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ECMO program regionálního kardiocentra bez kardiochirurgie: rok a půl provozu

Jiří Karásek

Koronární Jednotka

Kardiocentrum, Krajská nemocnice Liberec, a.s.

ECMO

- Mechanická podpora oběhu
- Plně či částečně nahrazuje funkci srdce a/nebo plic
- Slouží k překlenutí akutního stavu či poskytuje dostatečný čas k intervenci
- V ČR zatím není systematická péče o pacienty vyžadující tuto léčbu
- Je převážně vázána na pracoviště s kardiochirurgickým zázemím
- Lze provádět rutinně perkutánní implantací bez nutnosti přítomnosti perfuzionisty

PROČ ECMO?

European Heart Journal (2014) **35**, 2541–2619
doi:10.1093/eurheartj/ehu278

Recommendations	Class[a]	Level[b]	Ref[c]
Emergency echocardiography is indicated to assess LV and valvular function and exclude mechanical complications.	I	C	
Emergency invasive evaluation is indicated in patients with acute heart failure or cardiogenic shock complicating ACS.	I	B	180,201, 221,331
Emergency PCI is indicated for patients with cardiogenic shock due to STEMI or NSTE-ACS if coronary anatomy is amenable.	I	B	221
Emergency CABG is recommended for patients with cardiogenic shock if the coronary anatomy is not amenable to PCI.	I	B	221
Emergency surgery for mechanical complications of acute myocardial infarction is indicated in case of haemodynamic instability.	I	C	
IABP insertion should be considered in patients with haemodynamic instability/cardiogenic shock due to mechanical complications.	IIa	C	
Patients with mechanical complication after acute myocardial infarction require immediate discussion by the Heart Team.	I	C	
Short-term mechanical circulatory support in ACS patients with cardiogenic shock may be considered.	IIb	C	
Percutaneous repair of VSD may be considered after discussion by the Heart Team.	IIb	C	
Routine use of IABP in patients with cardiogenic shock is not recommended.	III	A	332,333

PROČ ECMO ?

As a consequence of advances in the technology for circulatory assistance, percutaneous cannula implantation no longer requires cardiac surgical skills or the involvement of a highly specialised team[2,4,7,13]. After training and in cooperation with a cardiac surgical hospital, an interventional cardiology team in a local hospital with a high-volume catheterisation laboratory but without on-site cardiovascular surgery facilities would be allowed to implant, prime, and run such devices.

CLINICAL RESEARCH

EuroIntervention 2012;8:375-382

Emergency extracorporeal membrane oxygenation in a hospital without on-site cardiac surgical facilities

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KEYWORDS

- extracorporeal membrane oxygenation
- cardiogenic shock
- refractory cardiac arrest

Abstract

Aims: We report the feasibility and outcomes of emergency extracorporeal membrane oxygenation (ECMO) implantation by a cardiac catheterisation team in patients in severe cardiogenic shock or refractory cardiac arrest in a hospital without cardiac surgical facilities.

Methods and results: This prospective cohort study involved 51 consecutive patients who had ECMO implantation (September 2006 - September 2010). Twenty-seven were in severe cardiogenic shock and 24 in refractory cardiac arrest (17 with out-of-hospital cardiac arrest; seven with in-hospital cardiac arrest). Implantations were done via a percutaneous femoral approach by a local interventional cardiologist team, and in collaboration with the nearest cardiac surgical institution. Patients' mean age was 51±15 years; 38 (74.5%) were men. Stable ECMO implantation was achieved in 26/27 (96.3%) patients in severe cardiogenic shock and in 18/24 (75.0%) patients in refractory cardiac arrest. In-hospital complications occurred in 23/27 cardiogenic shock patients; 13/27 were discharged alive. In patients with refractory cardiac arrest, complications occurred in 20/24; 21/24 were disconnected from ECMO because of brain death or multiorgan failure occurring ≤24 hours; one patient was discharged alive.

Conclusions: Emergency ECMO implantation by an interventional cardiologist in a hospital without cardiac surgical facilities is feasible, with a failure rate concordant with the literature.

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PROČ ECMO ?

