

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

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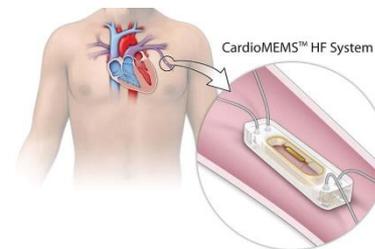


Obsah sdělení

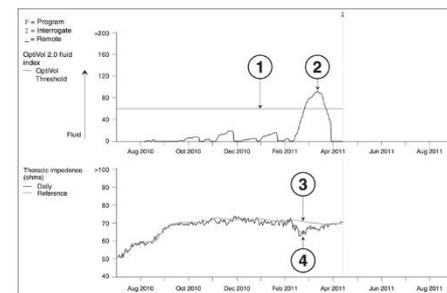
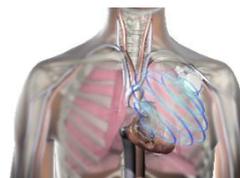
- Současné možnosti monitorace volémie
- Použití senzoru v DDŽ – naše zkušenosti
- Další parametry pro vzdálenou monitoraci u srdečního selhání

Možnosti monitorace volémie pacientů s HF

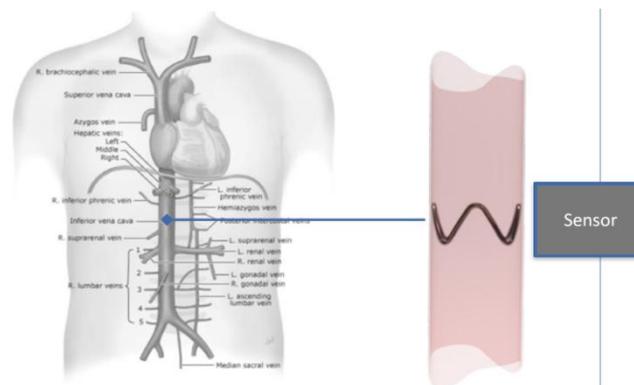
- CardioMems – senzor v plicnici



- OptiVol – hrudní impedance (CRT)

