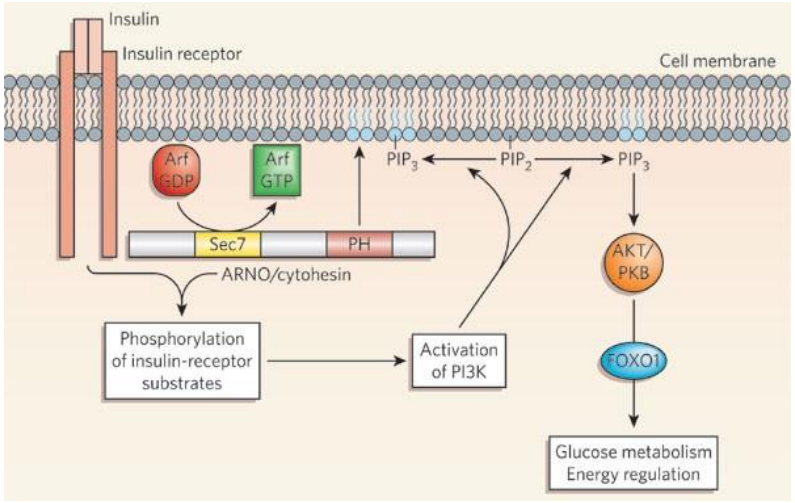
INZULINOVÁ REZISTENCE U AKUTNÍHO INFARKTU MYOKARDU: PREVALENCE, PREDIKTORY A SOUVISLOST S MYOKARDIÁLNÍM POŠKOZENÍM

Radim Špaček

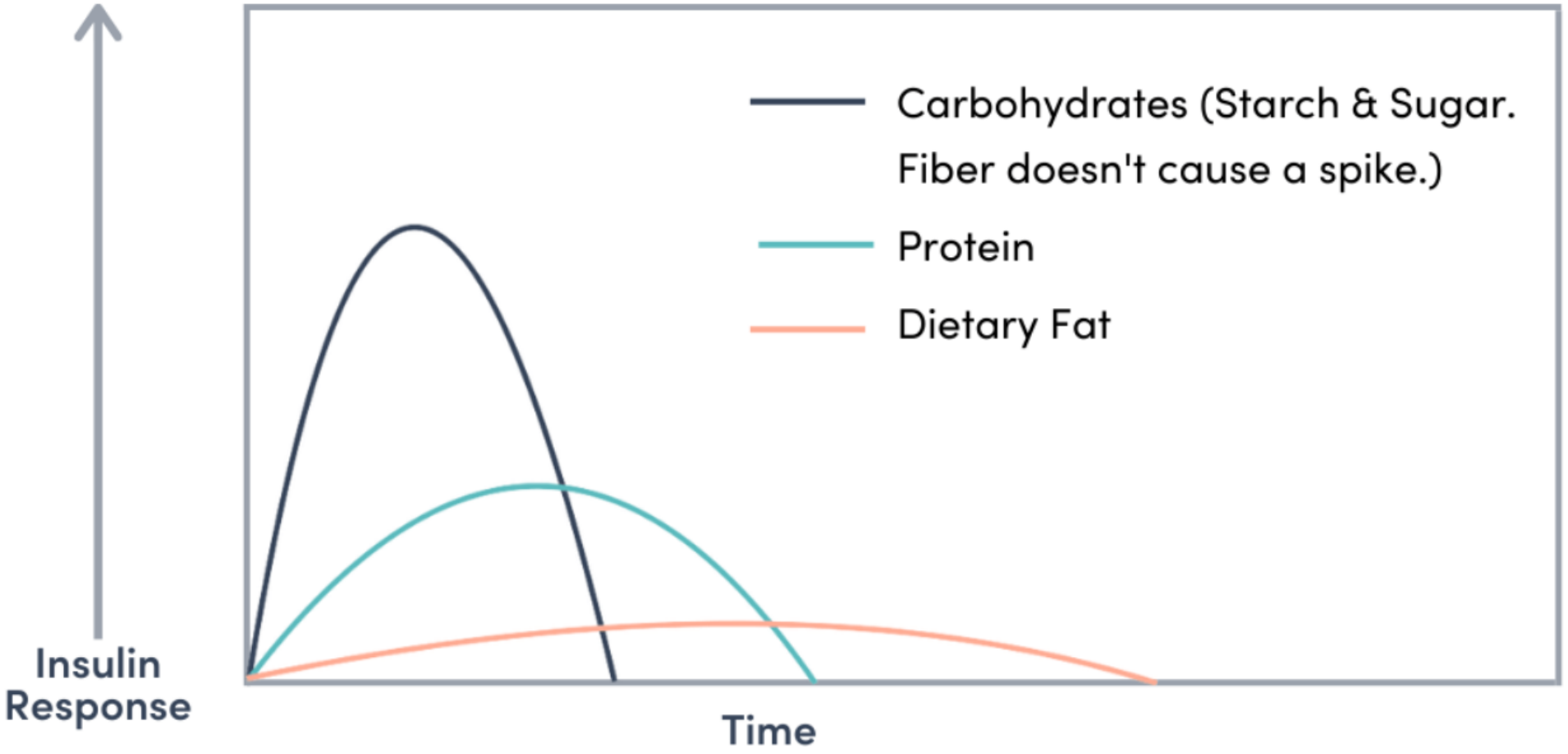
Co je inzulinová rezistence?

