Vzdálená monitorace (nejen) volémie a kongesce pacientů se srdečním selháním

Filip Málek
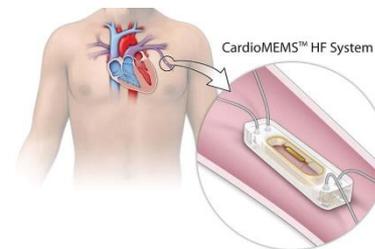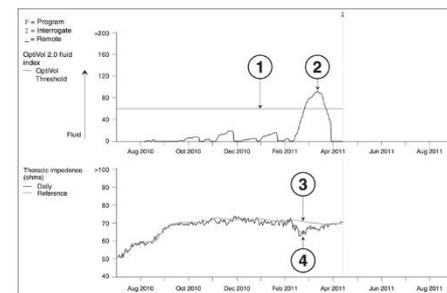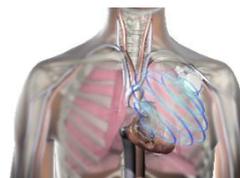
XXXIII. výroční sjezd ČKS Brno 2025

Obsah sdělení

- Současné možnosti monitorace volémie
- Použití senzoru v DDŽ – naše zkušenosti
- Další parametry pro vzdálenou monitoraci u srdečního selhání

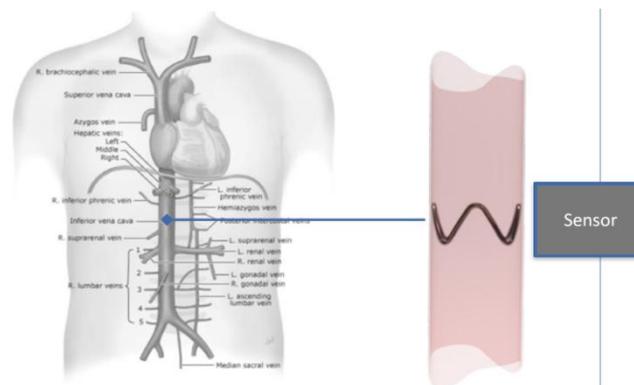# Možnosti monitorace volémie pacientů s HF

- CardioMems – senzor v plicnici
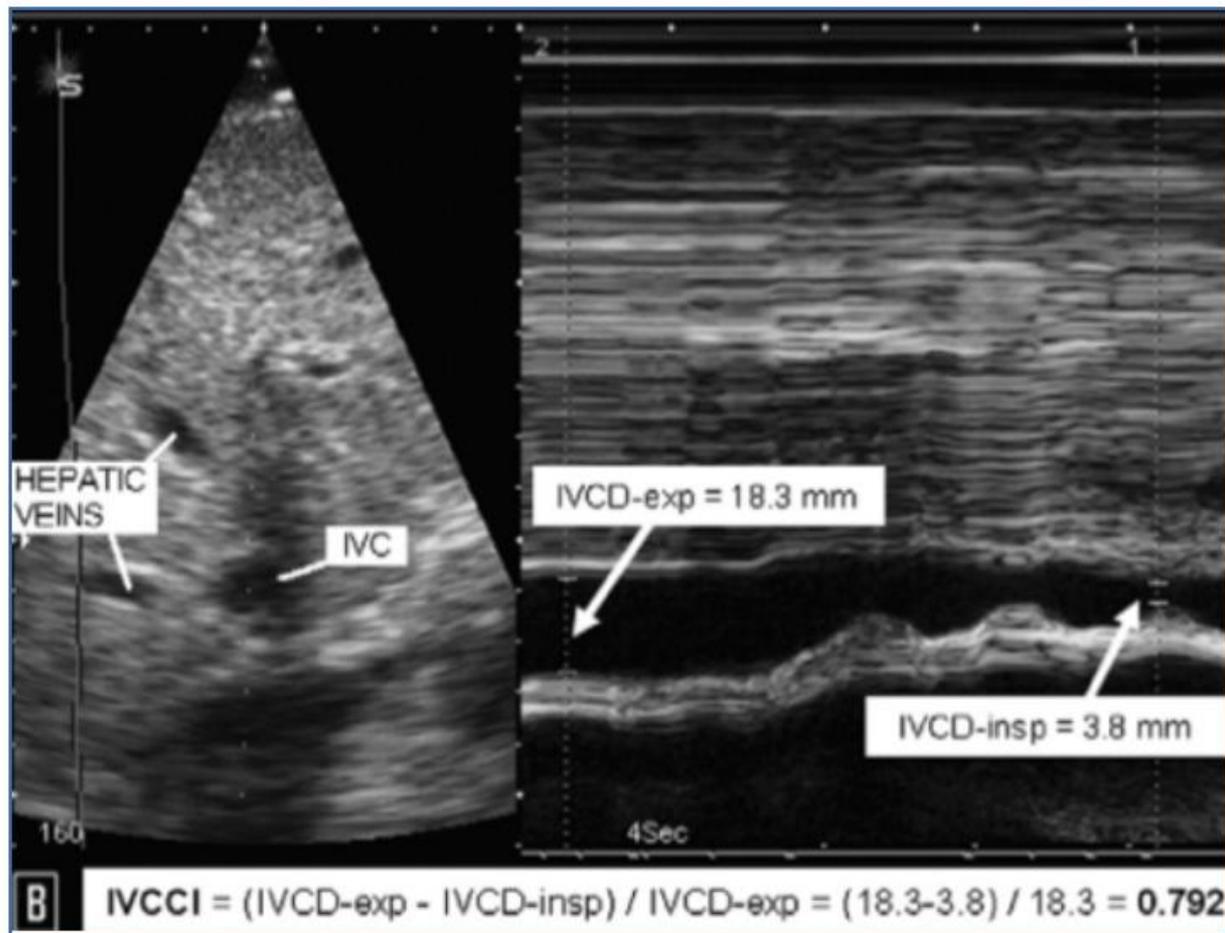
- OptiVol – hrudní impendance (CRT)