RESUSCITACE

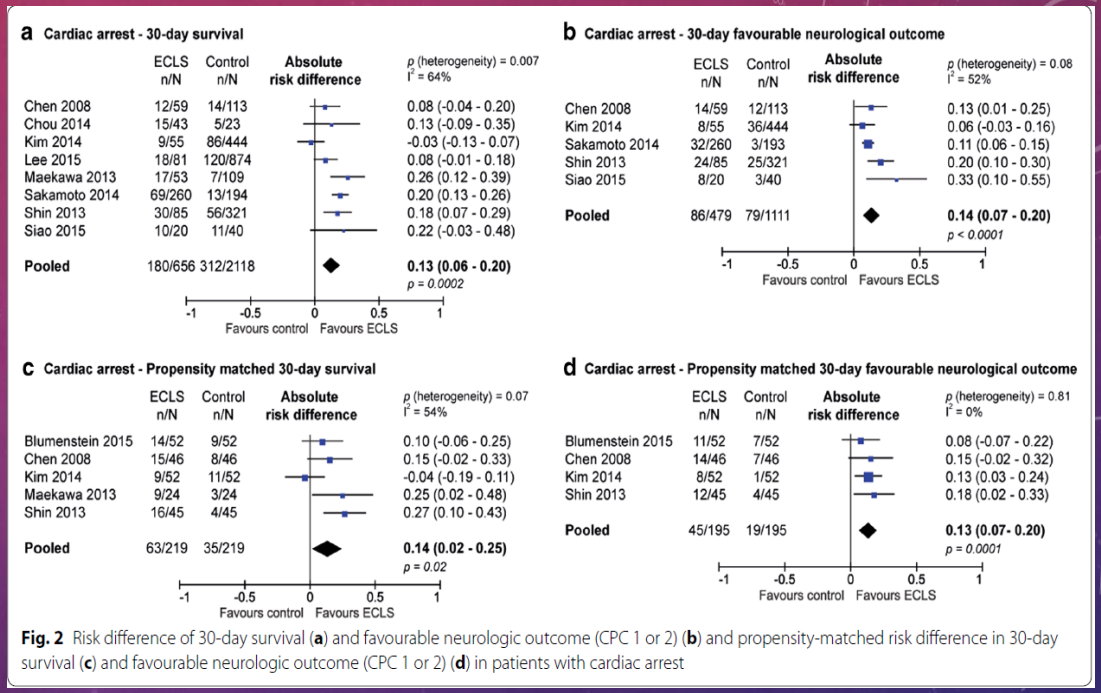


Fig. 2 Risk difference of 30-day survival (**a**) and favourable neurologic outcome (CPC 1 or 2) (**b**) and propensity-matched risk difference in 30-day survival (**c**) and favourable neurologic outcome (CPC 1 or 2) (**d**) in patients with cardiac arrest

ECMO vs. KPR o 13% vyšší 30-denní přežívání (95% CI 6-20%;p<0.001), NNT= 7,7

ECMO vs. KPR 14% lepší neurologický outcome (95% CI 7-20%; p<0.001), NNT= 7,1

Ouweneel DM, Schotborg JV, Limpens J, Sjauw KD, Henriques JPS et al. Exctracorporeal life suppert during cardiac arrest and cardiogenic shock: a systematic review and meta-analysis, Intensive Care Med. 2016;

PROČ ECMO ?