- Nedostatečná odpověď buněk na přítomnost inzulinu
- Důvodem je zvýšená stimulace buněk inzulinem

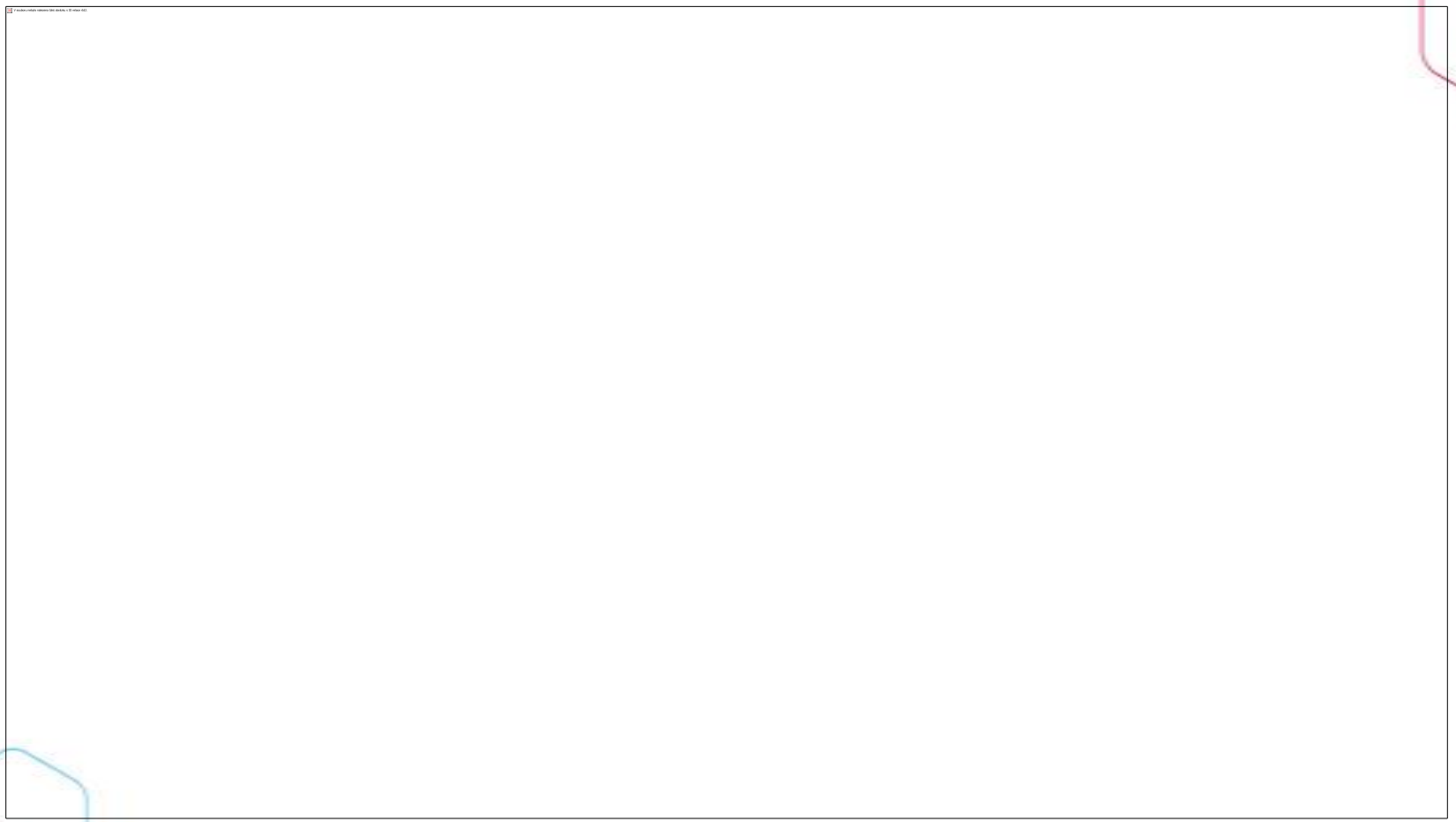


Shanik, M. H. *et al.* Insulin Resistance and Hyperinsulinemia: Is hyperinsulinemia the cart or the horse? *Diabetes Care* **31**, S262–S268 (2008).

Co stimuluje výdej inzulinu nejvíce?



Insulinová rezistence => DM 2. typu



Proč je to problém?

