# VPLYV TRANSAPIKÁLNEHO PRÍSTUPU PRI TAVI NA GLOBÁLNU FUNKCIU ĽAVEJ KOMORY

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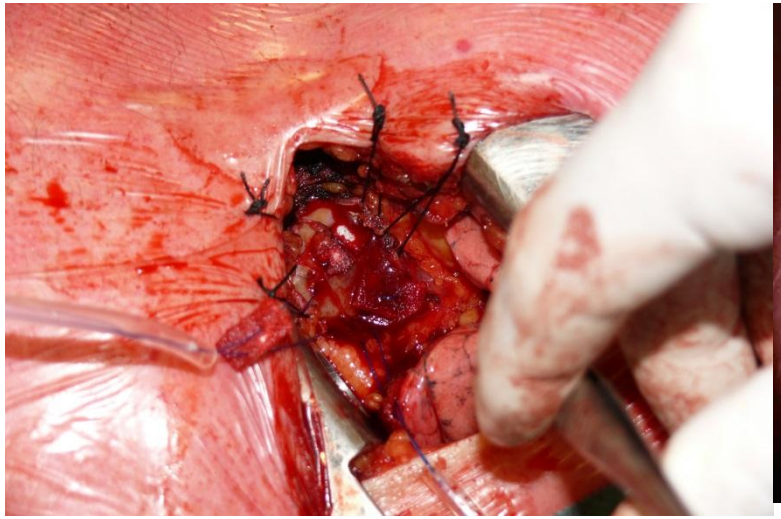
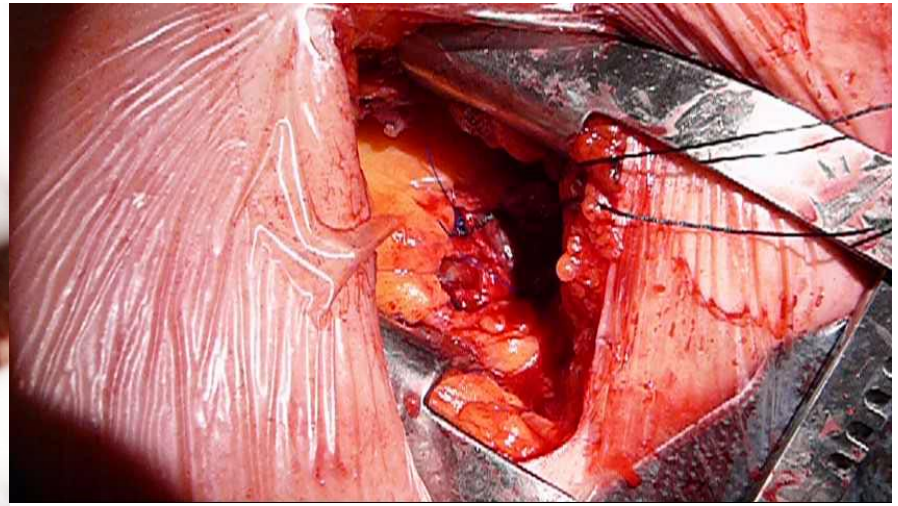
# Vplyv TA-TAVI na LVEF

- TAVI dnes zaužívaná metóda AVR u starých, polymorbidných, vysoko rizikových pc
- TF a TA prístupy najčastejšie

# Debaty a obavy o negat. vplyve apikálneho prístupu na funkciu ľavej komory a prežívanie pacientov





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# Regional left ventricular function after transapical vs. transfemoral transcatheter aortic valve implantation analysed by cardiac magnetic resonance feature tracking

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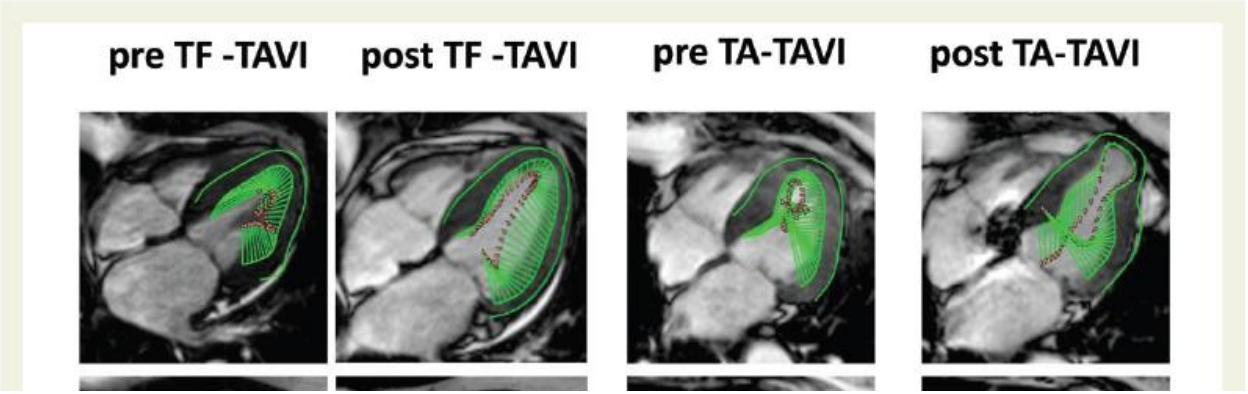
**Aims** This study analysed the impact of transapical (TA) vs. transfemoral (TF) access site transcatheter a
tation (TAVI) on post-procedural regional left ventricular (LV) function using cardiac magnetic
feature tracking (FT).

**Methods and results** CMR was performed 3 months after TAVI on 44 consecutive patients with normal LV ejection fraction prior to TAVI. Twenty patients had TA-TAVI, and 24 had TF-TAVI. Standard cine imaging was performed in three standard cardiac long-axis views (two-, four- and three-chamber views). Myocardial peak systolic radial strain (PSRS) and peak systolic longitudinal strain (PSLS) were analysed based on CMR-FT considering 49 segments in each of the three views. There were no differences in PSRS and PSLS for the basal and mid-ventricular segments between TA- and TF-TAVI groups. In contrast, PSRS and PSLS of apical segments and apical cap were reduced in the TA- compared with the TF-TAVI group (PSRS: 15.7 ± 6.4 vs. 35.9 ± 15.7%, respectively, $P < 0.001$; PSLS: −8.9 ± 5.3 vs. −16.9 ± 4.3%, respectively, $P < 0.001$). Comparison of all non-apical segments vs. apical segments and apical cap demonstrated no difference in the TF group (PSRS: 34.6 ± 9.0 vs. 35.9 ± 15.7%; respectively, $P = 0.702$; PSLS: −17.8 ± 4.6 vs. −16.9 ± 4.3%; respectively, $P = 0.802$). After TA-TAVI, PSRS and PSLS of the apical segments were reduced compared with the non-apical segments (PSRS: 15.7 ± 6.4 vs. 33.5 ± 7.0%, respectively, $P < 0.001$; PSLS: −8.9 ± 5.3 vs. −15.5 ± 3.5%, respectively, $P < 0.001$).

