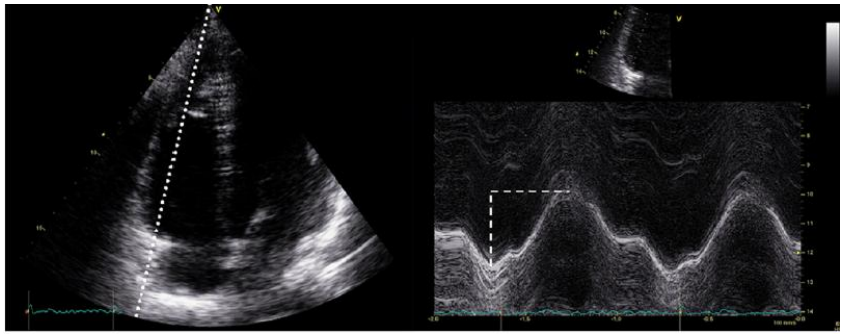

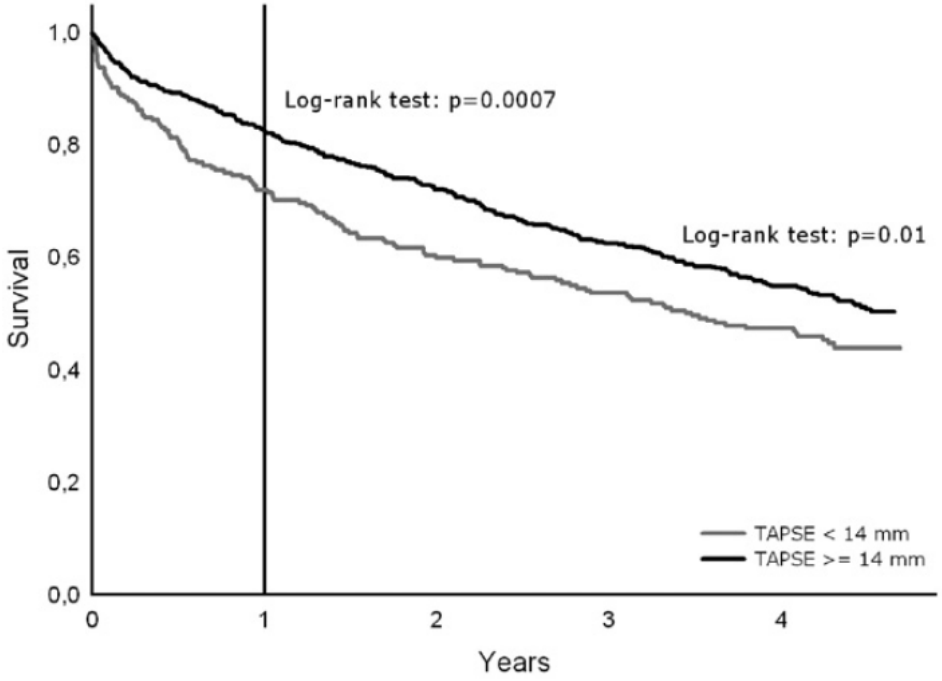

ZÁVĚR

Snížená systol fce PK (TAPSE) je spojena s vyšší mortalitou u nemocných přijatých pro SS a je nezávislá na jiných rizikových faktorech včetně EF LK.

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Right ventricular recovery during follow-up is associated with improved survival in patients with chronic heart failure with reduced ejection fraction