- Tkáně jsou různě citlivé na efekt inzulinu
- Hyperinzulinemie (IR) poté způsobuje:
  - KV onemocnění[1]
  - Onkologická onemocnění[2]
  - Neurodegenerativní onemocnění[3]
  - Poruchy plodnosti[4]
  - …..

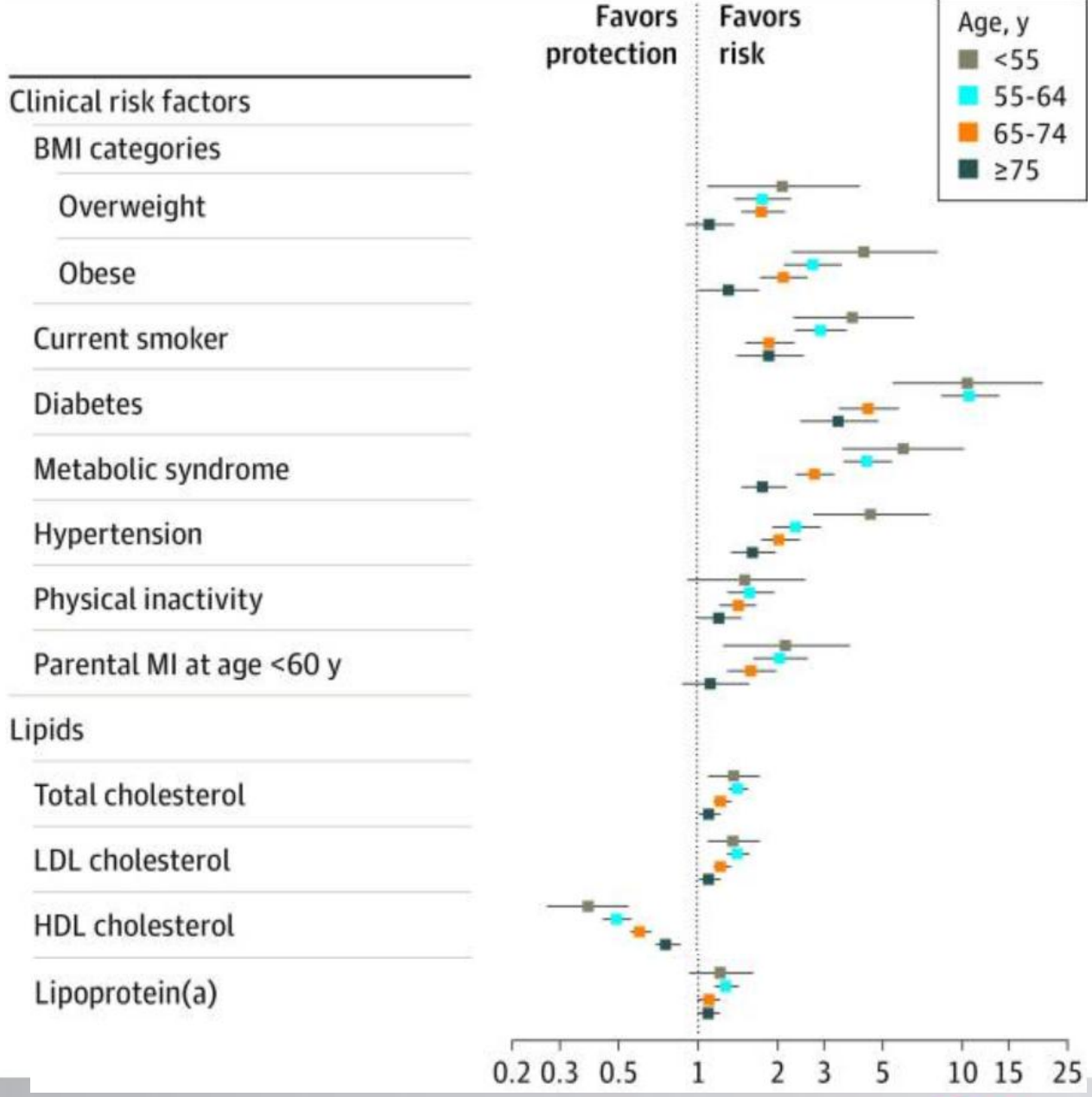
[1]DOI: 10.1046/j.1464-5491.2002.00719.x
[2]DOI: 10.1007/s00592-011-0361-2
[3]DOI: 10.3390/ijms23179540
[4]DOI: 10.1186/s13048-022-01091-0