**Conclusion** Apical LV function abnormalities can be detected at 3-month follow-up in all TA-TAVI patients using CMR-FT. TA-TAVI results in significant impairment of apical LV function compared with TF-TAVI.

## Study design and patient population

*Figure 1* illustrates the number of patients approached, patients withdrawn, and also patients finally included into the study. Between January 2011 and July 2012, 96 patients underwent TAVI for severe symptomatic calcified native aortic valve stenosis at this hospital. Patients included in this study had to have normal LV EF prior to the TAVI procedure as defined by echocardiography and no history of myocardial infarction, had to be in sinus rhythm without significant ventricular ectopy, and had to have no significant regurgitation of the mitral valve (Sellers ≥2). Furthermore, patients with pacemaker therapy for conduction defects were excluded. Finally, 44 consecutive patients (22 males, mean age 82.5 ± 6.3 years) fulfilling these criteria in whom a TAVI procedure was performed from either the TA or the TF access site were included in the study and underwent CMR at 3-month follow-up (*Figure 1*). In the last 10 patients (5 patients in the TA-TAVI group and 5 patients in the TF-TAVI group), CMR was performed before the TAVI procedure and at 3-month follow-up to allow serial analysis of LV function.




# Conclusion

There are significant differences in regional LV function after TA-TAVI vs. TF-TAVI as demonstrated by CMR-FT. While there are no regional wall motion abnormalities after TF-TAVI, regional LV function abnormalities can be detected after TA-TAVI affecting the apical cap and apical level.

Christian G. Meyer1et al. Left ventricular function after TAVI, European Heart Journal – Cardiovascular Imaging (2014) 15, 1168–1176, doi:10.1093/ehjci/jeu103

# Predictors and Impact of Myocardial Injury After Transcatheter Aortic Valve Repl

## A Multicenter Registry

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**ABSTRACT**

**BACKGROUND** Cardiac biomarker release signifying myocardial injury post-transca
(TAVR) is common, yet its clinical impact within a large TAVR cohort receiving differ
approaches is unknown.

**OBJECTIVES** This study sought to determine the incidence, clinical impact, and fac
biomarker elevation post TAVR.

**METHODS** This multicenter study included 1,131 consecutive patients undergoing TA
or self-expandable (42%) valves. Transfemoral and transapical (TA) approaches were
patients, respectively. Creatine kinase-myocardial band (CK-MB) measurements were obtained at baseline and at several time points within the initial 72 h post TAVR. Echocardiography was performed at baseline and at 6- to 12-month follow-up.

**RESULTS** Overall, 66% of the TAVR population demonstrated some degree of myocardial injury as determined by a rise in CK-MB levels (peak value: 1.6-fold [interquartile range (IQR): 0.9 to 2.8-fold]). A TA approach and major procedural complications were independently associated with higher peak of CK-MB levels ($p < 0.01$ for all), which translated into impaired systolic left ventricular function at 6 to 12 months post TAVR ($p < 0.01$). A greater rise in CK-MB levels independently associated with an increased 30-day, late (median of 21 [IQR: 8 to 36] months) overall and cardiovascular mortality ($p < 0.001$ for all). Any increase in CK-MB levels was associated with poorer clinical outcomes, and there was a stepwise rise in late mortality according to the various degrees of CK-MB increase after TAVR ($p < 0.001$).

**CONCLUSIONS** Some degree of myocardial injury was detected in two-thirds of patients post TAVR, especially in those undergoing TA-TAVR or presenting with major procedural complications. A greater rise in CK-MB levels associated with greater acute and late mortality, imparting a negative impact on left ventricular function.
(J Am Coll Cardiol 2015;66:2075–88) 

**PERSPECTIVES**

**COMPETENCY IN MEDICAL KNOWLEDGE:** Evidence of myocardial injury emerges commonly in patients after TAVR. Predictors of injury include a transapical approach, operator/center early experience, procedural complications such as major bleeding, device embolism, and need for a second prosthesis or surgery. More severe myocardial injury (particularly CK-MB >5 times the upper limit or normal) is associated with late LV dysfunction and increased acute and late mortality.

**TRANSLATIONAL OUTLOOK:** Future studies are needed to identify patients before TAVR who are at greatest risk of periprocedural myocardial injury and to develop management strategies to minimize its adverse impact on clinical outcomes.

# Myocardial injury following transcatheter aortic valve implantation: insights from delayed-enhancement cardiovascular magnetic resonance

Henrique B. [illegible]
Luis Nombel
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## Impact on daily practice

age. This is also supported by a previous study in an experimental model showing that apical puncture closure with a device (without the sutures) did not cause LV myocardial fibrosis beyond the access site[15]. Importantly, the necrotic mass was ~3 g and represented ~5% of the left ventricular myocardial mass. This amount of necrosis is similar to that observed in the context of percutaneous coronary intervention (PCI)[13], where new myocardial necrosis is detected in ~25% of cases, also extending to a mean of 5% of the LV mass[13]. However, this amount of myocardial injury by LGE

Figure 4. *Degree and extent of myocardial necrosis at the apex before and after TAVI (transapical approach patients).*