- Senzor v IVC (FIRE I)
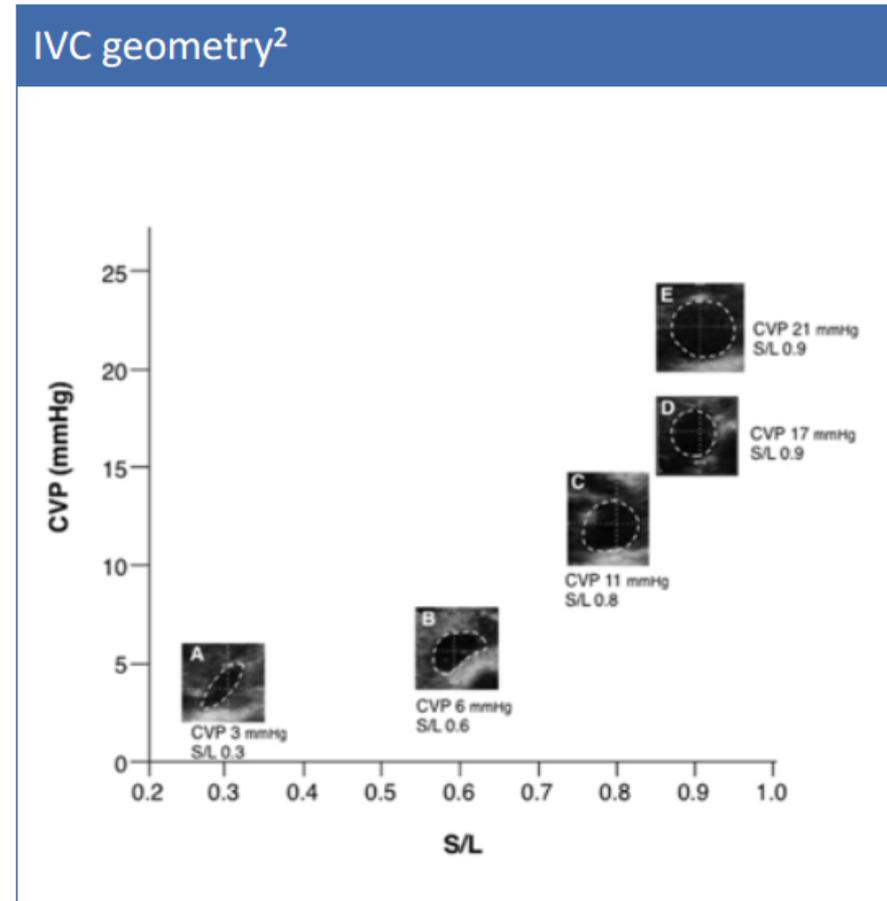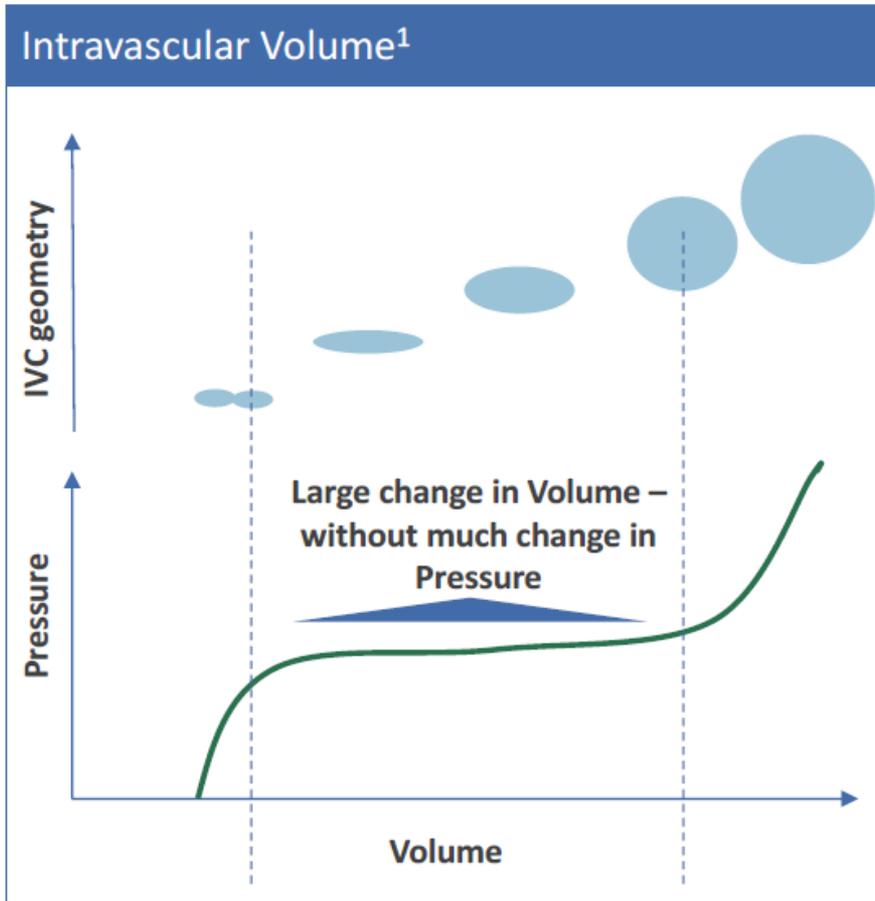 - rozměr a kolapsibilita IVC