Jak velký je to problém?

▸ JAMA Cardiol. 2021 Jan 20;6(4):1–11. doi: 10.1001/jamacardio.2020.7073

Association of Lipid, Inflammatory, and Metabolic Biomarkers With Age at Onset for Incident Coronary Heart Disease in Women

Sagar B Dugani [1,2], M Vinayaga Moorthy [1,3], Chunying Li [1,3], Olga V Demler [1,3], Alawi A Alsheikh-Ali [4], Paul M Ridker [3,5], Robert J Glynn [1,3], Samia Mora [1,3,5,✉]


Favors protection
Favors risk
Age, y
<55
55-64
65-74
≥75
Clinical risk factors
BMI categories
Overweight
Obese
Current smoker
Diabetes
Metabolic syndrome
Hypertension
Physical inactivity
Parental MI at age <60 y
Lipids
Total cholesterol
LDL cholesterol
HDL cholesterol
Lipoprotein(a)
0.2 0.3 0.5 1 2 3 5 10 15 25

Clinical risk factors[a]	Incident CHD, adjusted HR (95% CI)				*P* value for interaction[b]
	At age <55 y	At 55 to <65 y	At 65 to <75 y	At age ≥75 y	
BMI, per SD increment	1.47 (1.24-1.74)	1.40 (1.29-1.51)	1.33 (1.24-1.42)	1.12 (1.01-1.24)	.002
BMI categories					
Overweight (25.0 to <30.0)	2.13 (1.10-4.14)	1.78 (1.39-2.28)	1.78 (1.48-2.14)	1.12 (0.91-1.39)	.004
Obese (≥30.0)	4.33 (2.31-8.11)	2.76 (2.15-3.55)	2.14 (1.74-2.62)	1.32 (1.02-1.71)	<.001
Current smoker	3.92 (2.32-6.63)	2.97 (2.37-3.71)	1.89 (1.54-2.32)	1.89 (1.42 - 2.52)	.003
Diabetes	10.71 (5.57-20.60)	10.92 (8.44-14.13)	4.49 (3.46-5.83)	3.47 (2.47-4.87)	<.001
Metabolic syndrome	6.09 (3.60-10.29)	4.45 (3.62-5.47)	2.82 (2.40-3.30)	1.79 (1.48-2.17)	<.001
Hypertension	4.58 (2.76-7.60)	2.38 (1.93-2.94)	2.06 (1.76-2.43)	1.64 (1.36-1.98)	<.001