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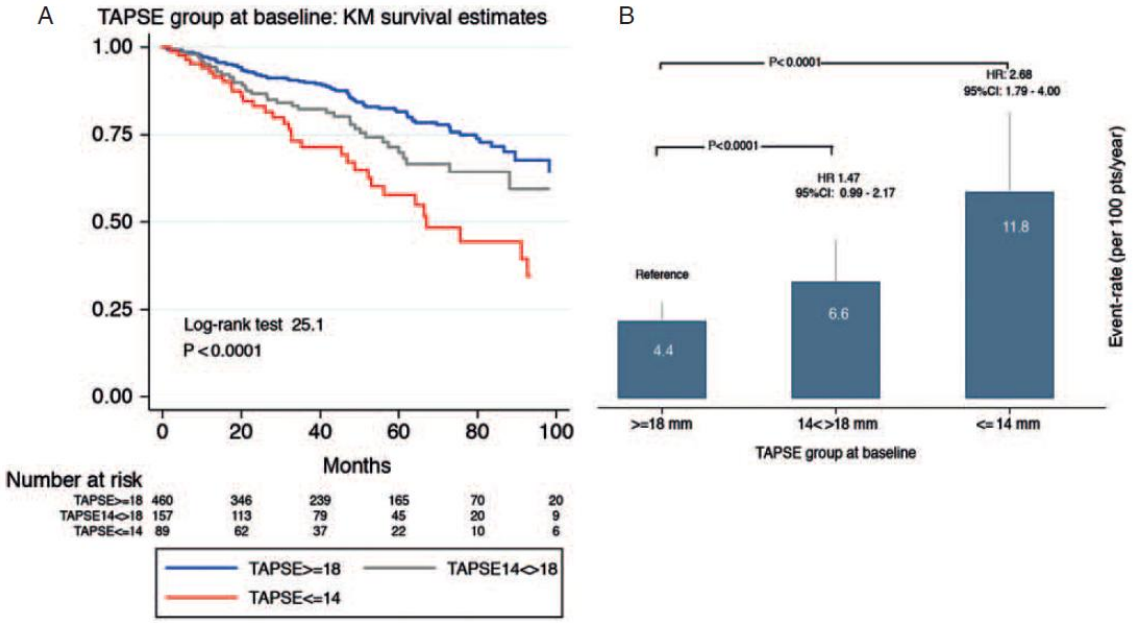
Frank Lloyd Dini[1]*, Erberto Carluccio[2], Anca Simioniuc[1], Paolo Biagioli[2], Gianpaolo Reboldi[3], Gian Giacomo Galeotti[1], Claudia Raineri[4], Luna Gargani[5], Laura Scelsi[4], Giulia Elena Mandoli[1], Antonia Cannito[4], Andrea Rossi[6], Pier Luigi Temporelli[7], and Stefano Ghio[4], on behalf of the Network Labs Ultrasound (NEBULA) in Heart Failure Study Group

TAPSE at baseline

All patients	Preserved	Slightly reduced	Severely reduced
$n = 706$	(≥18 mm), $n = 460$	(14<>18 mm), $n = 157$	(≤14 mm), $n = 89$

Prognostický význam vstupních hodnot TAPSE



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Right ventricular recovery during follow-up is associated with improved survival in patients with chronic heart failure with reduced ejection fraction

Frank Lloyd Dini[1]*, Erberto Carluccio[2], Anca Simioniuc[1], Paolo Biagioli[2], Gianpaolo Reboldi[3], Gian Giacomo Galeotti[1], Claudia Raineri[4], Luna Gargani[5], Laura Scelsi[4], Giulia Elena Mandoli[1], Antonia Cannito[4], Andrea Rossi[6], Pier Luigi Temporelli[7], and Stefano Ghio[4], on behalf of the Network Labs Ultrasound (NEBULA) in Heart Failure Study Group