Možnosti monitorace systémové kongesce

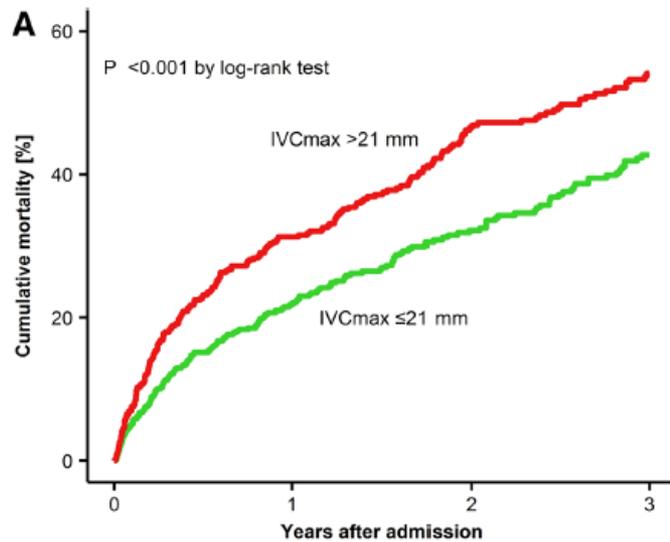Monitorace rozměru
a dynamických změn IVC

Dynamické změny morfologie IVC předcházejí rozvoji systémové kongesce
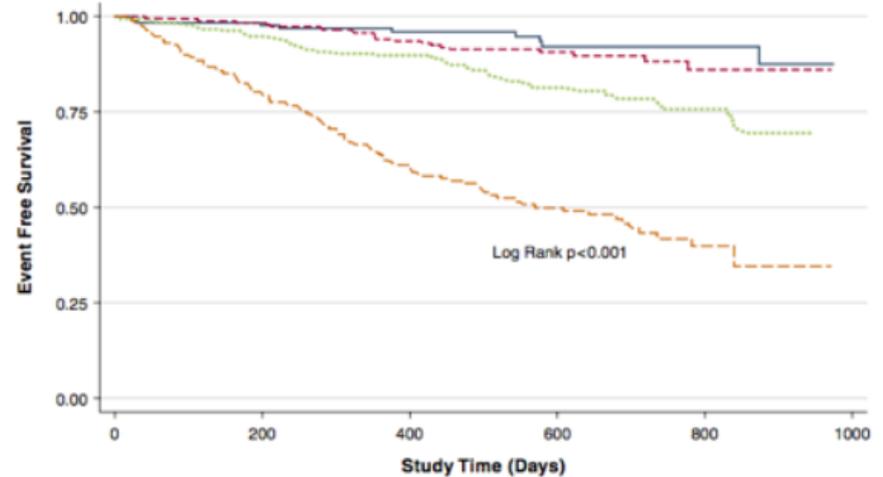
Prognostický význam rozměru IVC
u AHF a CHF

Acute HF (n=1101)

Chronic HF (n=683)

Tertile 1: median IVC ⌀ 16 mm
Tertile 2: median IVC ⌀ 19 mm
Tertile 3: median IVC ⌀ 24 mm

Source: 1. Jobs et al., Heart Vessels (2017) (available online 23rd January 2017). 2. Pellicori et al,. JACC Cardiovascular Imaging (2013), 6, (1) 16-28

FIRE 1 senzor v IVC

Implantace systému FIRE-1

FIRE1
Belt

Area of reduced
contrast is target
landing zone for
deployment
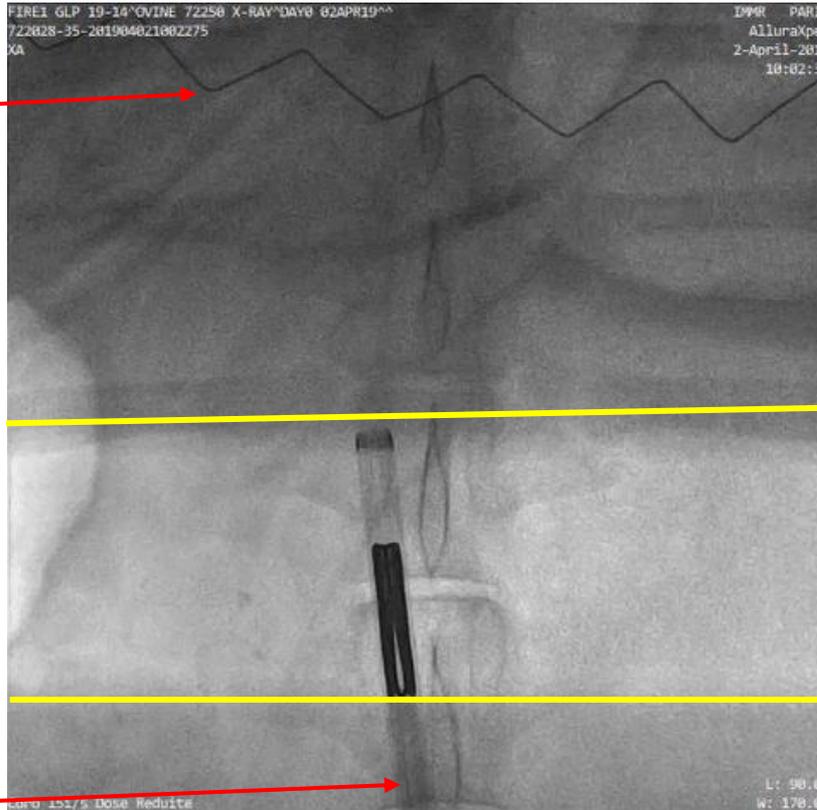
Deployed under
breath hold and
Sheath and Pusher
fully retracted
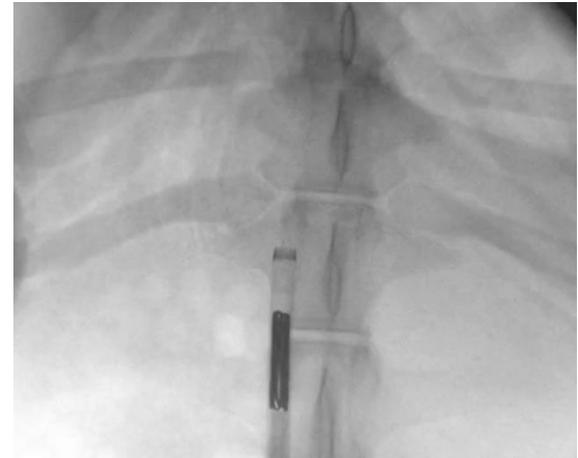during deployment