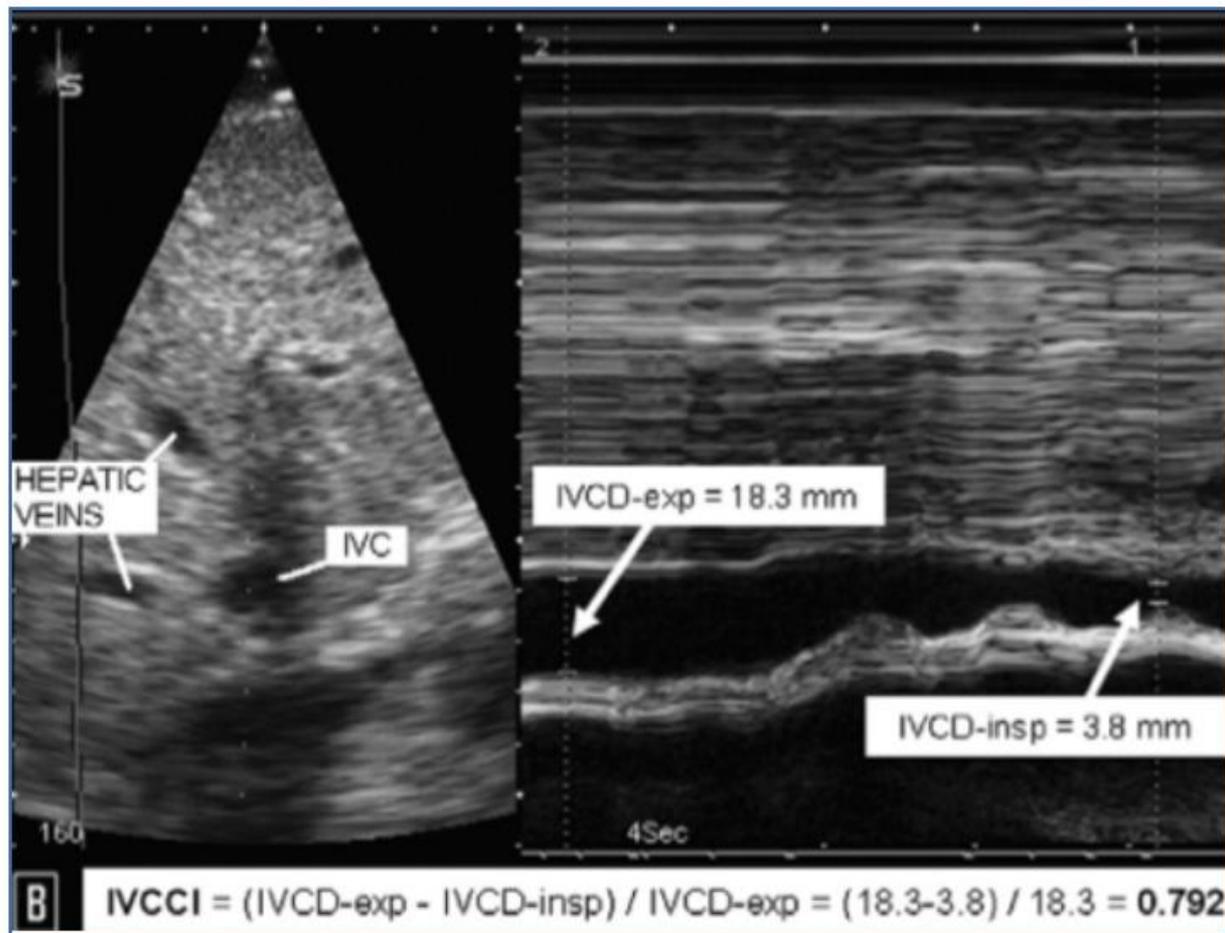


- Senzor v IVC (FIRE I)
- rozměr a kolapsibilita IVC

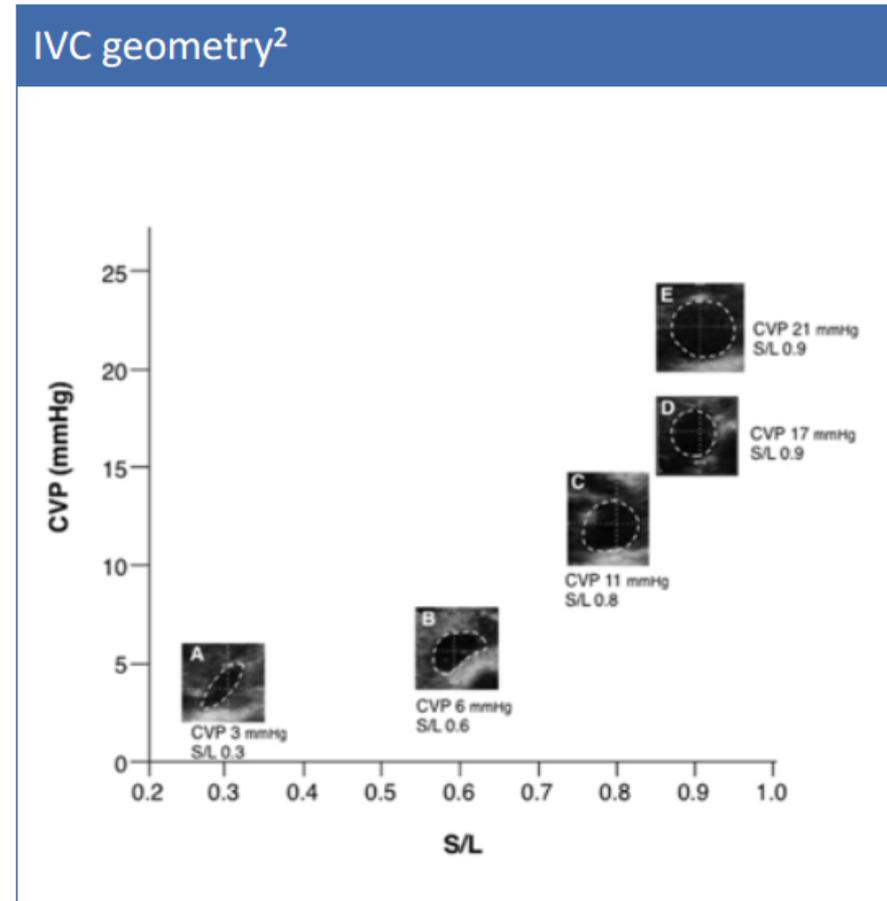
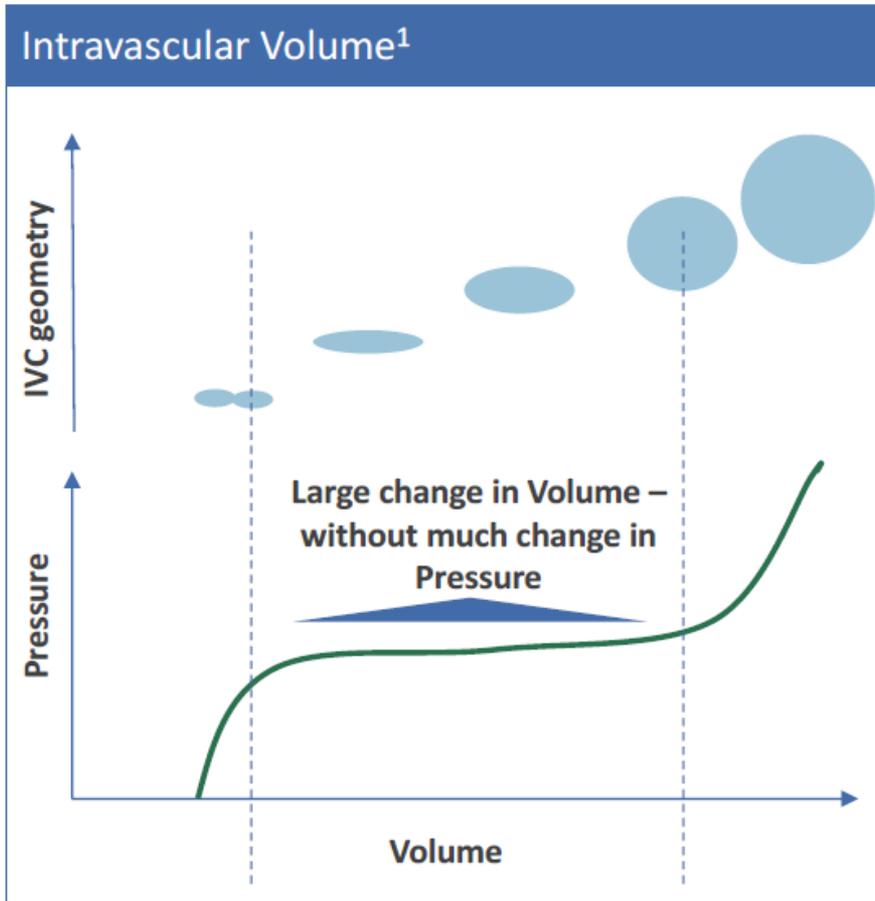


Možnosti monitorace systémové kongesce

Monitorace rozměru
a dynamických změn IVC



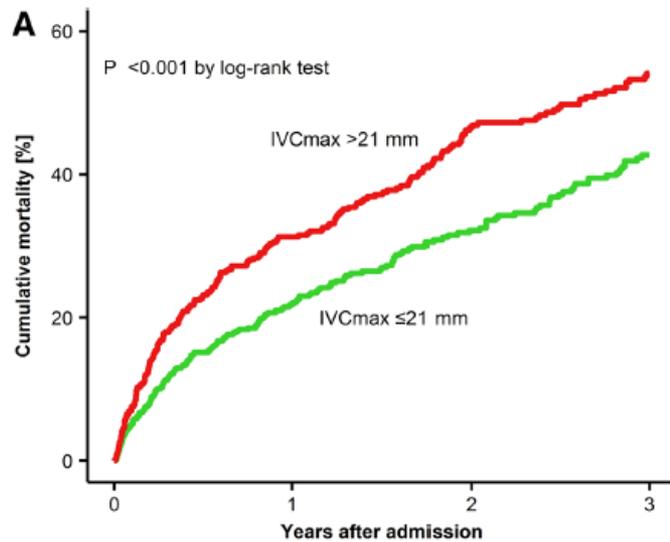
Dynamické změny morfologie IVC předcházejí rozvoji systémové kongesce