## Impact of Changes in Left Ventricular Ejection Fraction on Survival After Transapical Aortic Valve Implantation

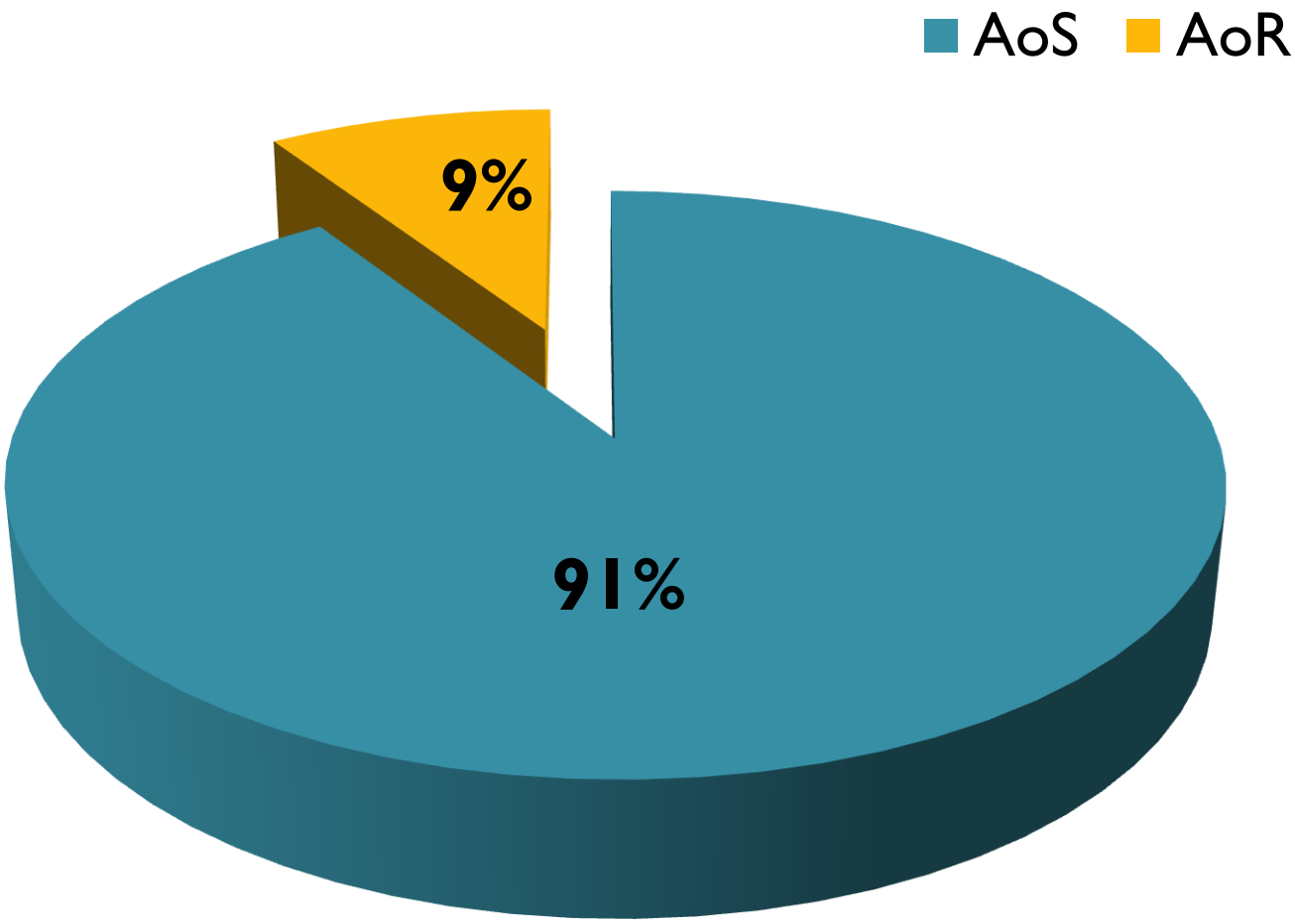
### *Conclusions*

According to our data, LVEF changes after TA-TAVI do not seem to have a significant effect on patient outcomes. The chance of LVEF improvement is higher in patients with a severely depressed preoperative LVEF (<0.35). Sheath diameter reduction is not associated with significant LVEF changes. As a result of these findings, concerns about ventricular function worsening after TA-TAVI should be reduced, and the TA access should not be contraindicated in patients with poor LVEF preoperatively.

# TA- TAVI
# Skúsenosti České Budějovice

- Cieľ : retrospektívne zhodnotenie našeho súboru pacientov po TA-TAVI
- Celkom 141 pacientov
- Nezaradení pacienti po TMVI
- Metodika : EF- TTE/TEE – kalkulovaná pomocou biplanárnej Simpson metódy

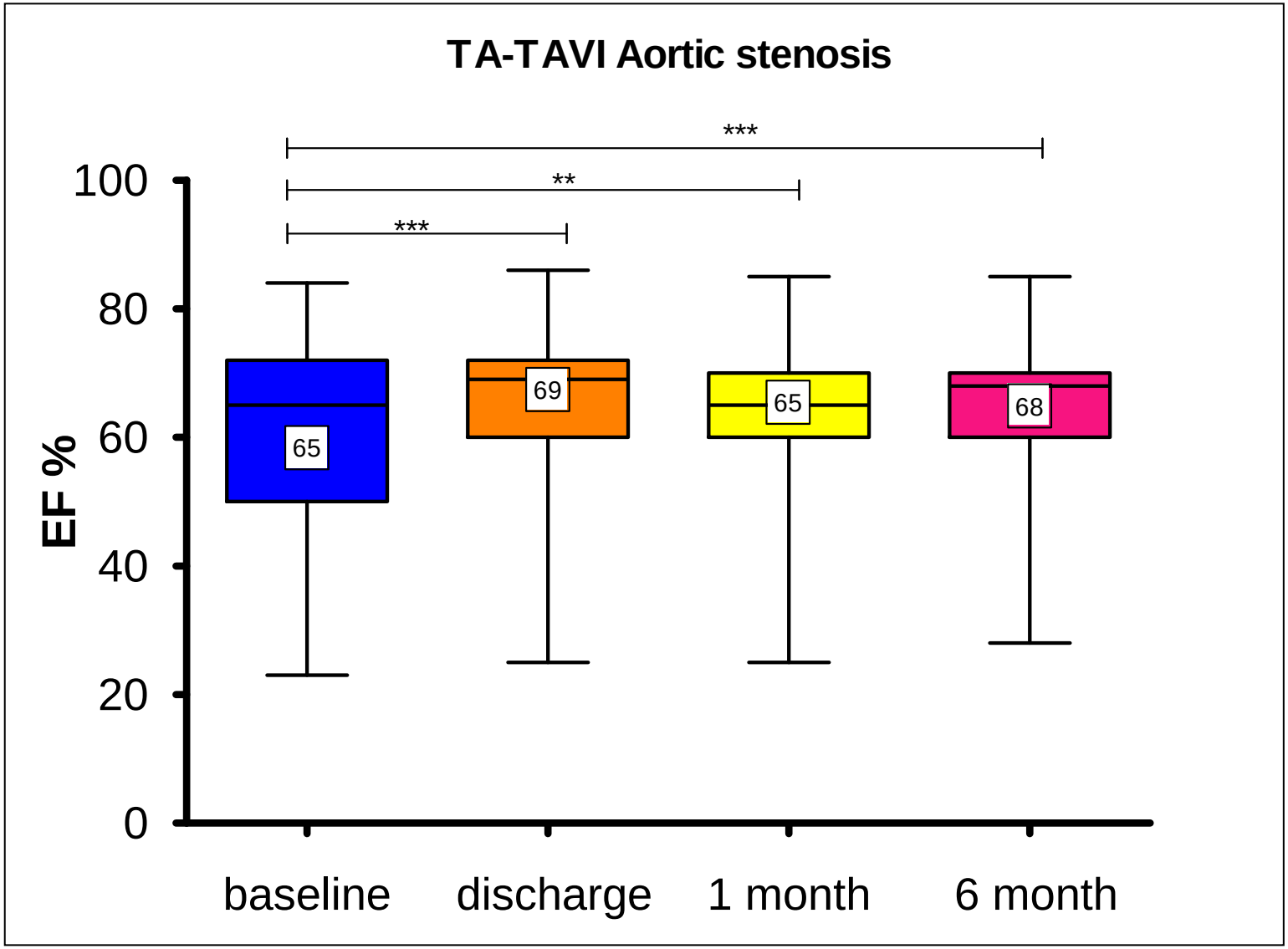
# Skúsenosti České Budějovice Rozloženie dľa typu aortálnej vady, No 141