Skiaskopický obraz FIRE-1
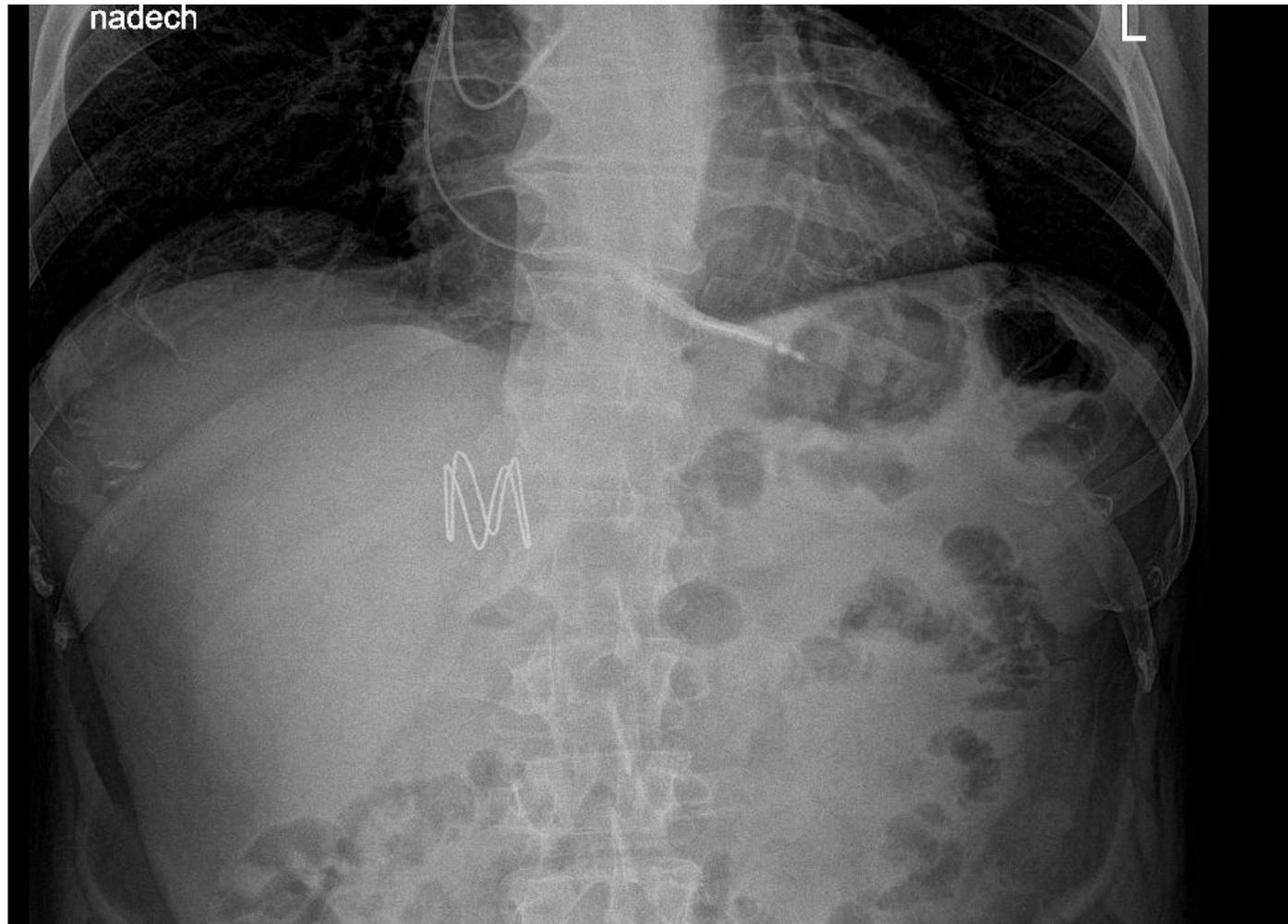
Budoucnost monitorace pacientů s HF
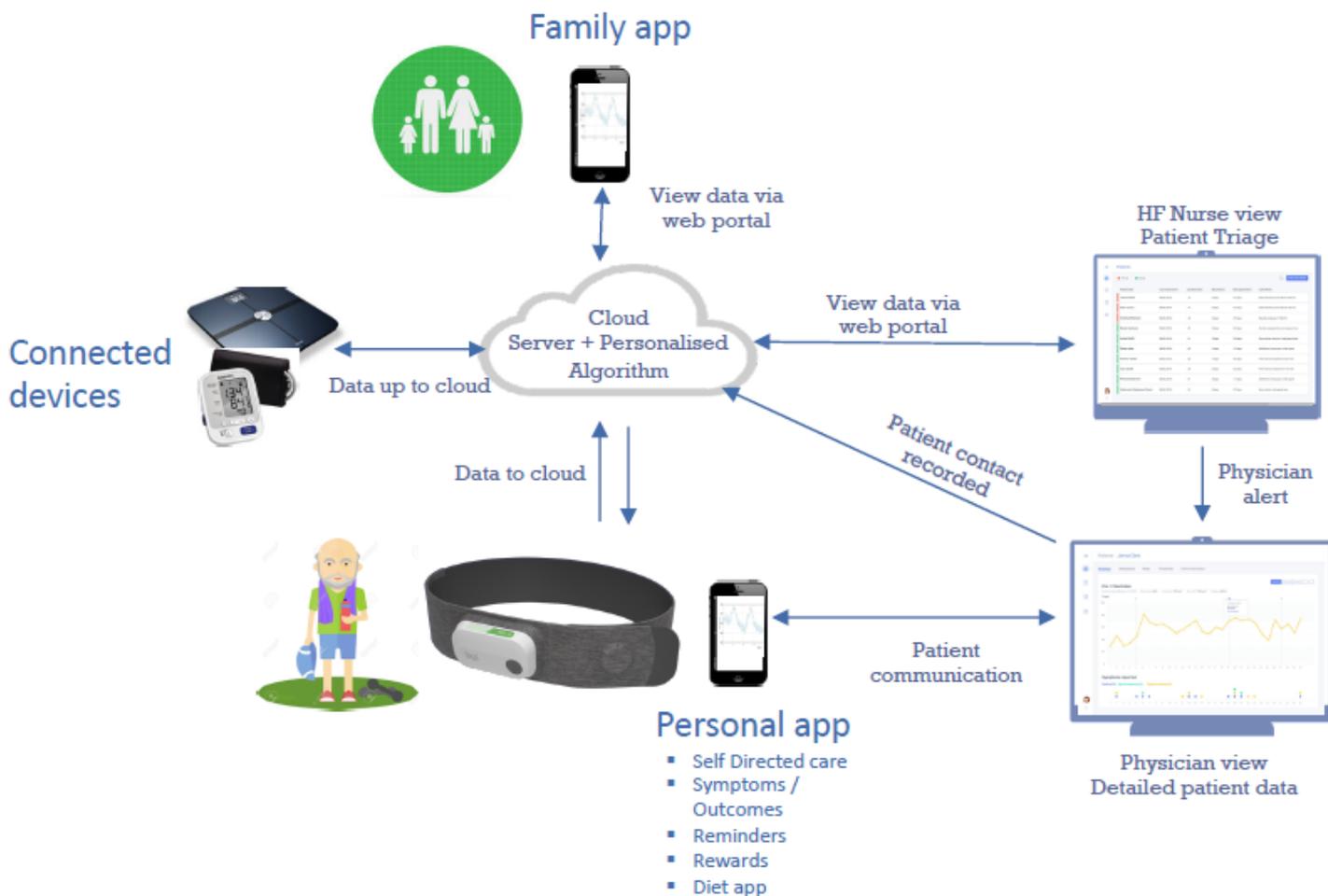