LDL particles					
Total[d]	1.75 (1.42-2.15)	1.59 (1.45-1.74)	1.36 (1.27-1.47)	1.24 (1.13-1.36)	<.001
Large[e]	1.02 (0.74-1.42)	1.04 (0.92-1.17)	1.01 (0.92-1.11)	1.10 (0.99-1.23)	.67
Medium[e]	1.13 (0.80-1.60)	1.16 (1.02-1.32)	1.08 (0.98-1.19)	0.99 (0.88-1.10)	.32
Small[e]	2.25 (1.76-2.89)	1.93 (1.73-2.15)	1.57 (1.43-1.72)	1.37 (1.22-1.53)	<.001
LDL particle average size[d]	0.64 (0.50-0.80)	0.74 (0.67-0.82)	0.80 (0.74-0.86)	0.89 (0.81-0.97)	.01

Inzulinová rezistence - diagnostika

- Lačný inzulin + glykemie => HOMA-IR[1]
- HOMA-IR = (Fasting insulin, uIU/mL)*(Fasting glucose, mg/dL) / 405
- Norma HOMA-IR < 2

DOI: 10.1007/BF00280883

Data z naší Koronární jednotky

- 132 konsekutivních pacientů s AKS
- Průměrný věk 64 let
- Muži 76%
- Kuřáci 53%