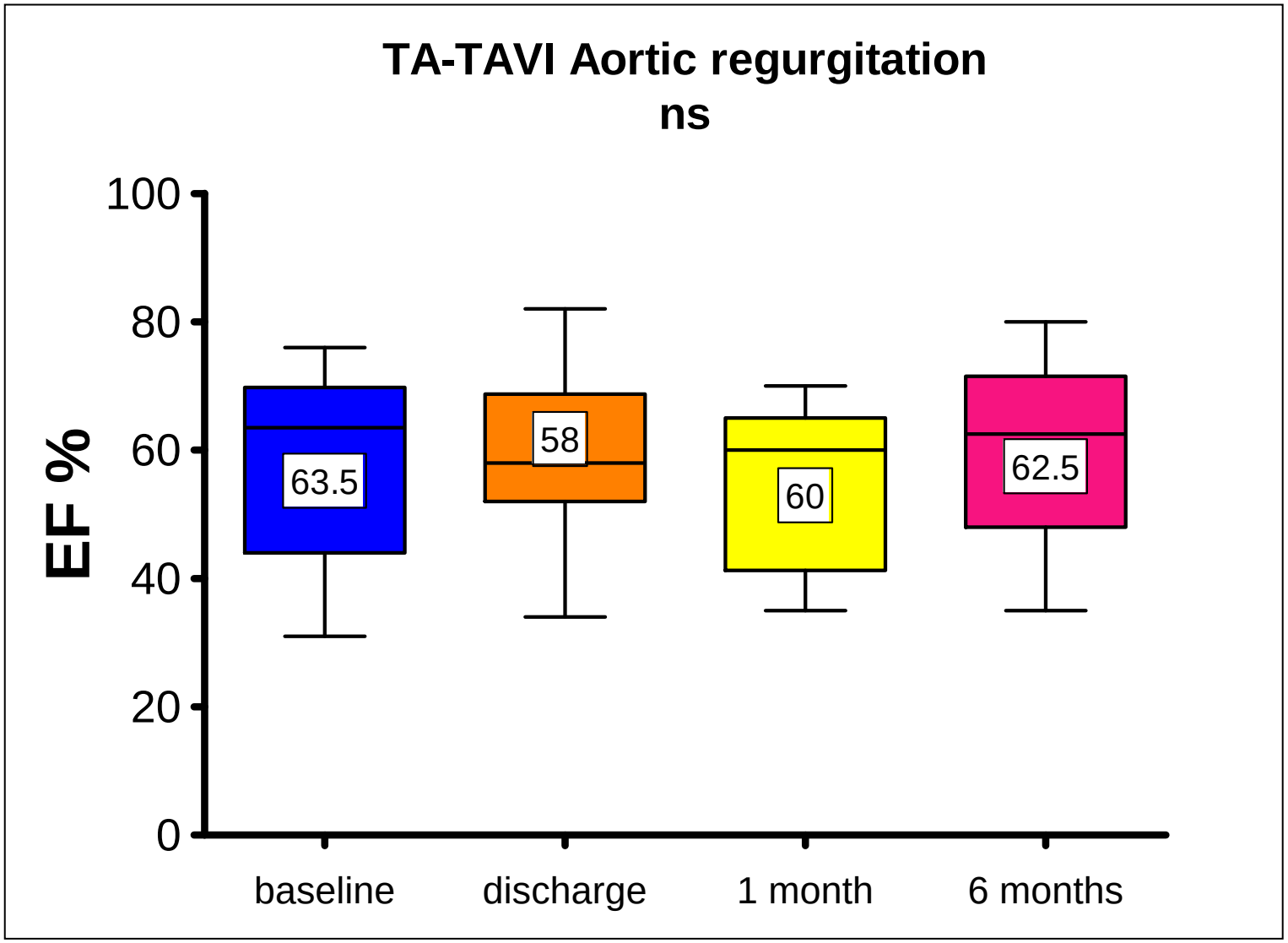
# Predoperačné údaje dľa typu aortálnej vady

| TA- TAVI No 141 pc | Ao stenoza (128) | Ao regurgitácia (13) |
|---|---|---|
| Vek | **79.96** | 71.67 |
| log EuroScore (%) | 19.7 | 21 |
| PG (mmHg) | 71.99 | 54.08 |
| MG (mmHg) | **43.96** | 34.08 |
| AVAi ($cm^2/cm^2$) | 0.40 | 0.59 |
| EF (%) | **60** | 58 |