Prognostický význam rozměru IVC u AHF a CHF

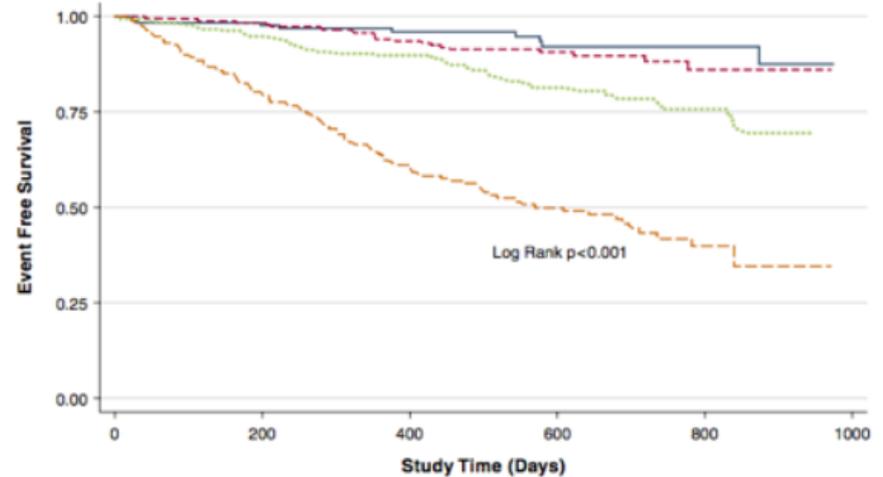
Acute HF (n=1101)

Chronic HF (n=683)