- Definice IR: HOMA-IR > 2,5 a/nebo DM 2. typu

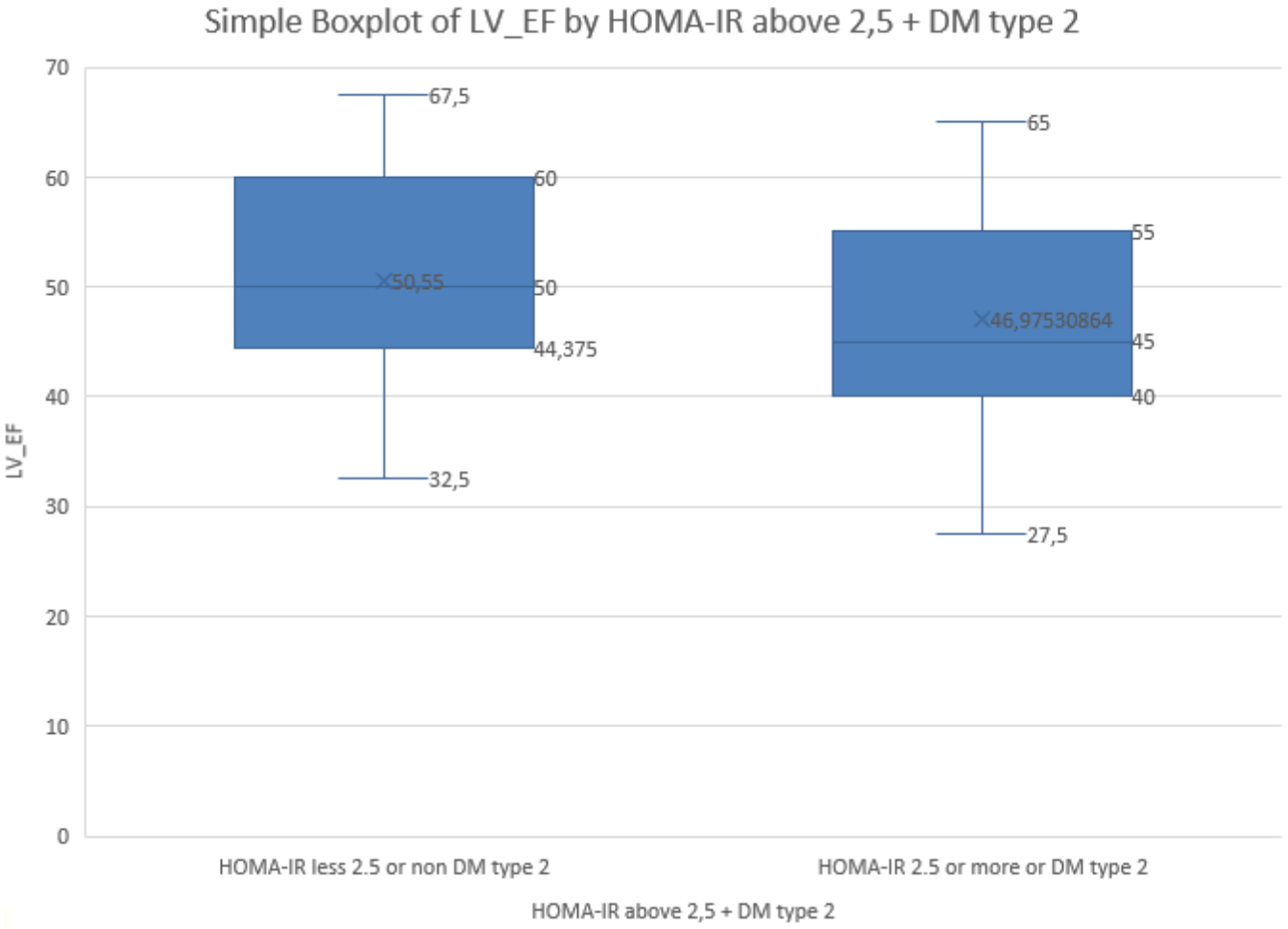
Data z naší Koronární jednotky

Category	IR Sensitive (n=49)	IR Resistant (n=81)	p-value
Demographics			
Age, years	60 (50–71) [37–91]	66 (58–74) [44–86]	0,037
Male sex (%)	34 (69.4)	66 (81.5)	0,113
BMI, kg/m²	25.78 (23.03–29.38) [13.32–36.85]	29.23 (27.38–32.61) [18.14–46.53]	**<.001**
Current smoking (%)	32 (65.3)	37 (47.4)	**0,049**
Medical History			
Hypertension (%)	24 (49.0)	59 (72.8)	**0,006**
Prior coronary artery disease (%)	6 (12.2)	17 (21.0)	0,206
Prior peripheral artery disease (%)	3 (6.1)	8 (9.9)	
Prior atrial arrhythmia (%)	4 (8.2)	5 (6.2)	0,665
Prior malignancy (%)	4 (8.2)	4 (4.9)	0,458