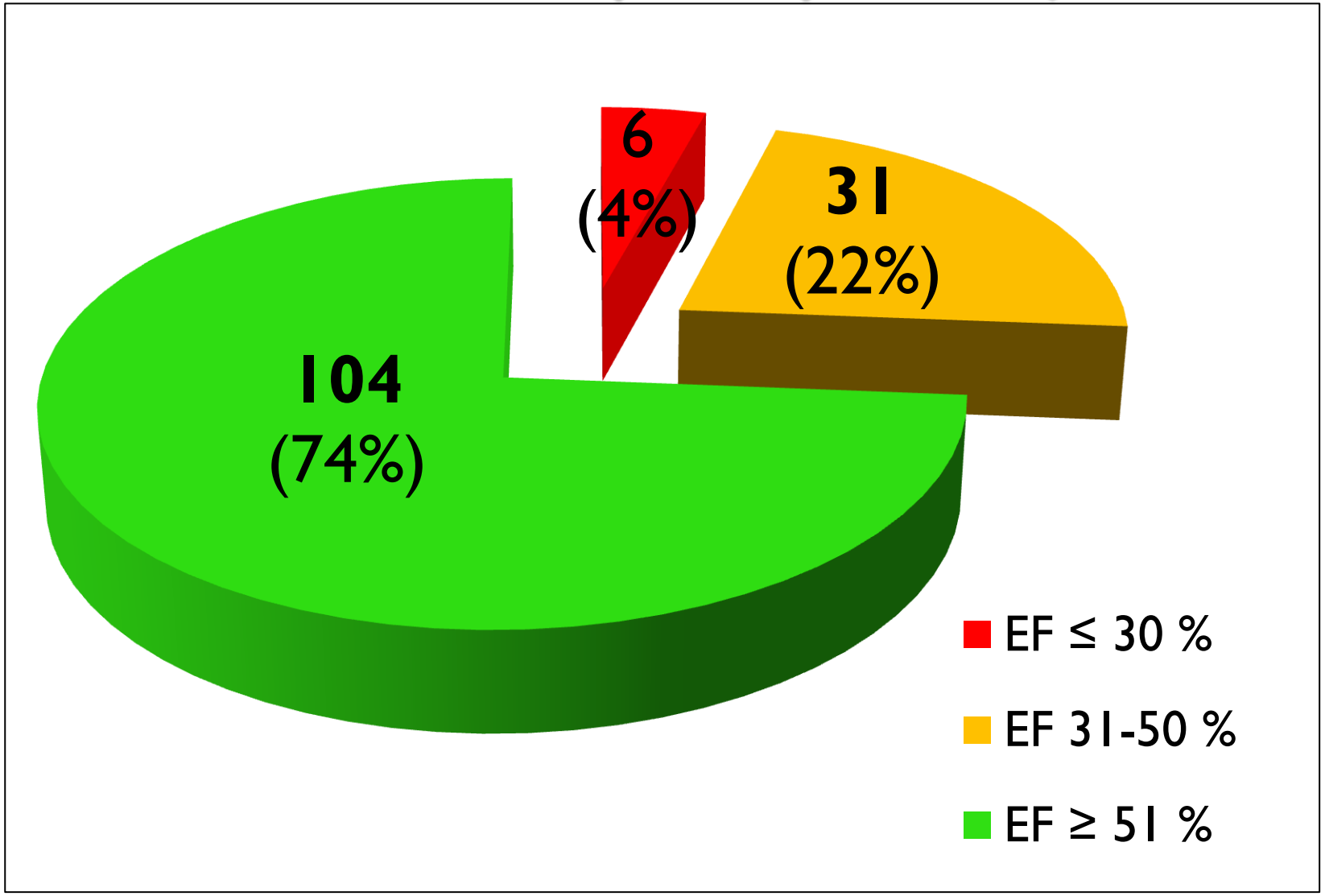
# Zmena EF pri aortálnej stenóze



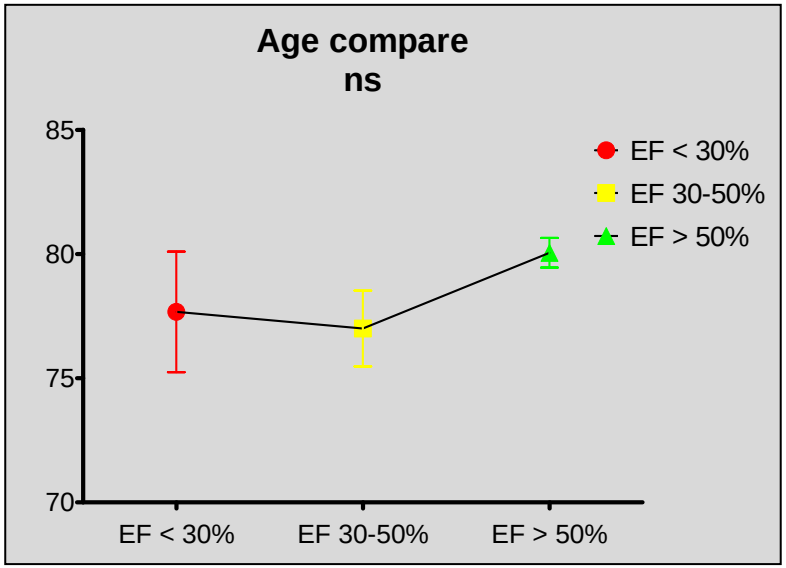
# Zmena EF pri aortálnej insuficiencii

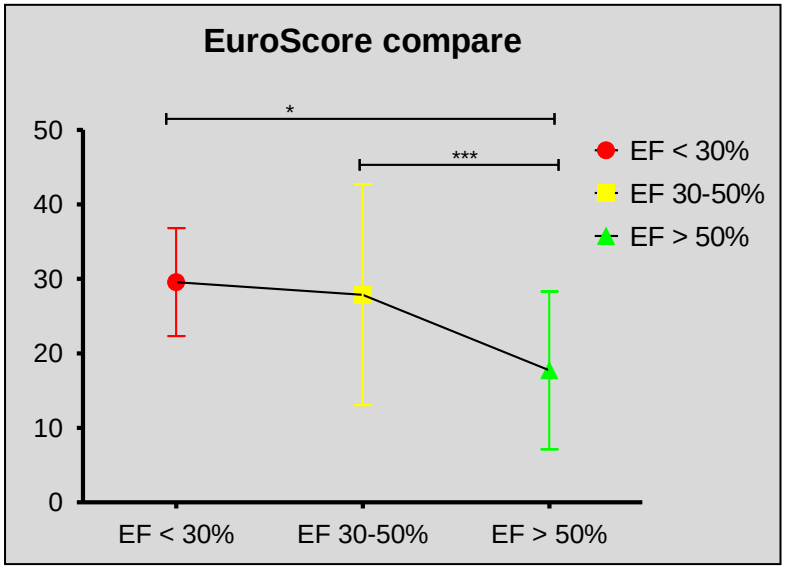


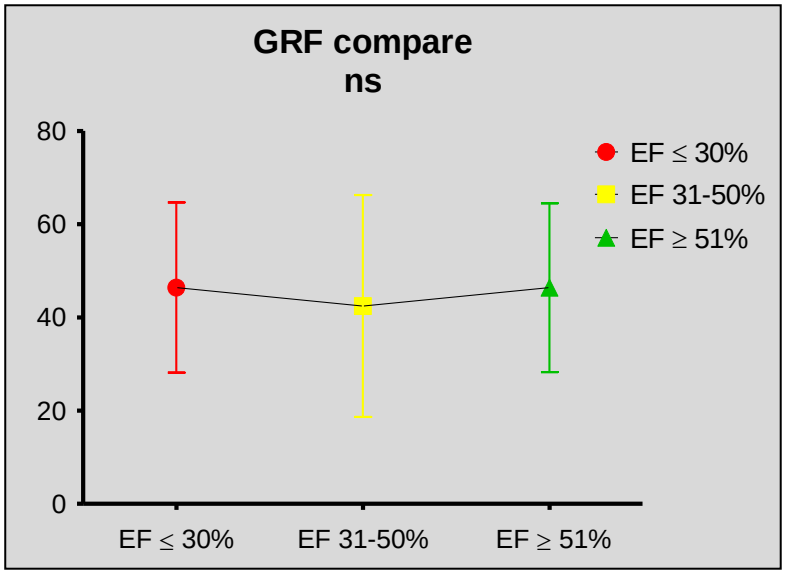
# Skúsenosti České Budějovice Rozloženie dľa predoperačnej EF