Number at risk

	0	1	2	3
>21 mm	474	272	158	106
≤21 mm	627	362	201	136



Tertile 1: median IVC \varnothing 16 mm

Tertile 2: median IVC \varnothing 19 mm

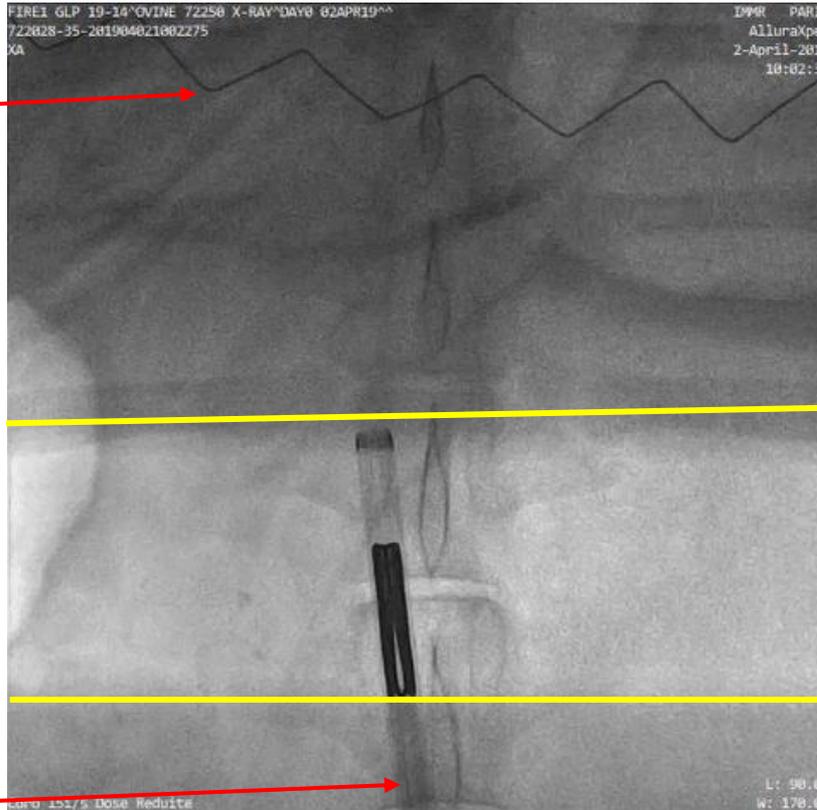
Tertile 3: median IVC \varnothing 24 mm

FIRE 1 senzor v IVC



Implantace systému FIRE-1

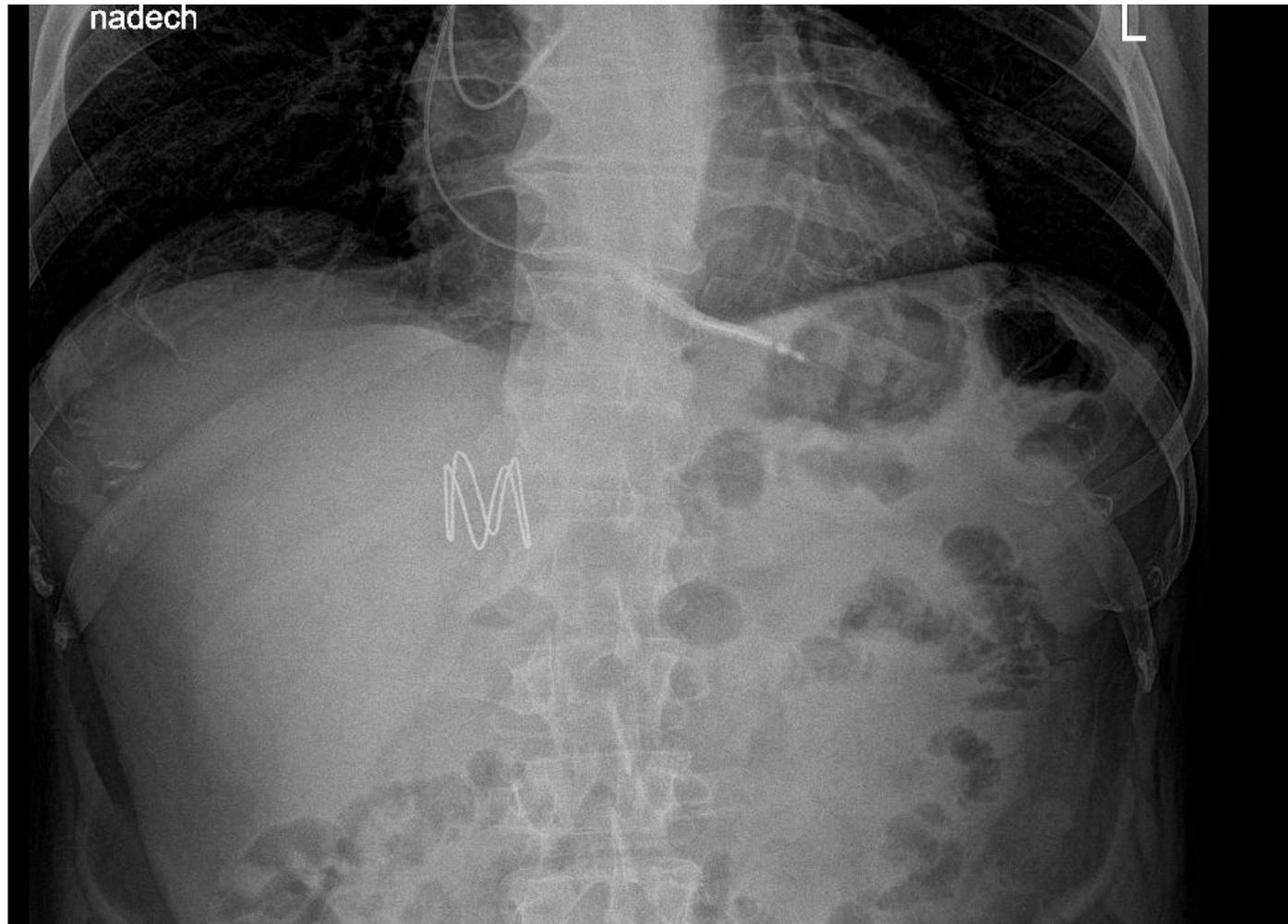
FIRE1
Belt



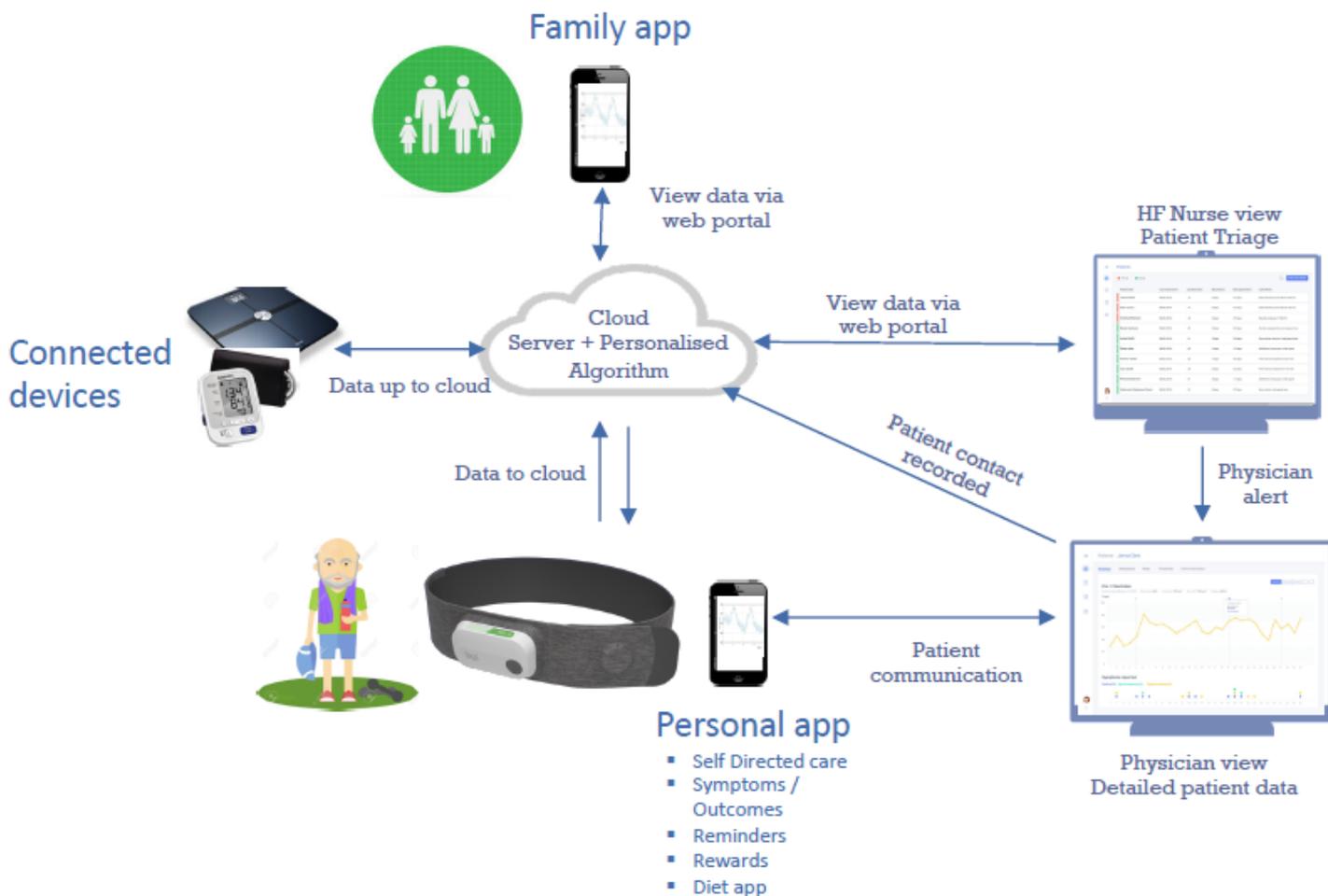
Deployed under
breath hold and
Sheath and Pusher
fully retracted
during deployment