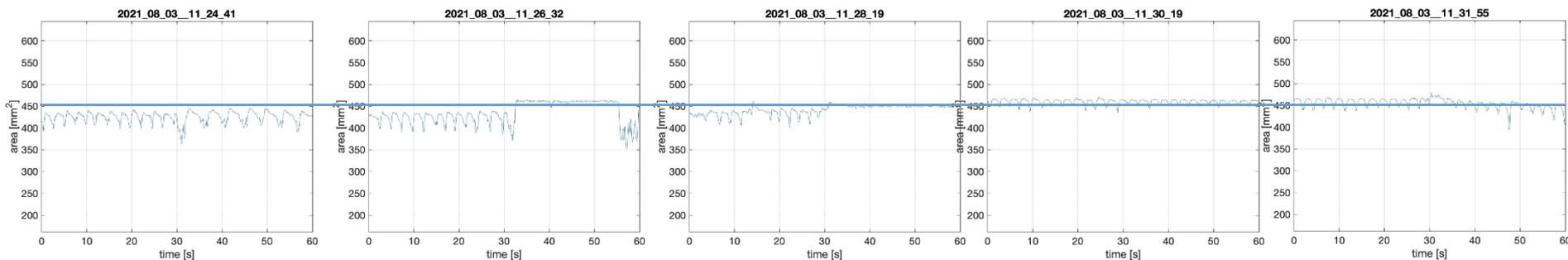# Kazuistika
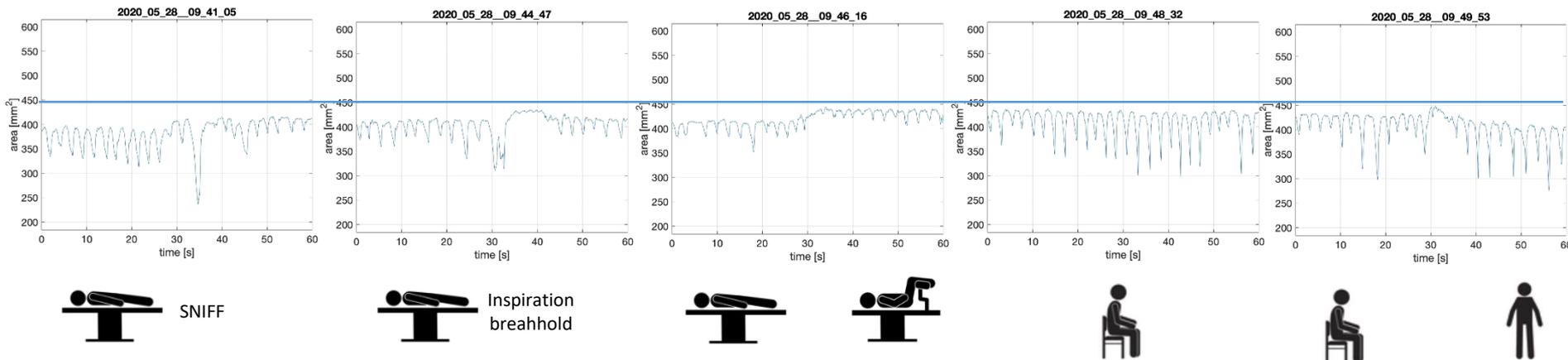## Muž 48 let s DKMP