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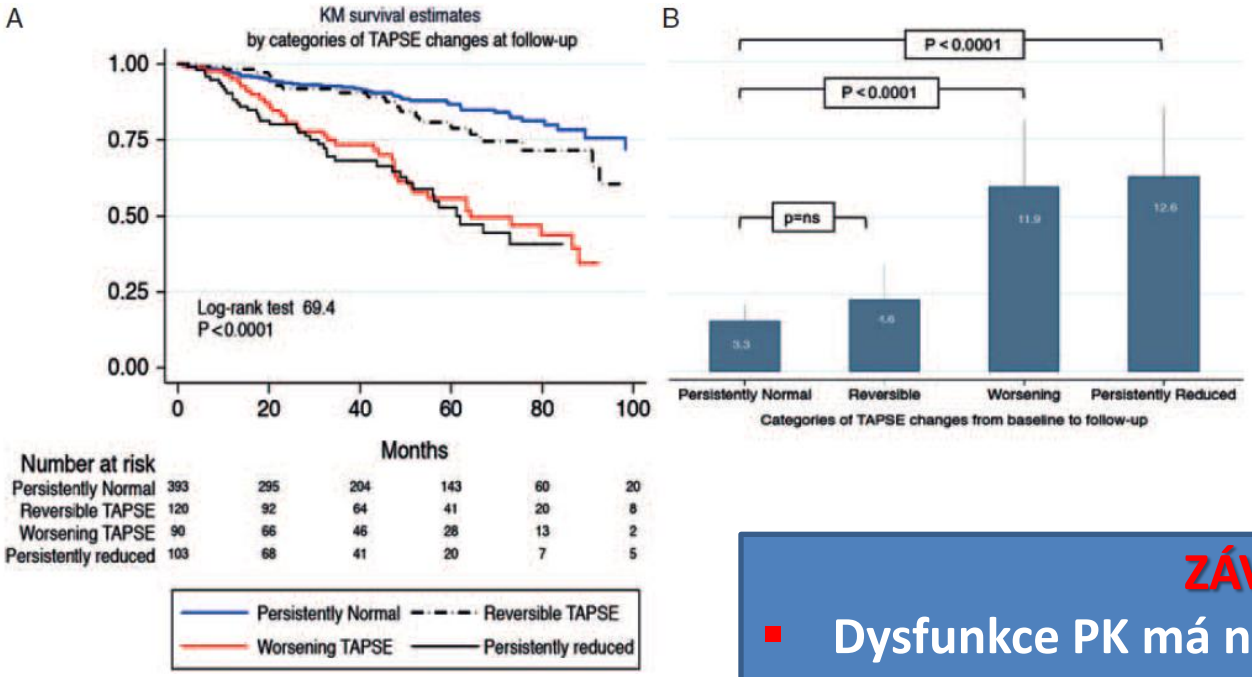
Prognostický význam změny TAPSE



ZÁVĚR

- Dysfunkce PK má negativní prognostický význam.
- Pacienti s původně nízkým TAPSE, u kterých došlo ke zlepšení, mají stejnou prognózu jako ti s pův. norm. hodnotou

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Right Ventricular Function in Peripartum Cardiomyopathy at Presentation Is Associated With Subsequent Left Ventricular Recovery and Clinical Outcomes

Lori A. Blauwet, MD; Antonia Delgado-Montero, MD; Keiko Ryo, MD, PhD; Josef J. Marek, MD; Rami Alharethi, MD; Paul J. Mather, MD; Kalgi Modi, MD; Richard Sheppard, MD; Vinay Thohan, MD; Jessica Pisarcik, BSN; Dennis M. McNamara, MD; John Gorcsan III, MD; for the IPAC Investigators*

Circ Heart Fail. 2016;9:e002756. DOI: 10.1161/CIRCHEARTFAILURE.115.002756.

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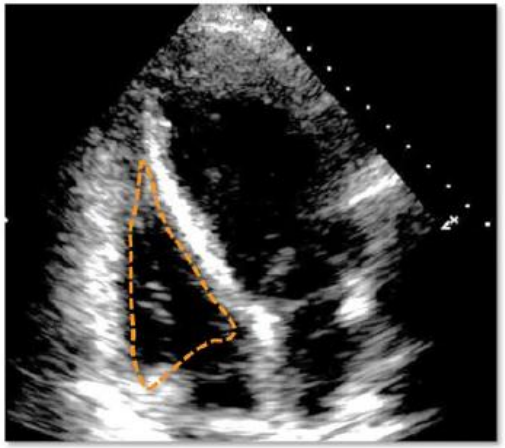
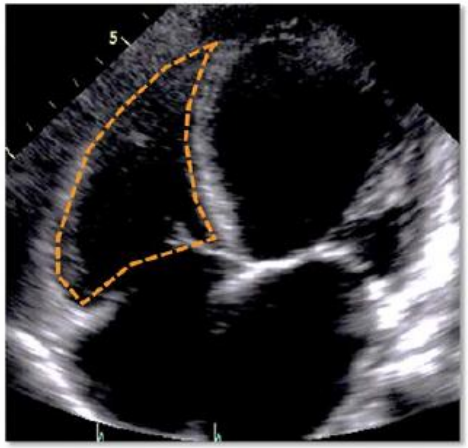
30-year-old PPCM patient