Area of reduced
contrast is target
landing zone for
deployment

Skiaskopický obraz FIRE-1



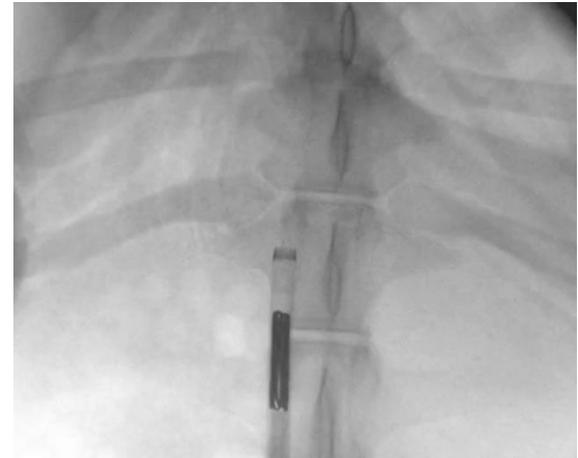
Budoucnost monitorace pacientů s HF



Kazuistika

Muž 48 let s DKMP

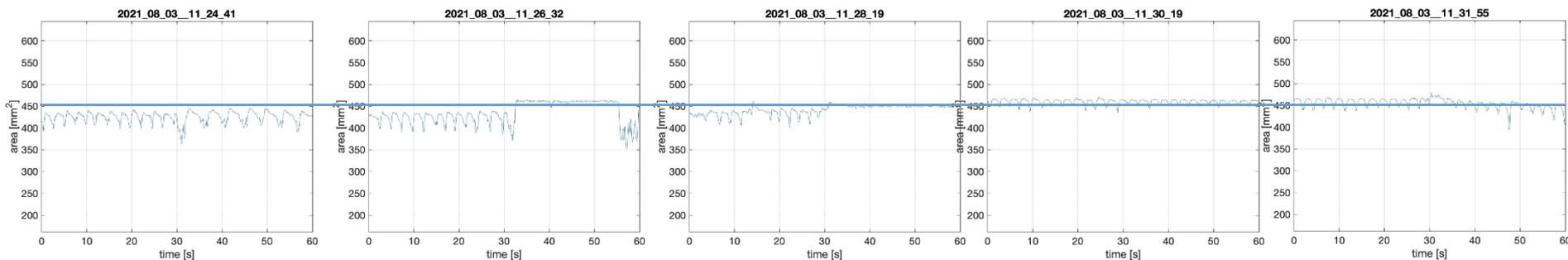
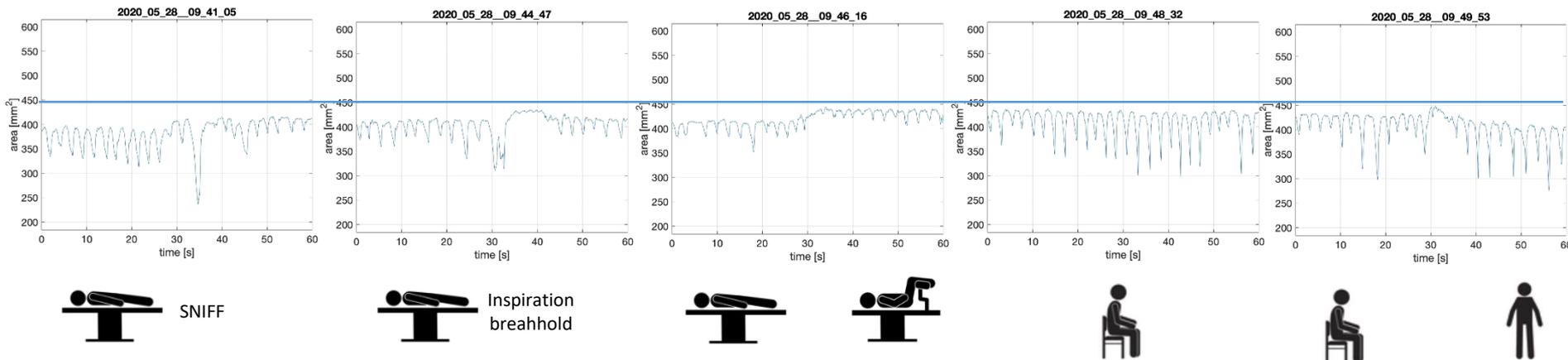
- Stabilní NYHA III v úvodu studie
- Implantace senzoru 31.1.2020
- Sběr data po dobu 5 let
- Femorální přístup k implantaci senzoru do IVC



[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)