- Stabilní NYHA III v úvodu studie

- Implantace senzoru 31.1.2020

- Sběr data po dobu 5 let

- Femorální přístup k implantaci senzoru

do IVC

[Sheridan, Burkhoff et al., European Journal of Heart Failure, early view 2023]

Efekt polohových manévrů na velikost IVC hodnocenou pomocí senzoru FIRE 1

(May2020, compensated)

SNIFF

Inspiration breahhold

(Aug2021, before hospitalisation)

Kazuistika – pacient S.P., 48 let, pokroč. ChSS akutní dekompenzace

Comments

- Patient has had multiple interventions during course of trial participation (e.g., extra lead placement, AV node ablation)

- Continued deterioration in HF status (aligned with FIRE1 signal)

- Upward trend in IVC area over last 2 weeks; collapse remaining low

- Patient undergoing advanced HF therapy assessment

Signal trending up persistently – collapse v. low

HFH
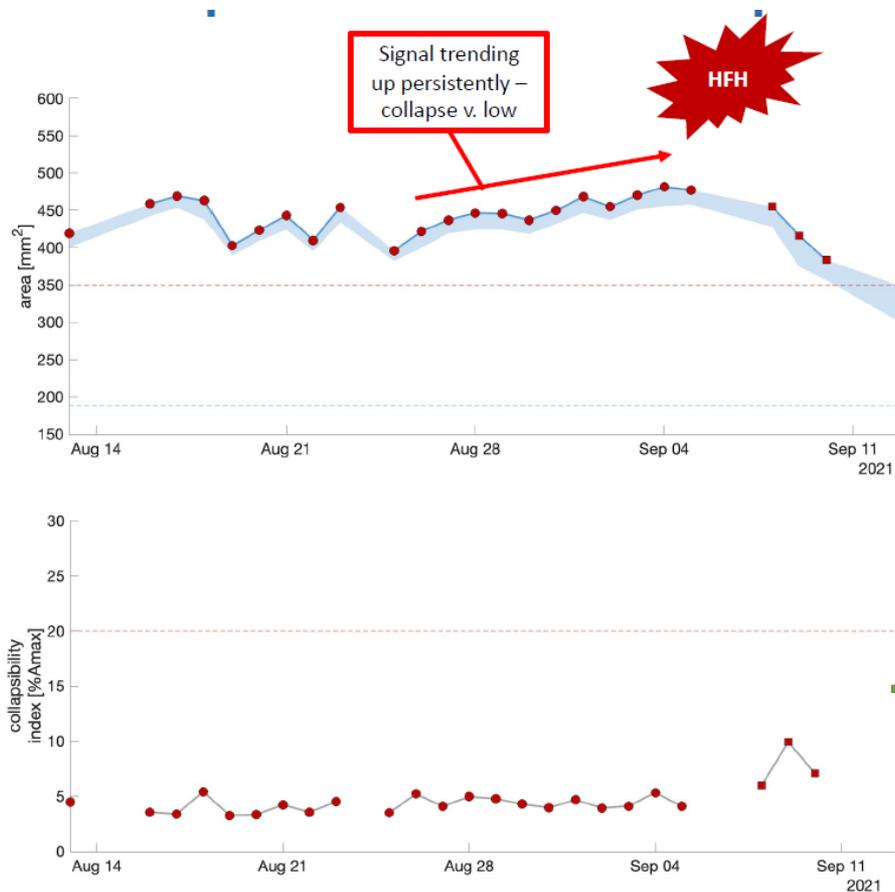
- Slow VT event with associated congestion
- Treatment included oral diuretics, inotropes and significant changes in HF medication e.g. commenced on SGLT-2 inhibitor
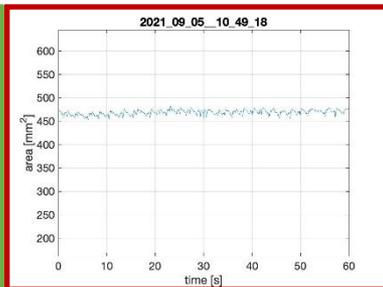
Pacient s pokročilým ChSS