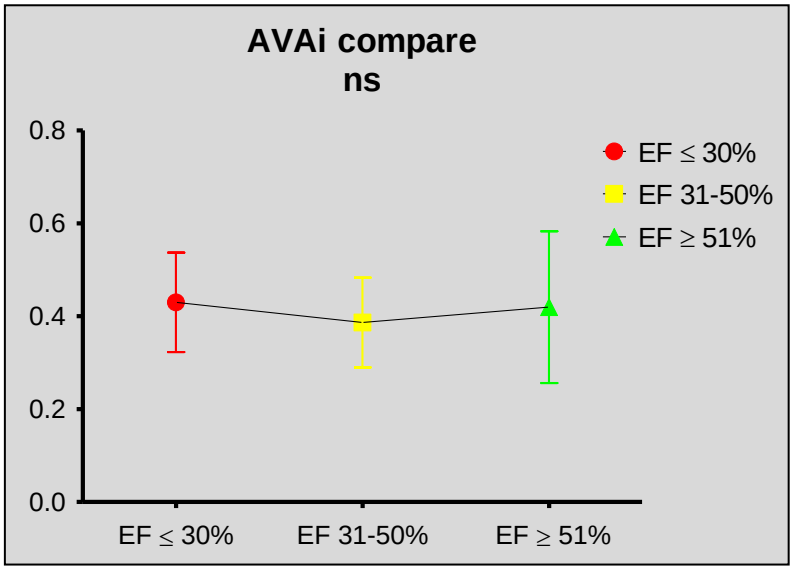


# Predoperačná charakteristika

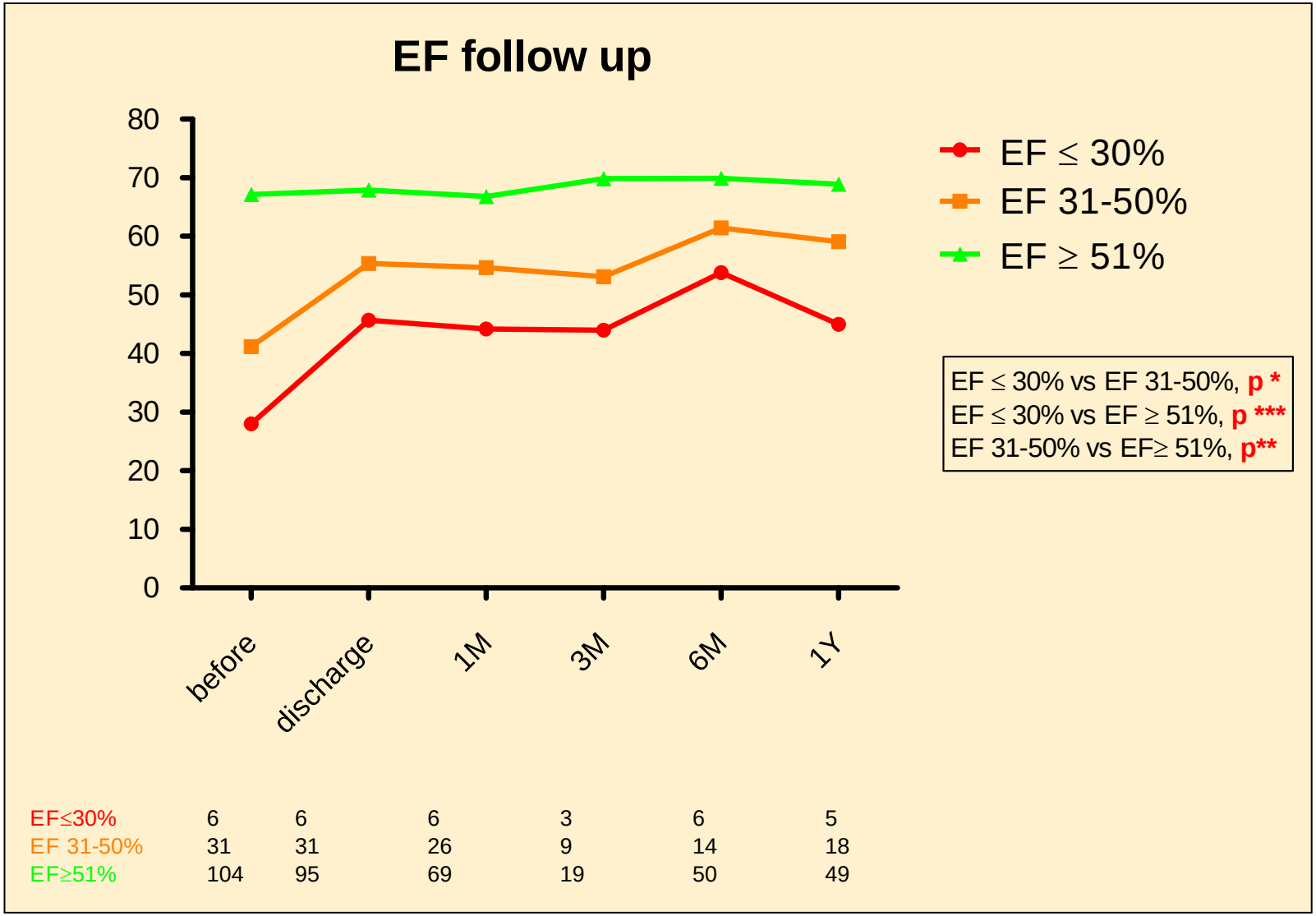


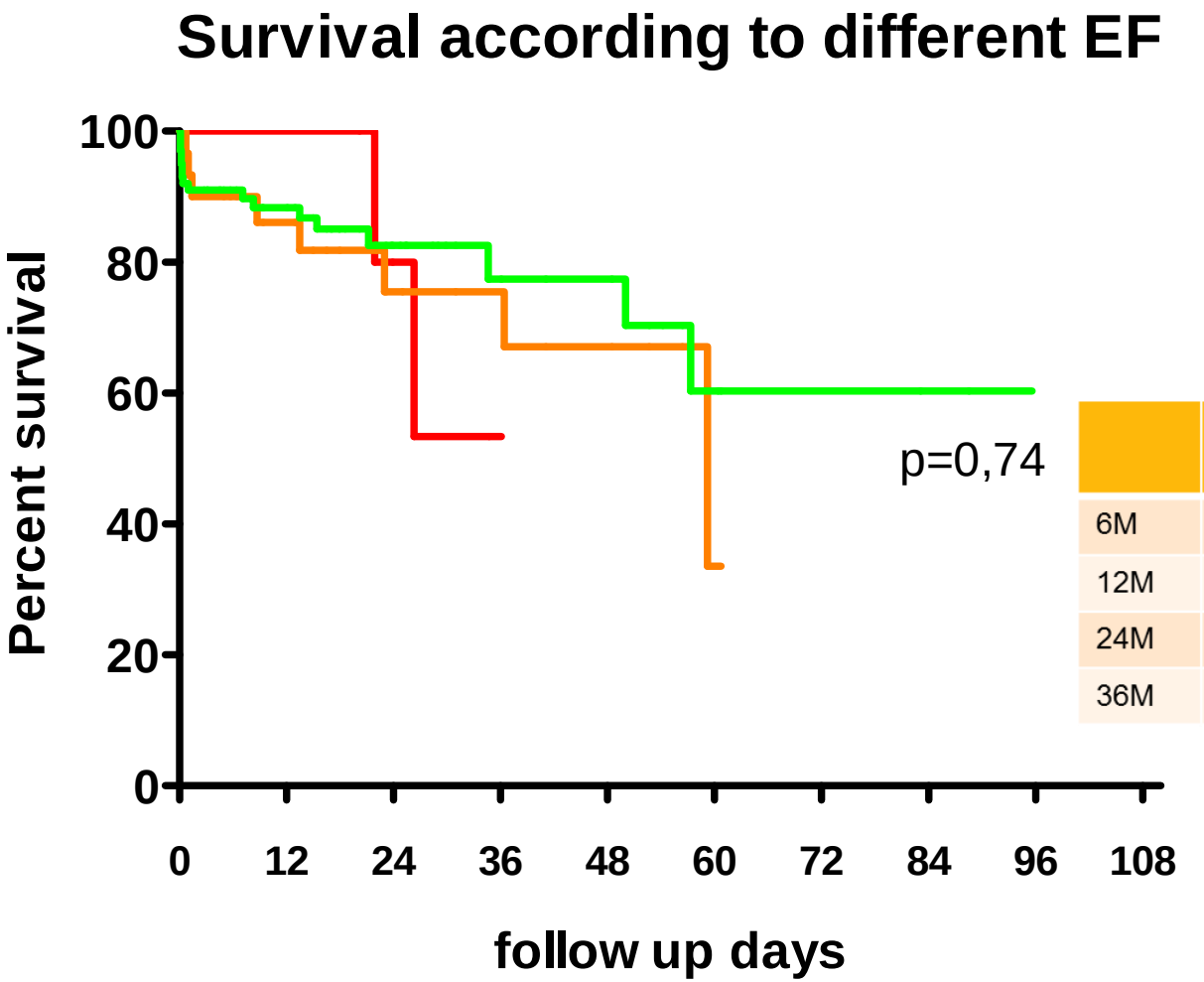



# Zmeny EF v priebehu follow up




| | | | | | | |
|---|---|---|---|---|---|---|
| EF≤30% | 6 | 6 | 6 | 3 | 6 | 5 |
| EF 31-50% | 31 | 31 | 26 | 9 | 14 | 18 |
| EF≥51% | 104 | 95 | 69 | 19 | 50 | 49 |

# Prežívanie dľa EF




| | EF ≤ 30% | EF 31-50% | EF ≥ 51% |
|---|---|---|---|
| 6M | 100 | 90 | 91 |