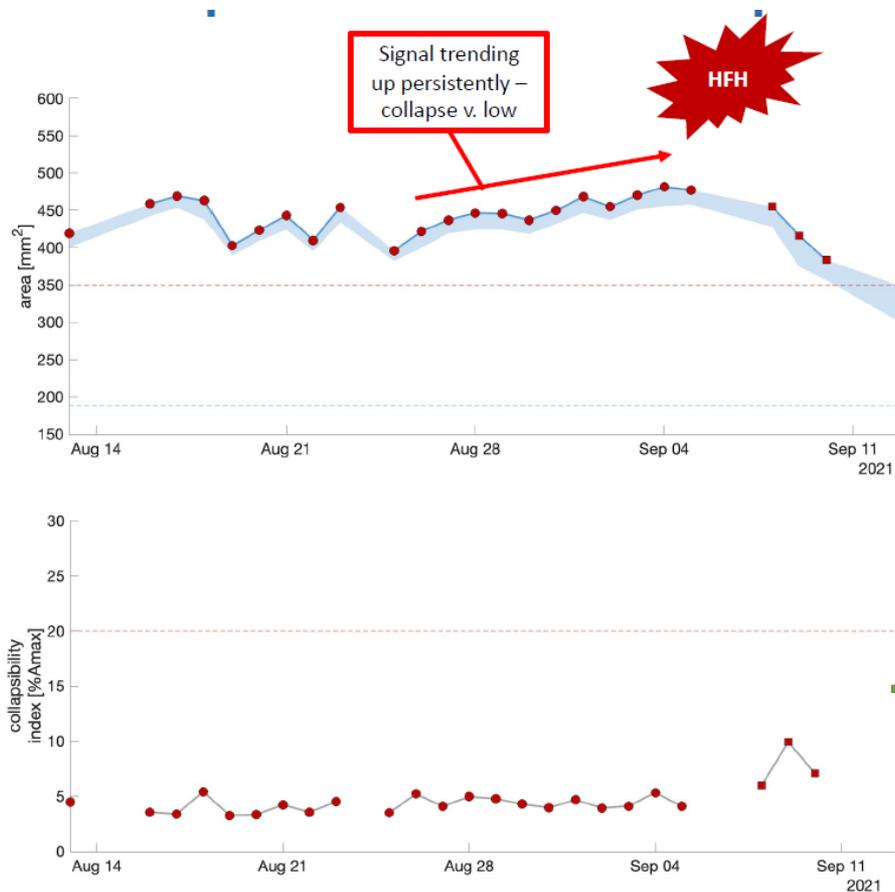


(Aug2021, before hospitalisation)

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

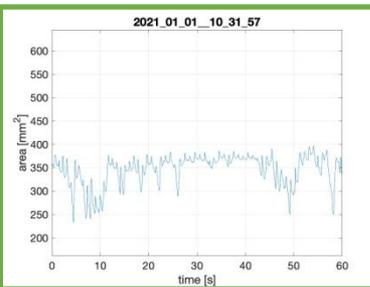


- Slow VT event with associated congestion
- Treatment included oral diuretics, inotropes and significant changes in HF medication e.g. commenced on SGLT-2 inhibitor

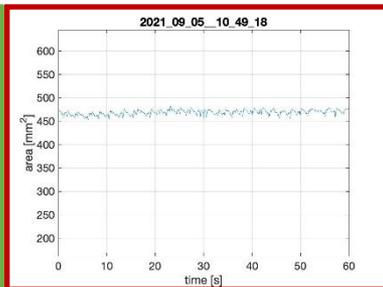
Pacient s pokročilým ChSS

PID101_003: traces in relation to hospitalisation and LVAD placement

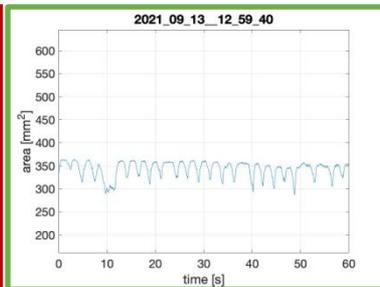
Recovered after CRT
9 months before Hospitalisation



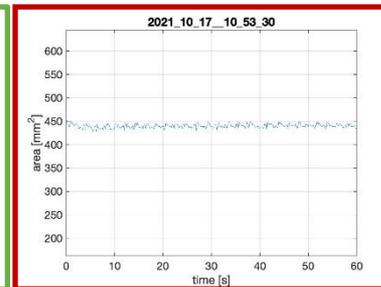
1 day before Hospitalisation



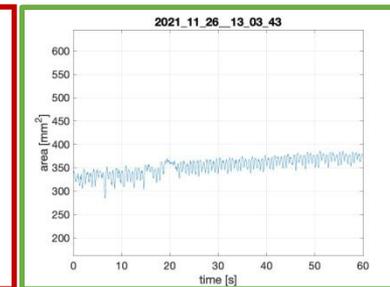
Recompensated
7 days after Hospitalisation