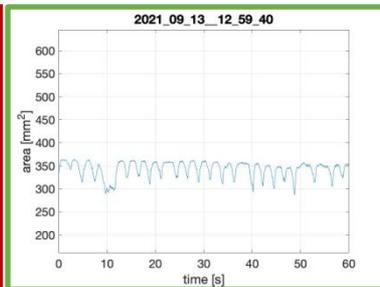# PID101_003: traces in relation to hospitalisation and LVAD placement

Recovered after CRT
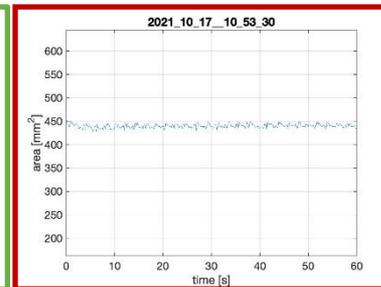9 months before Hospitalisation
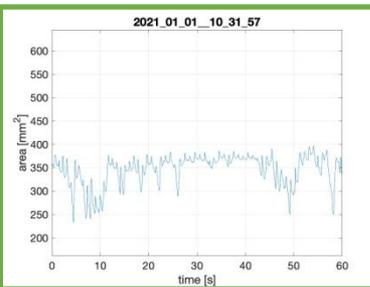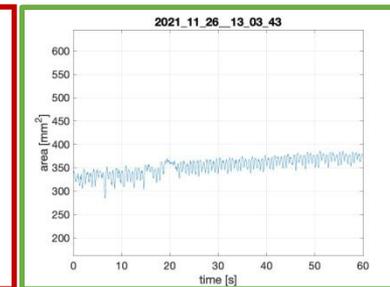
1 day before Hospitalisation