Baseline LVEF:	32%
RV EDA:	17.8 cm^2
RV ESA:	10.3 cm^2
RV FAC:	42%
Follow-up LVEF:	56%

22-year-old PPCM patient



Baseline LVEF:	19%
RV EDA:	28.6 cm^2
RV ESA:	20.0 cm^2
RV FAC:	30%
Follow-up LVEF:	20%

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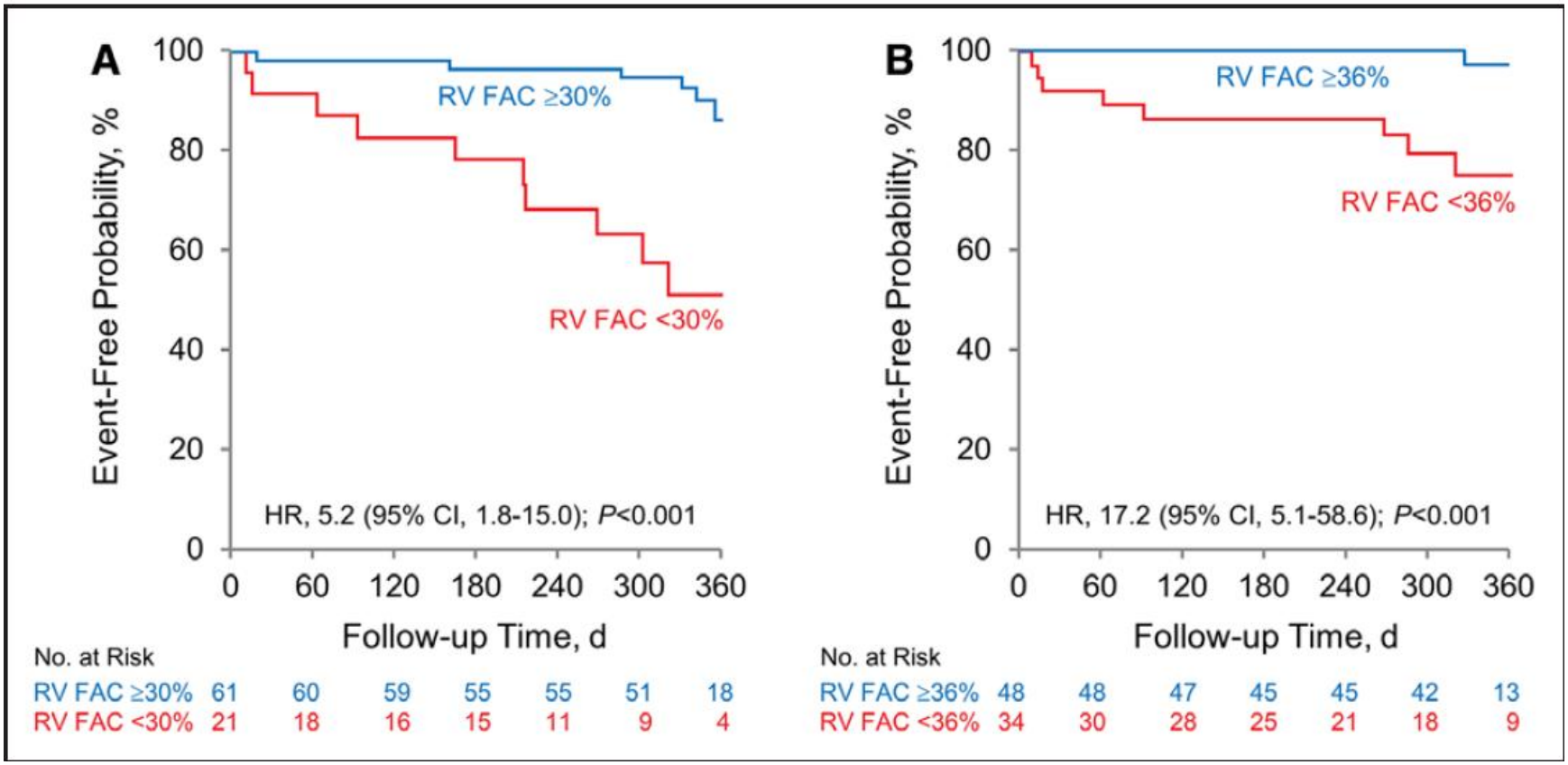
Vztah RV FAC a