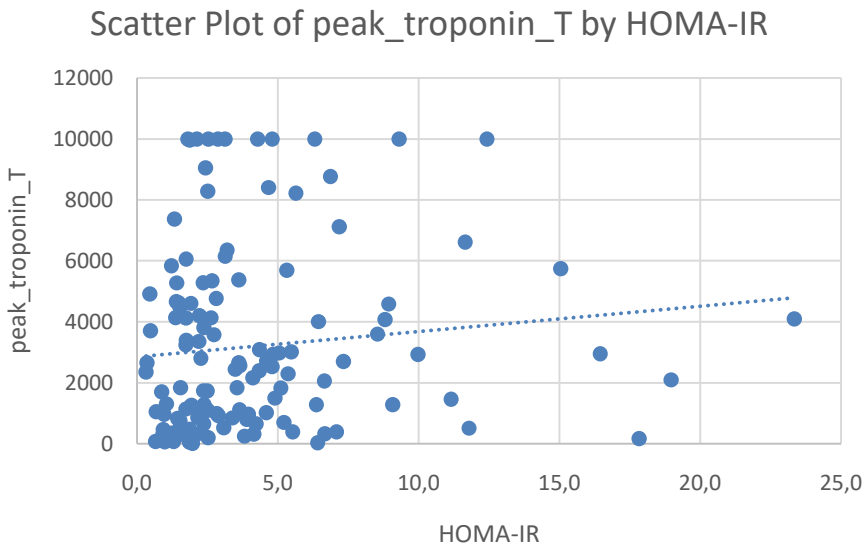
Data z naší Koronární jednotky

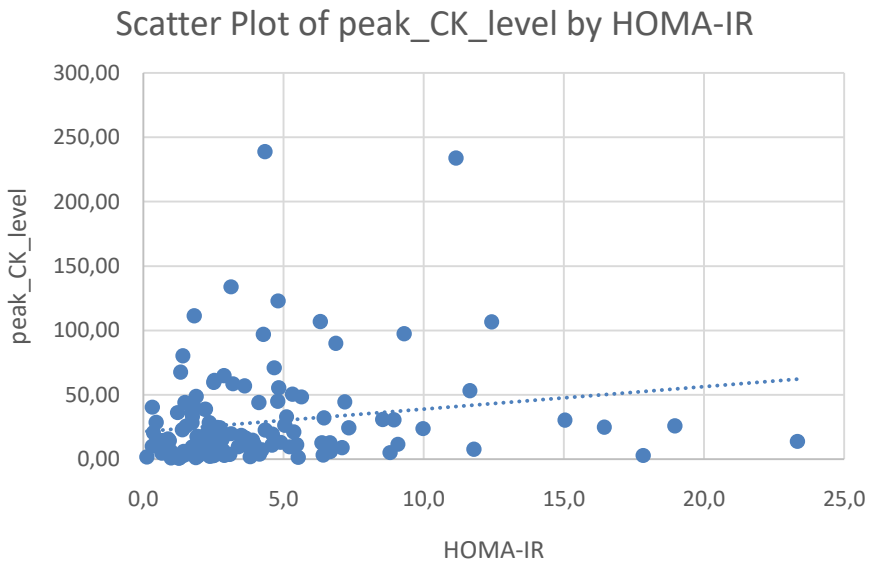
Category	IR Sensitive (n=49)	IR Resistant (n=81)	p-value
Index Event Characteristics			
STEMI (%)	35 (71.4)	54 (66.7)	0,571
OHCA (%)	5 (10.2)	0 (0)	**0,003**
IHCA (%)	1 (2.1)	1 (1.3)	0,717
LVEF, %	50.0 (43.8–58.8) [32.5–67.5]	45.0 (40.0–55.0) [27.5–65.0]	**0.061**
RV impairment (%)	3 (6.3)	5 (6.2)	0,986
Moderate/severe aortic stenosis (%)	1 (2.1)	3 (3.7)	0,608
Hospital Course			
ICU stay, days	2 (2–4) [1–12]	3 (2–4) [1–21]	0,368
Subsequent PCI (%)	0 (0.0)	8 (9.9)	**0,023**
Inpatient atrial arrhythmia (%)	3 (6.1)	7 (8.6)	0,601
Inpatient vasopressor use (%)	7 (14.3)	5 (6.2)	0,121
Sustained ventricular tachycardia (%)	1 (2.0)	0 (0.0)	0,19

Data z naší Koronární jednotky



Data z naší Koronární jednotky



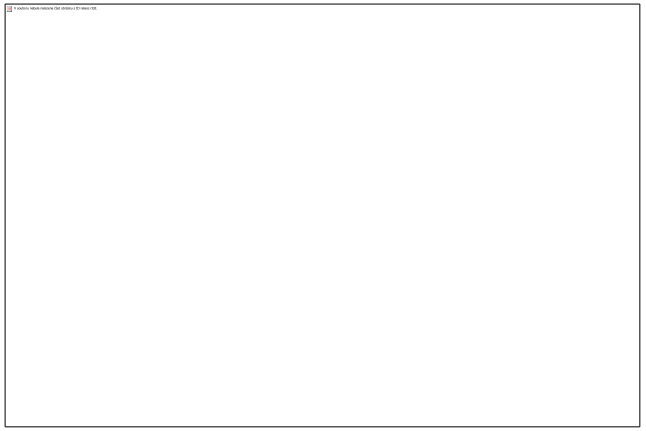


Závěrem

- Inzulinová rezistence (IR) je nejsilnější a nejčastější rizikový faktor ICHS
- IR pravděpodobně koreluje s rozsahem myokardiálního postižení u AKS
- Vyšetřování lačného inzulinu (cut-off 10uUI/ml) a určení HOMA-IR by mělo být standardem stejně jako lipidogram
- Edukace pacienta v sekundární prevenci má začít již na JIP

IR řešení

- Pohyb
- Spánek
- **Nízkosacharidová („low-carb“) strava**



Děkuji Vám za pozornost