Last scan before ICU
submission for LVAD

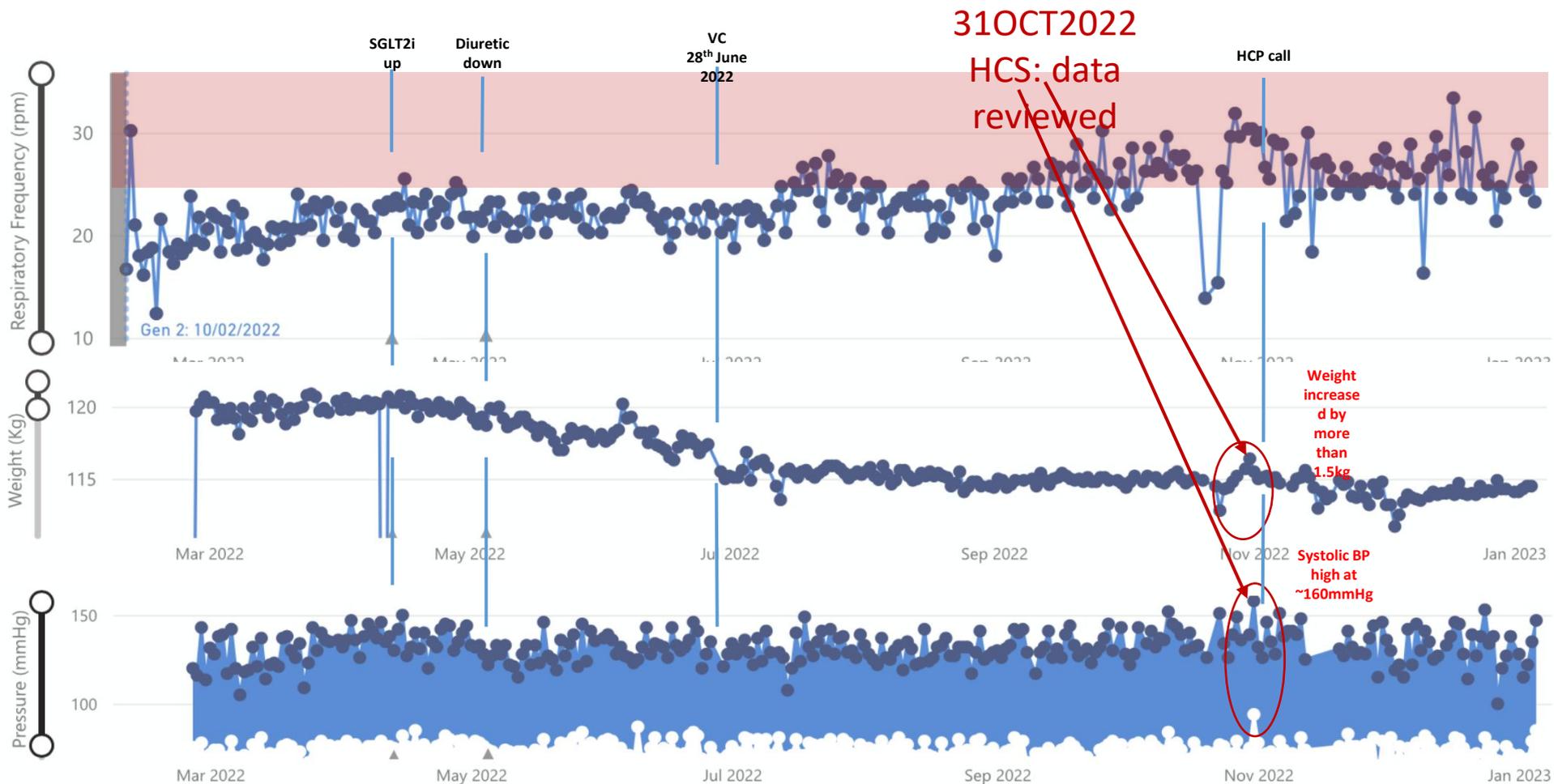


LVAD @home



Konzultace změn signálu s lékařem

PID101_005 Understanding the HCP call



Klinické studie vzdálené monitorace u HF

- Studie s různým plánem a různými parametry

openheart Remote monitoring in patients with heart failure with cardiac implantable electronic devices: a systematic review and meta-analysis

Michael J McGee^{1,2}, Max Ray², Stephn C Briennes², Shanathan Sritharan², Andrew J Boyle^{2,3}, Nicholas Jackson², James W Leitch², Aaron L Sverdlow^{2,3}

J Innov Cardiac Rhythm Manage. 2021;12(8):4621-4624

DOI: 10.19102/icrm.2021.120802

REMOTE MONITORING

ORIGINAL RESEARCH

Impact of Remote Monitoring on Hospitalizations for Heart Failure: A Five-year Single-center Experience

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ESC
European Society of Cardiology
Europe (2022) 24, 256–267
doi:10.1093/eurpub/ckab160

CLINICAL RESEARCH
Remote CIED monitoring

Remote monitoring data from cardiac implantable electronic devices predicts all-cause mortality

Fozia Zahir Ahmed^{1,2†}, Camilla Sammut-Powell^{1†}, Chun Shing Kwok^{1,4,5}, Tricia Tay¹, Manish Motwani^{1,2}, Glen P. Martin¹, and Joanne K. Taylor^{3,6*}

¹Division of Cardiovascular Sciences, Faculty of Biology, Medicine and Health, University of Manchester, Manchester, UK; ²Department of Cardiology, Manchester University, Hathersall 1847 Foundation Trust, Oxford Rd, Manchester, UK; ³Division of Population Health and Data Sciences, Faculty of Biology, Medicine and Health, University of Manchester, Manchester Academic Health Science Centre, Manchester, UK; ⁴School of Primary, Community and Social Care, Keele University, Stoke-on-Trent, UK; and ⁵Department of Cardiology, University Hospital of Northumbria NHS Trust, Newcastle-on-Tyne, UK

Received 1 December 2020; editorial decision 17 April 2021; online published ahead of print 3 October 2021

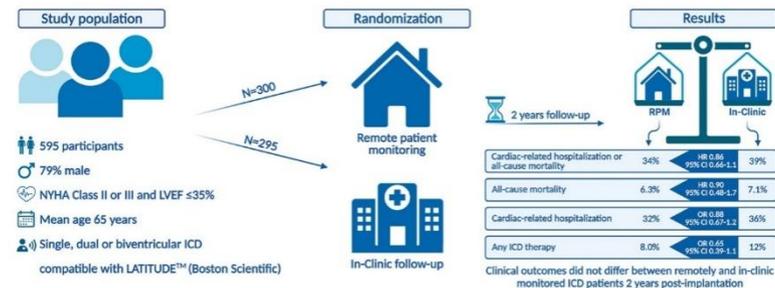
Aims To determine if remotely monitored physiological data from cardiac implantable electronic devices (CIEDs) can be used to identify patients at high risk of mortality.

Methods and results This study evaluated whether a risk score based on CIED physiological data (Trigge-Heart Failure Risk Status, Trigge-HFRS; previously validated to predict heart failure (HF) events) can identify patients at high risk of death. Four hundred and thirty-nine adults with CIEDs were prospectively enrolled. Primary observed outcome was all-cause mortality (median follow-up: 702 days). Several physiological parameters (including heart rate profile, atrial fibrillation/tachycardia (AF/AT) burden, ventricular rate during AT/AF, physical activity, thoracic impedance, therapies for ventricular tachycardia/fibrillation) were continuously monitored by CIEDs and dynamically combined to produce a Trigge-HFRS every 24 h. According to transmission parameters were categorized into 'high-risk' or 'lower high-risk' groups. During follow-up, 285 patients (63%) had a high-risk episode and 60 patients (14%) died (50 in high-risk group; 10 in lower high-risk group). Significantly more cardiovascular deaths were observed in the high-risk group, with mortality rates across groups of high vs. never-high 10.3% vs. <4.0%, $P = 0.03$. Experiencing any high-risk episode was associated with a substantially increased risk of death [odds ratio (OR): 3.07, 95% confidence interval (CI): 1.57–6.28, $P = 0.002$]. Furthermore, each high-risk episode ≥ 14 consecutive days was associated with increased odds of death (OR: 1.26, 95% CI: 1.06–1.48, $P = 0.006$).

Conclusion Remote monitoring data from CIEDs can be used to identify patients at higher risk of all-cause mortality as well as HF events. Distinct from other prognostic scores, this approach is automated and continuously updated.