| 12M | 100 | 86 | 88 |
| 24M | 80 | 75 | 82 |
| 36M | 53 | 75 | 77 |

# Záver

- TA TAVI je bezpečná metóda
- TA prístup nemá vplyv a nevedie k zhoršeniu globálnej funkcie LK

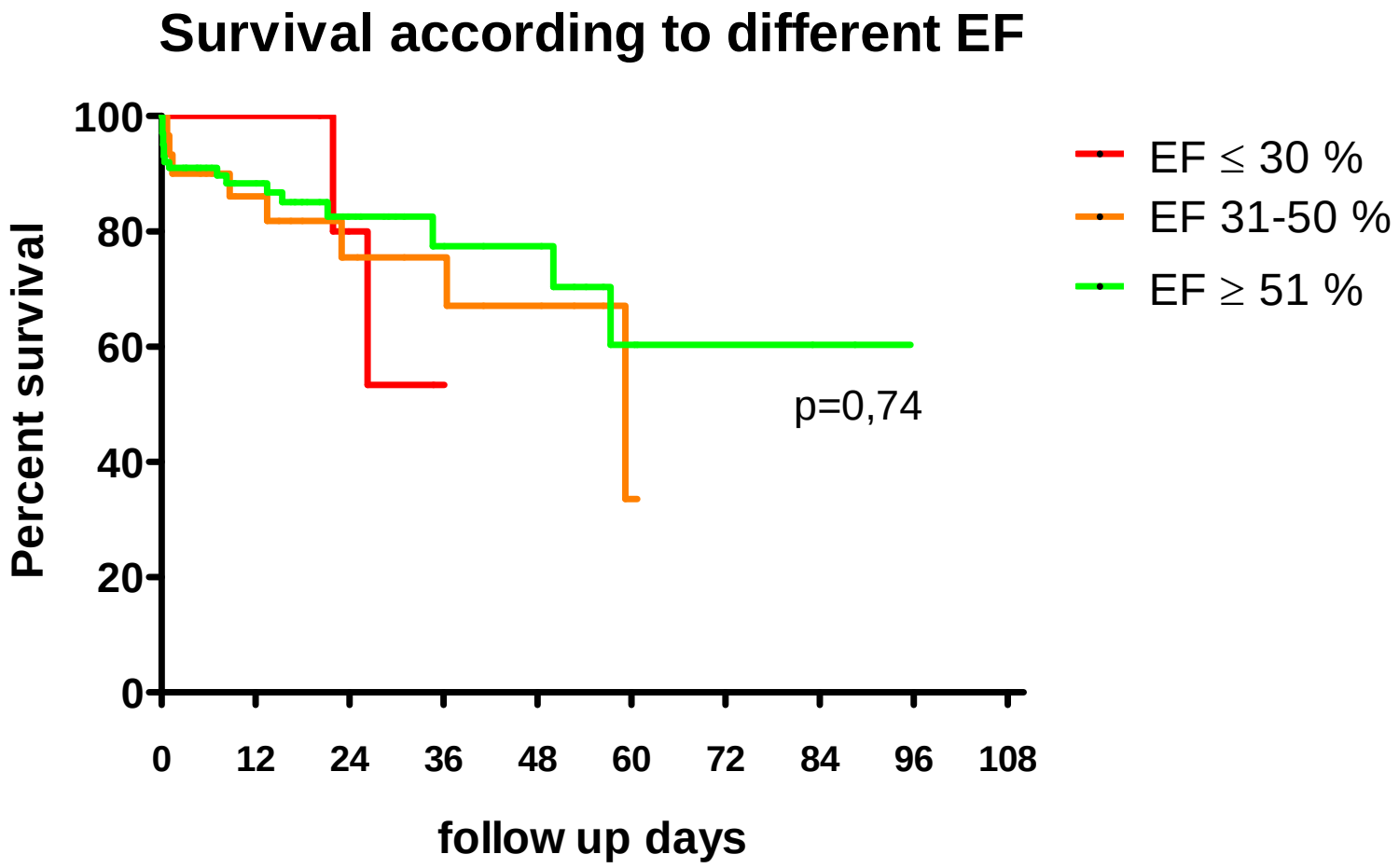
# Záver

- Šanca na zlepšenie EF LKS je významnejšia u pacientov s dysfunkciou LKS a prevahou aortálnej stenózy

- Krátkodobé prežívanie (24 mesiacov) je porovnateľné u pacientov s ťažkou dysfunkciou LKS i pacientov s norm. fc.