Recompensated
7 days after Hospitalisation

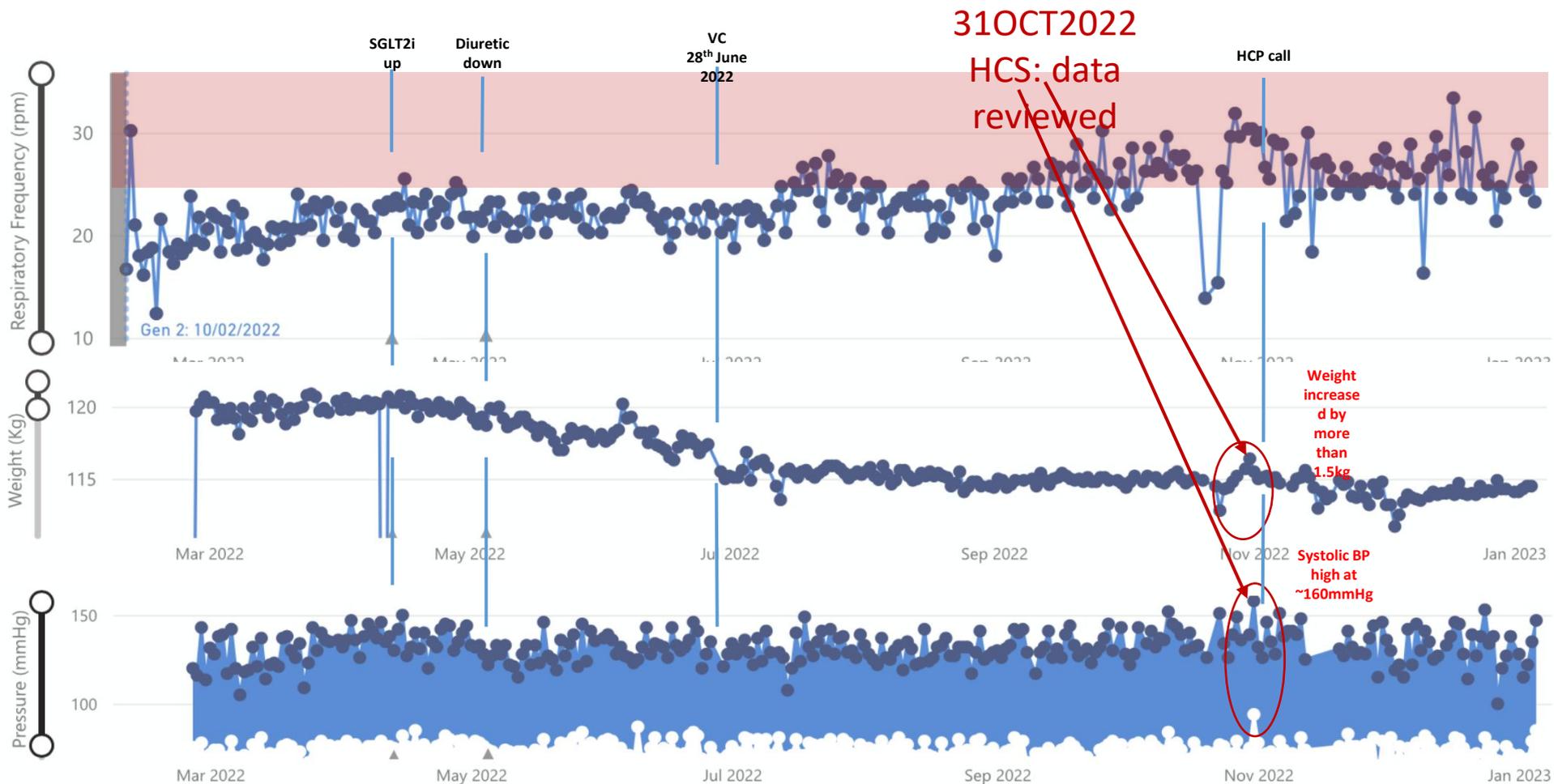Last scan before ICU
submission for LVAD

LVAD @home

Konzultace změn signálu s lékařem

PID101_005 Understanding the HCP call

Klinické studie vzdálené monitorace u HF

- Studie s různým plánem a různými parametry
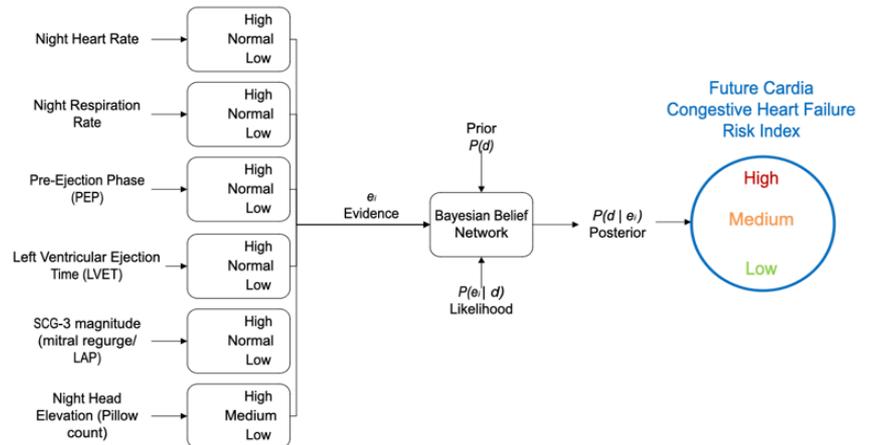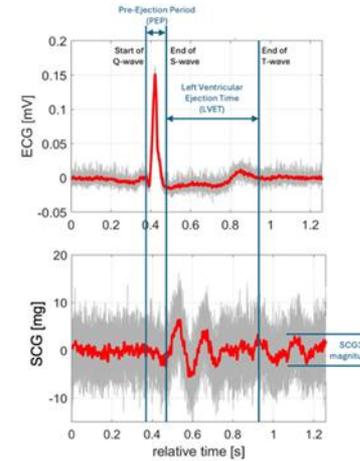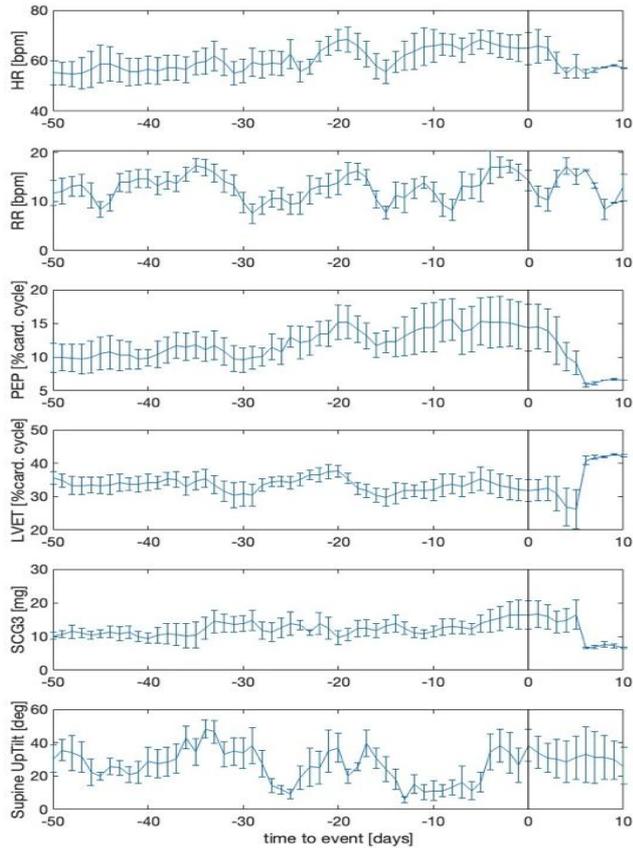
Více parametrický impantabilní monitor Future Cardia

HR – heart rate, RR – respiration rate, PEP – Pre-ejection Period, LVET – Left Ventricular Ejection Time, SCG3 – third wave of the SCG (seismocardiography), upper body tilt angle (Supine Uptilt)

Implantabilní monitor Future Cardia

Implantabilní senzor pro monitoraci IFP (tlak intersticiální tekutiny)

(A) The IFPx sensor is inserted subcutaneously in a 5-minute procedure in an office-based setting under local anesthesia. The IFPx sensor measures interstitial fluid pressure (IFP), heart rate, activity, sleep incline, respiratory rate, and more. (B) Pilot data (5-minute rolling mean and SD, representative data, thoracic location) showing the relationship between IFP and hemodynamic pressures in a porcine model of acute fluid-overloaded heart failure. CVP = central venous pressure; LVEDP = left ventricular end diastolic pressure; mPAP = mean pulmonary artery pressure.

Závěry

- Změny volémie je možné hodnotit pomocí senzoru v DDŽ
- Nový senzor umožňuje předpovědět riziko klinické deteriorace
- Vzdálená monitorace pomocí senzoru v DDŽ umožňuje reagovat na
- změny volémie a intervenovat je
- Vzdálená monitorace pomocí CIED s využitím více parametrů

u pacientů s ChSS je schopna předpovědět riziko úmrtí a HF příhod

- Budoucností je využití implantabilních multiparametrických senzorů
- Vyhodnocení pomocí AI
- Intervence však vždy pod kontrolou lékařem!

Děkuji vám za pozornost