Keywords Cardiac resynchronization • Defibrillators • Prognosis • Risk score • Mortality • Remote monitoring

Effect of remote monitoring on clinical outcomes in European heart failure patients with an implantable cardioverter-defibrillator: secondary results of the REMOTE-CIED randomized trial

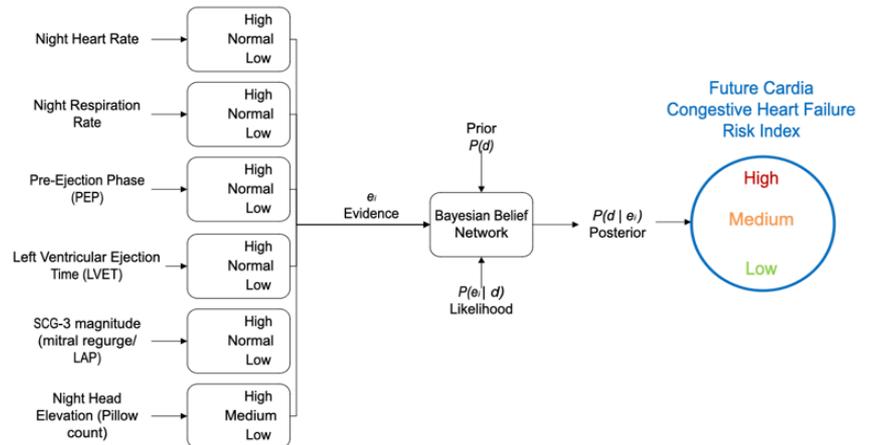
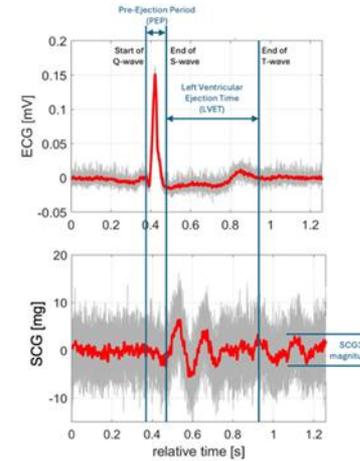
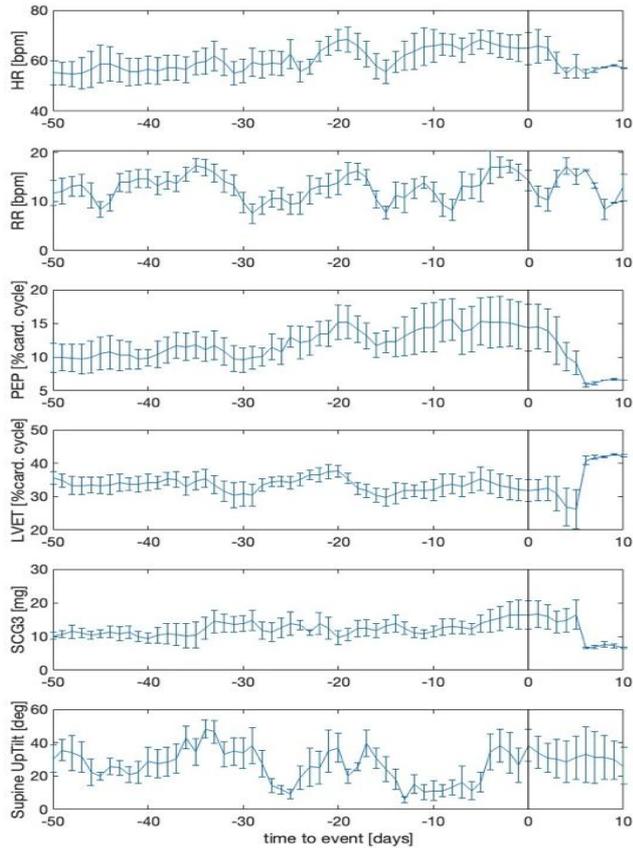


Více parametrický impantabilní monitor Future Cardia



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

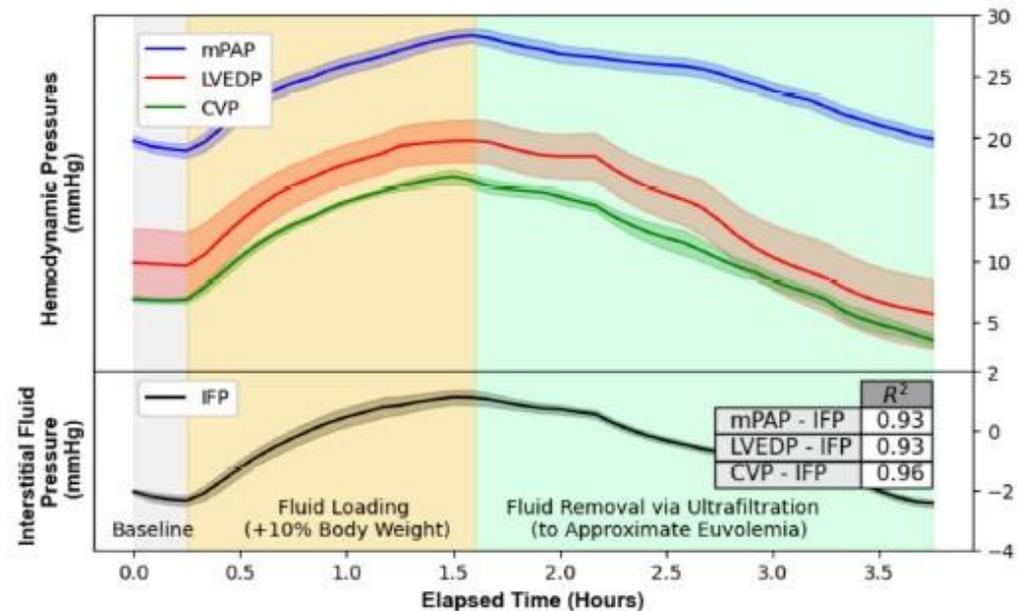


Implantabilní senzor pro monitoraci IFP (tlak intersticiální tekutiny)

A IFPx Subcutaneous Multiparameter Sensor and Insertion Procedure



B Relationship of Interstitial Fluid Pressure (IFP) and Hemodynamic Pressures



(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