Nepřítomnost zlepšení LVEF nad 50% nebo klinická příhoda (smrt, HTx, LVAD)

Perzistující dysfunkce LK s LVEF pod 35% nebo klinická příhoda



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Výsledky

Table 4. Univariable and Multivariable Analysis of Predictors of Lack of Left Ventricular Recovery (Left Ventricular Ejection Fraction <50%) or Unfavorable Clinical Event (n=84)

Predictor	Hazard Ratio*	95% CI	*P* Value
Univariable			
Age, y	0.97	0.90–1.04	0.41
Black race	2.10	0.87–5.02	0.09
LVEF, %	0.91	0.86–0.95	<0.001
LV EDD, mm	1.10	1.03–1.17	0.03
RV FAC, %	0.94	0.91–0.97	<0.001
RV EDA, cm^2	1.09	1.02–1.17	0.02
RV ESA, cm^2	1.13	1.06–1.22	<0.001
RV free wall strain, %	1.13	1.04–1.24	0.006
RV global strain, %	1.26	1.09–1.46	0.002
TAPSE, mm	0.97	0.89–1.06	0.52
Multivariable			
RV FAC, %	0.95	0.92–0.99	0.02
RV ESA, cm^2	1.08	1.00–1.17	0.06
RV free wall strain, %	1.07	0.96–1.19	0.24

Table 5. Univariable and Multivariable Analysis of Predictors of Persistent Severe Left Ventricular Dysfunction (Left Ventricular Ejection Fraction ≤35%) or Unfavorable Clinical Event (n=84)

Predictor	Hazard Ratio*	95% CI	*P* Value
Univariable			
Age, y	0.93	0.85–1.03	0.19
Black race	2.97	0.90–9.80	0.08
LVEF, %	0.86	0.80–0.92	<0.001
LV EDD, mm	1.11	1.03–1.21	0.01
RV FAC, %	0.92	0.84–0.96	<0.001
RV EDA, cm^2	1.10	1.02–1.17	0.02
RV ESA, cm^2	1.17	1.06–1.29	0.002
RV free wall strain, %	1.15	1.00–1.21	0.05
RV global strain, %	1.26	1.04–1.27	0.009
TAPSE, mm	0.89	0.78–1.01	0.08
Multivariable			
RV FAC, %	0.93	0.87–0.99	0.04
RV ESA, cm^2	1.10	0.98–1.23	0.11
RV free wall strain, %	1.07	0.89–1.24	0.59

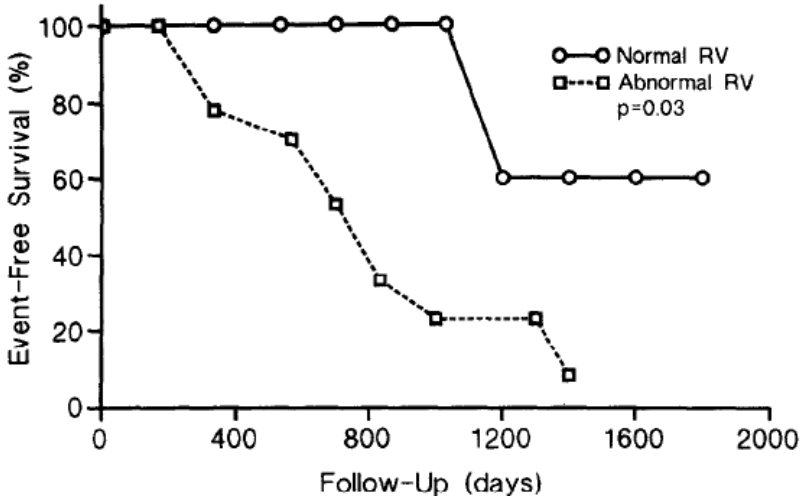
Význam funkce pravé komory u myokarditid