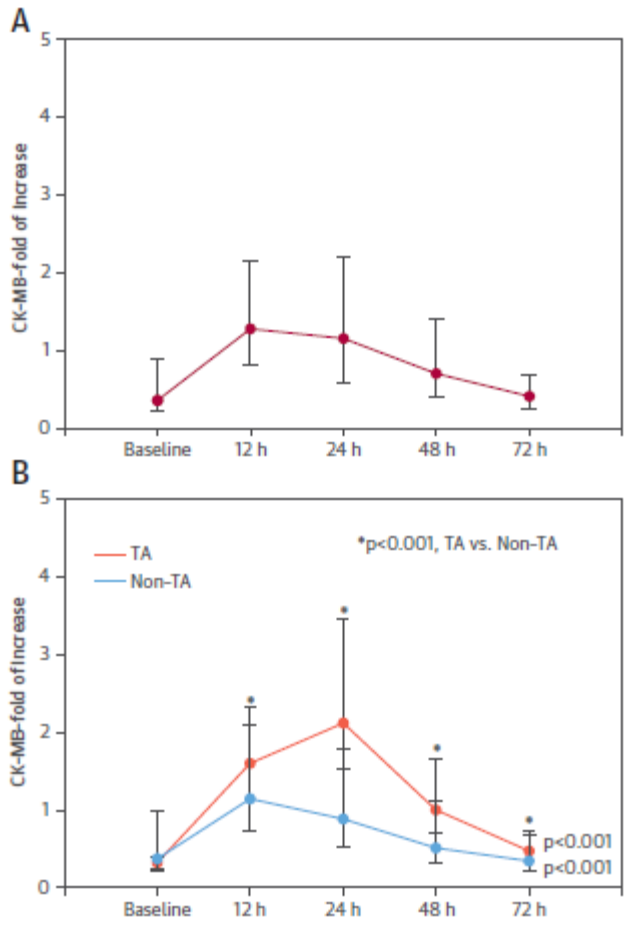
# Ďakujem za pozornosť

# Prežívanie dľa EF



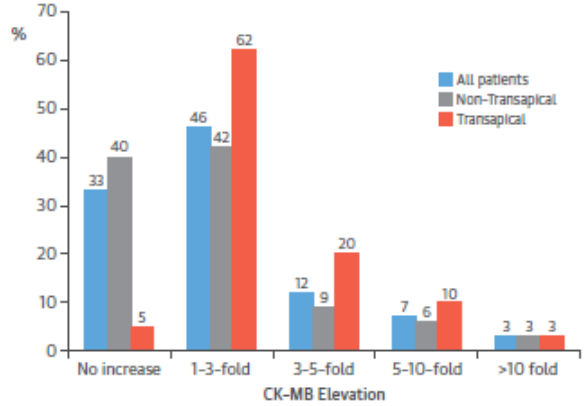

| Pts at risk | baseline | 6M | 12M | 24M | 36M | 48M | 60M | 84M |
|---|---|---|---|---|---|---|---|---|
| EF ≤ 30 % | 6 | 6 | 6 | 4 | 1 | 1 | 1 | 1 |
| EF 31-50 % | 30 | 24 | 22 | 12 | 10 | 7 | 2 | 1 |
| EF ≥ 51 % | 100 | 71 | 62 | 27 | 14 | 12 | 6 | 3 |

**FIGURE 1** Changes in Serum Markers of Myocardial Injury After TAVR



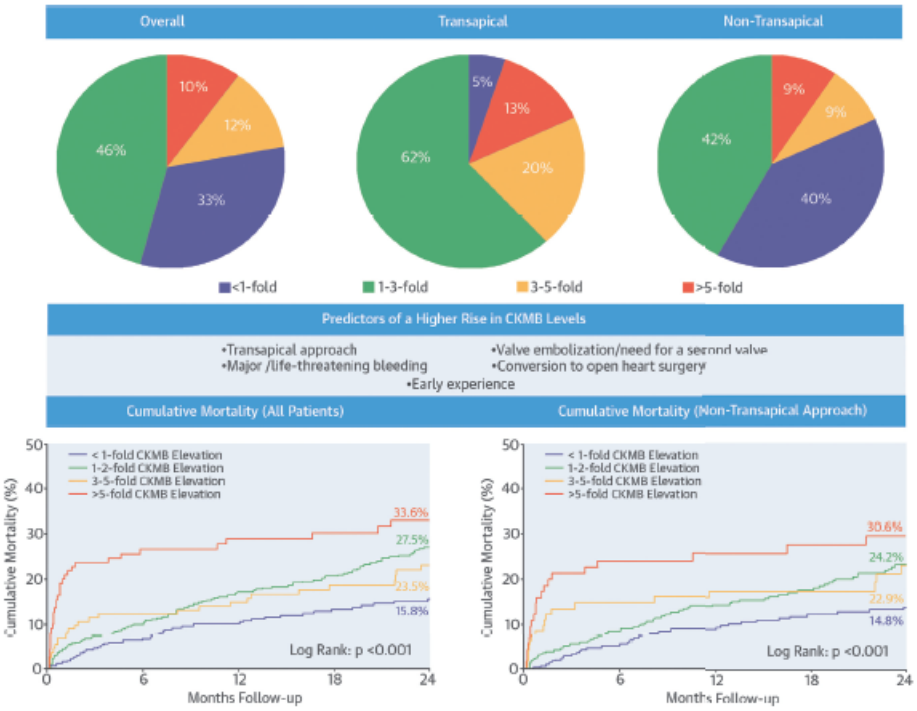

Changes in CK-MB levels within 72 h after TAVR in the entire study population **(A)** and grouped according to the approach (TA vs. non-TA) **(B)**. Values are expressed as median (25th to 75th interquartile range). CK-MB = creatine kinase-myocardial band; TA = transapical; TAVR = transcatheter aortic valve replacement.

**FIGURE 2** Degree of Increase in CK-MB Levels After TAVR




Percent of patients with elevation in all patients in Figure 1.

**CENTRAL ILLUSTRATION** Incidence, Predictors, and Cumulative Mortality According to Various Degrees of Increase in CK-MB Levels After TAVR




Ribeiro, H.B. et al. J Am Coll Cardiol. 2015; 66(19):2075-88.

Percent of patients with each fold of increase in creatinine kinase-myocardial band (CK-MB) levels, for the overall population and according to approach, including its independent predictors and the ensuing cumulative mortality for the entire population and the nontransapical approach group. TAVR = transcatheter aortic valve replacement.