Right ventricular dysfunction: An independent predictor of adverse outcome in patients with myocarditis

To assess the predictive value of right ventricular systolic function in patients with active myocarditis, the echocardiograms of 23 patients with biopsy-confirmed myocarditis were reviewed. Right ventricular systolic function was evaluated qualitatively and quantitatively by descent of the right ventricular base. Patients were divided into those with normal right ventricular function, in whom right ventricular descent was 1.9 ± 0.1 cm, and those with abnormal right ventricular function, in whom right ventricular descent was 0.8 ± 0.1 cm ($p < 0.001$). There were no differences between the two groups in age, duration of symptoms, baseline hemodynamics, or histologic assessment. Initial left ventricular ejection fraction was significantly lower in patients with depressed right ventricular function (27.5 ± 4.9%) compared with that in patients with normal right ventricular function (47.5 ± 6.3%) ($p = 0.01$). The likelihood of an adverse outcome, defined as death or need for cardiac transplantation, was greater in patients with abnormal right ventricular function (right ventricular descent ≤ 1.7 cm) than in patients with normal right ventricular function (right ventricular descent > 1.7 cm) ($p < 0.03$). Multivariate analysis revealed that right ventricular dysfunction as quantified by right ventricular descent was the most powerful predictor of adverse outcome. (Am Heart J 1994;128:301-7.)

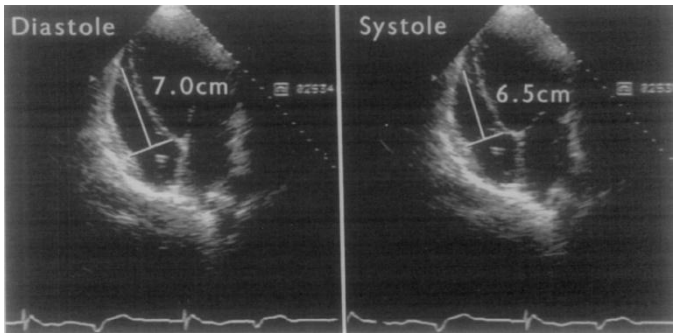
Lisa A. Mendes, MD, G. William Dec, MD, Michael H. Picard, MD,
Igor F. Palacios, MD, John Newell, BA, and Ravin Davidoff, MBBCh *Boston, Mass.*

- jediná práce na 23 nemocných



ZÁVĚR

- Pravděpodobnost úmrtí nebo transplantace byla vyšší v přítomnosti dysfunkce PK
- V multivariantní analýze byla dysfunkce PK nejsilnějším prediktorem špatné prognózy



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Right heart dysfunction in heart failure with preserved ejection fraction

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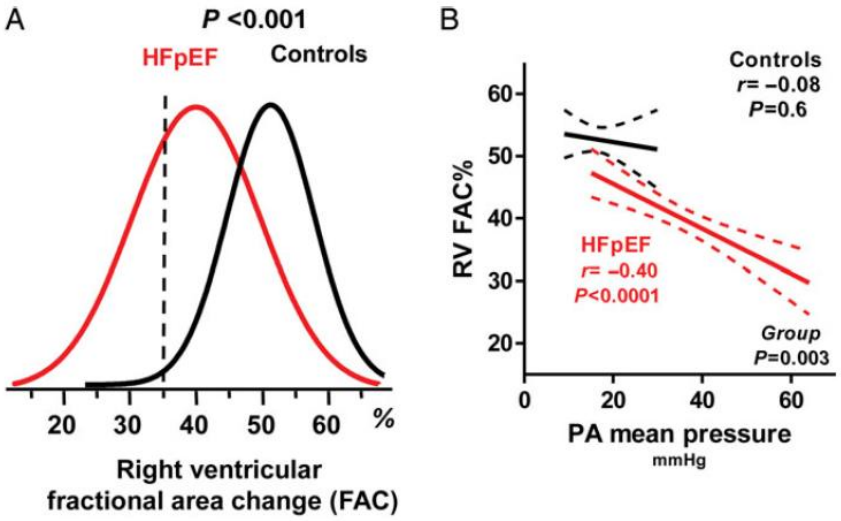
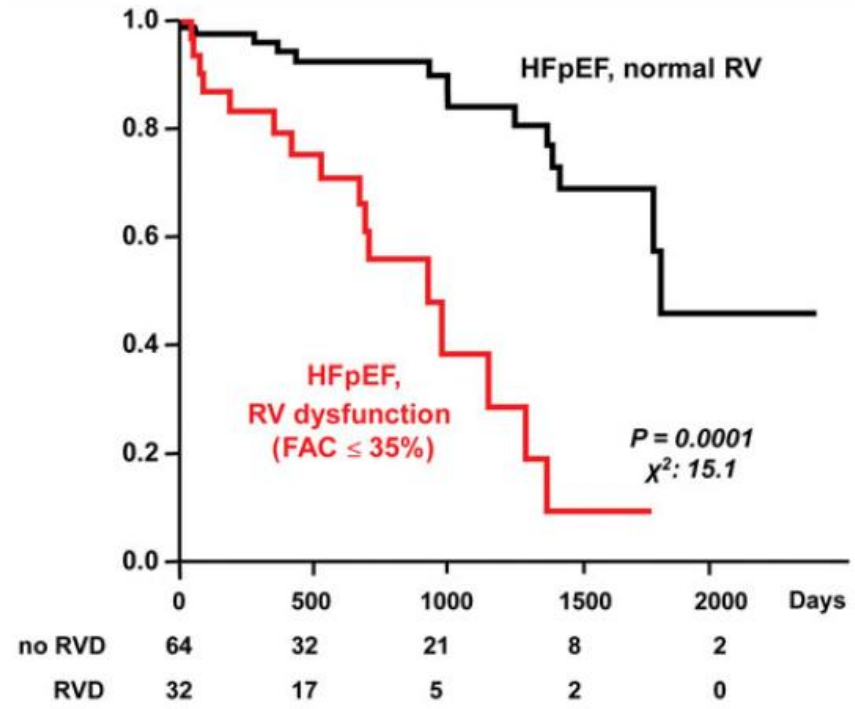
Vojtech Melenovsky[1,2]*, Seok-Jae Hwang[1], Grace Lin[1], Margaret M. Redfield[1], and Barry A. Borlaug[1]

[1]Division of Cardiovascular Diseases, Department of Medicine, Mayo Clinic, Rochester, MN, USA; and [2]Department of Cardiology, Institute of Clinical and Experimental Medicine – IKEM, Videnska 1958/9, Prague 4 140 28, Czech Republic





ZÁVĚR

- Dysfunkce PK je častá a je spojena s horším přežívání nemocných s HFpEF
- Je způsobena jednak kontraktilní dysfunkcí PK a také zvýšením tlaku v PA

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Abnormal right ventricular-pulmonary artery coupling with exercise in heart failure with preserved ejection fraction

Barry A. Borlaug*, Garvan C. Kane, Vojtech Melenovsky, and Thomas P. Olson

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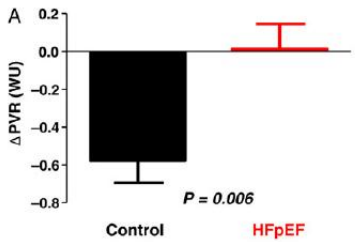
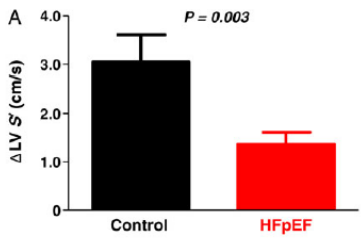
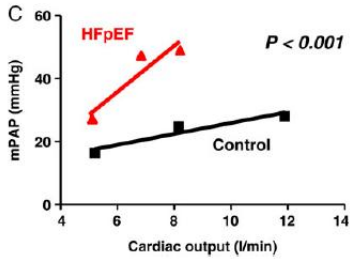
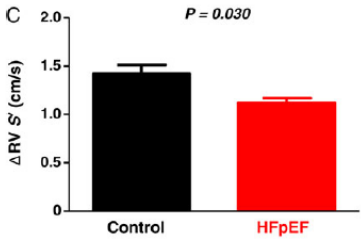
	Baseline		20 W exercise		Peak exercise		*P*-value[a]
	Control	HFpEF	Control	HFpEF	Control	HFpEF	
Central haemodynamics							
RAP (mmHg)	4 ± 2	10 ± 4*	8 ± 3	21 ± 5*	8 ± 4	22 ± 6*	<0.001
PASP (mmHg)	27 ± 6	41 ± 12*	37 ± 10	66 ± 12*	41 ± 9	70 ± 13*	<0.001
mPAP (mmHg)	16 ± 4	27 ± 8*	25 ± 7	47 ± 10*	27 ± 6	48 ± 8*	<0.001
Ventricular mechanics							
RV e′ (cm/s)	11 ± 5	12 ± 9	13 ± 5	11 ± 5	19 ± 9	12 ± 6	0.010
RV s′ (cm/s)	12 ± 3	11 ± 3	13 ± 4	10 ± 3	14 ± 4	11 ± 3	0.044
LV e′ (cm/s)	8.5 ± 2.1	6.9 ± 2.0†	10 ± 3	7 ± 2	13 ± 5	8 ± 3*	<0.001
LV s′ (cm/s)	7.5 ± 1.9	6.4 ± 1.5†	8 ± 2	7 ± 2‡	11 ± 3	8 ± 2†	0.025









ZÁVĚR

- Patologická reakce na zátěž je ovlivněna nejen funkcí LK, ale také dysfunkcí PK
- HFpEF je biventrikulární onemocnění
- ovlivnění hemodyn. v malém oběhu jako terapeutický cíl?

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Impaired Right Ventricular–Pulmonary Arterial Coupling and Effect of Sildenafil in Heart Failure With Preserved Ejection Fraction

An Ancillary Analysis From the Phosphodiesterase-5 Inhibition to Improve Clinical Status And Exercise Capacity in Diastolic Heart Failure (RELAX) Trial

Imad Hussain, MBBS; Selma F. Mohammed, MBBS; Paul R. Forfia, MD; Gregory D. Lewis, MD; Barry A. Borlaug, MD; Dianne S. Gallup; Margaret M. Redfield, MD

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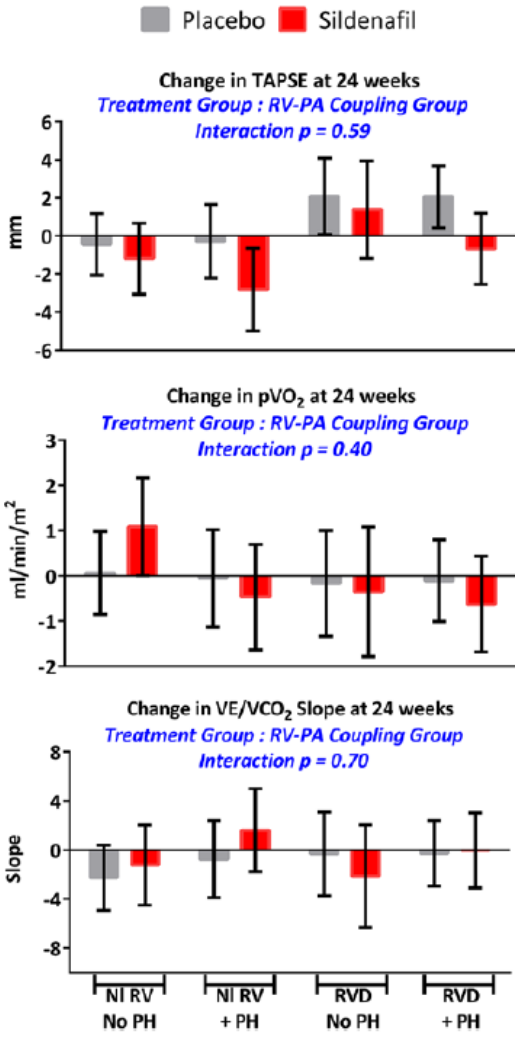

ZÁVĚR

- Podobně jako v celé studii RELAX nebyl prokázán příznivý efekt sildenafilu na funkci PK, toleranci zátěže či ventilační efektivitu u nemocných s HFpEF

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Děkuji za pozornost !