KARDIOGENNÍ ŠOK

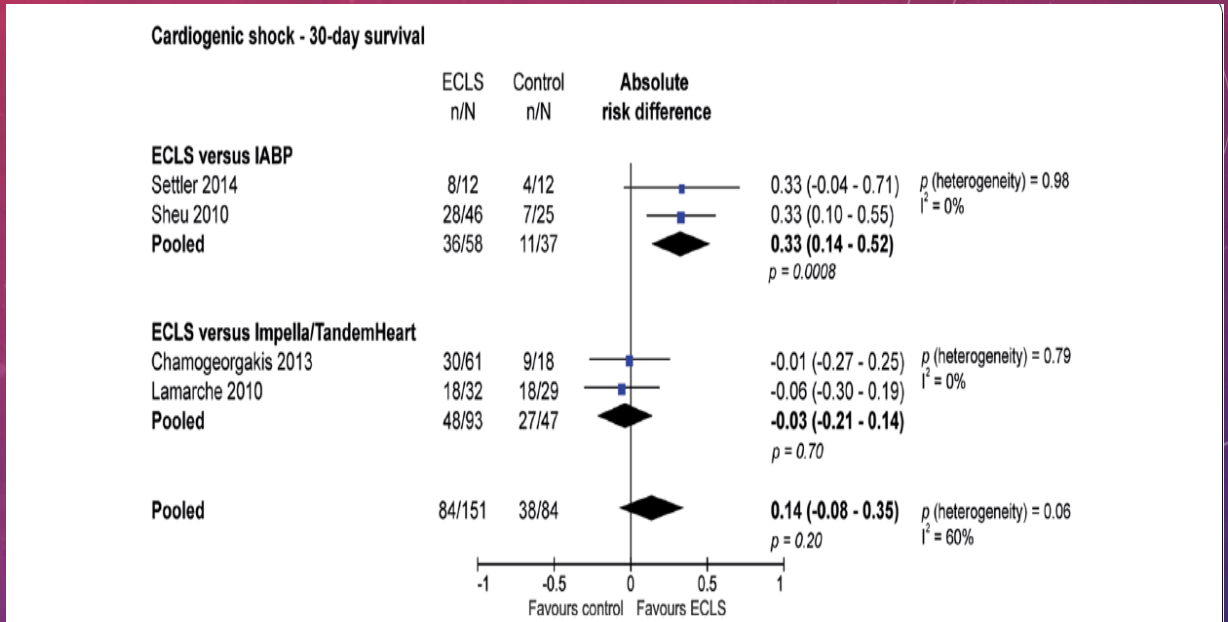


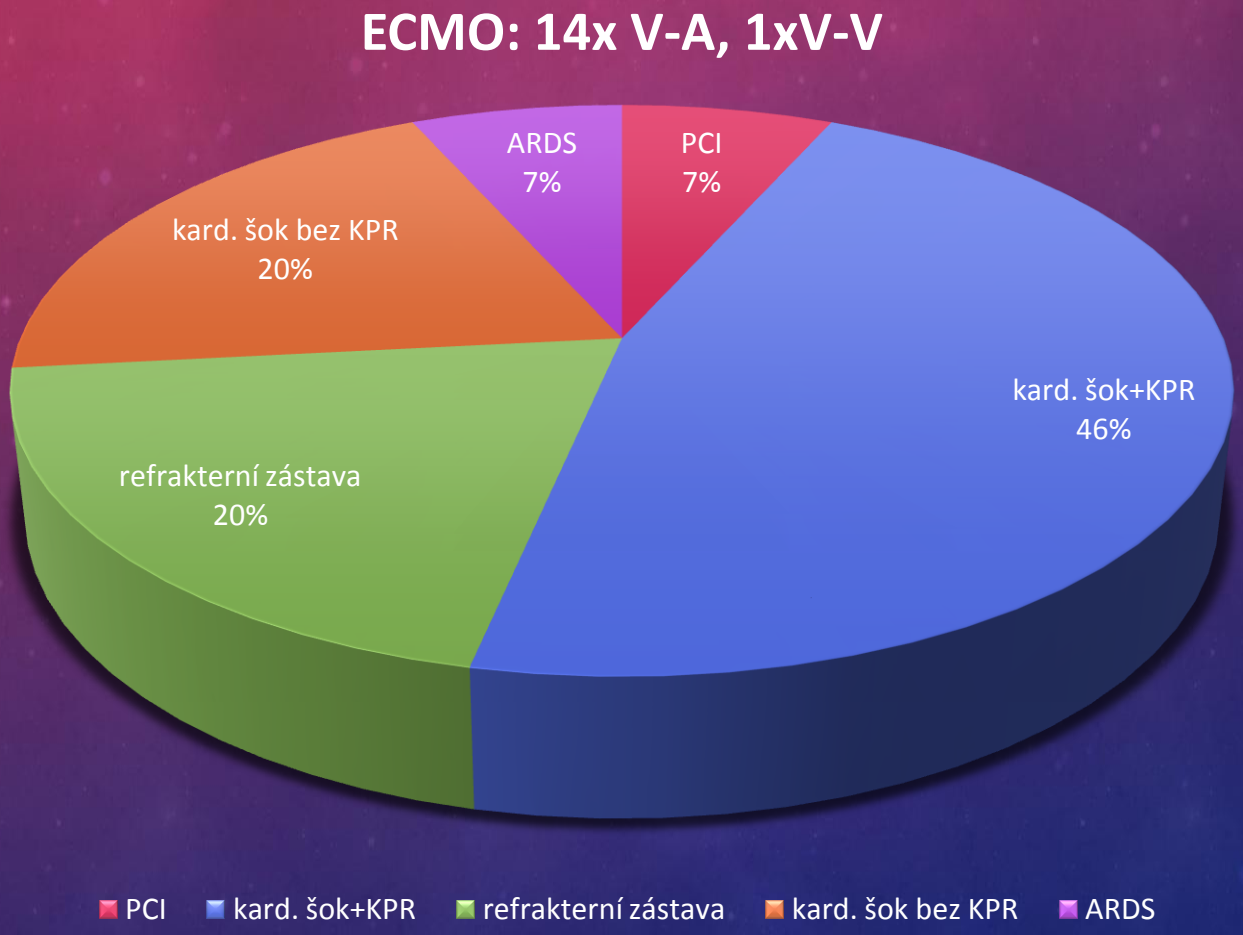
Fig. 3 Difference of 30-day survival of patients with cardiogenic shock, stratified according to different control therapies (IABP or Impella/TandemHeart)

ECMO vs. IABP o 33% vyšší 30-denní přežívání (95% CI 14-52%; p<0.001;NNT=13)

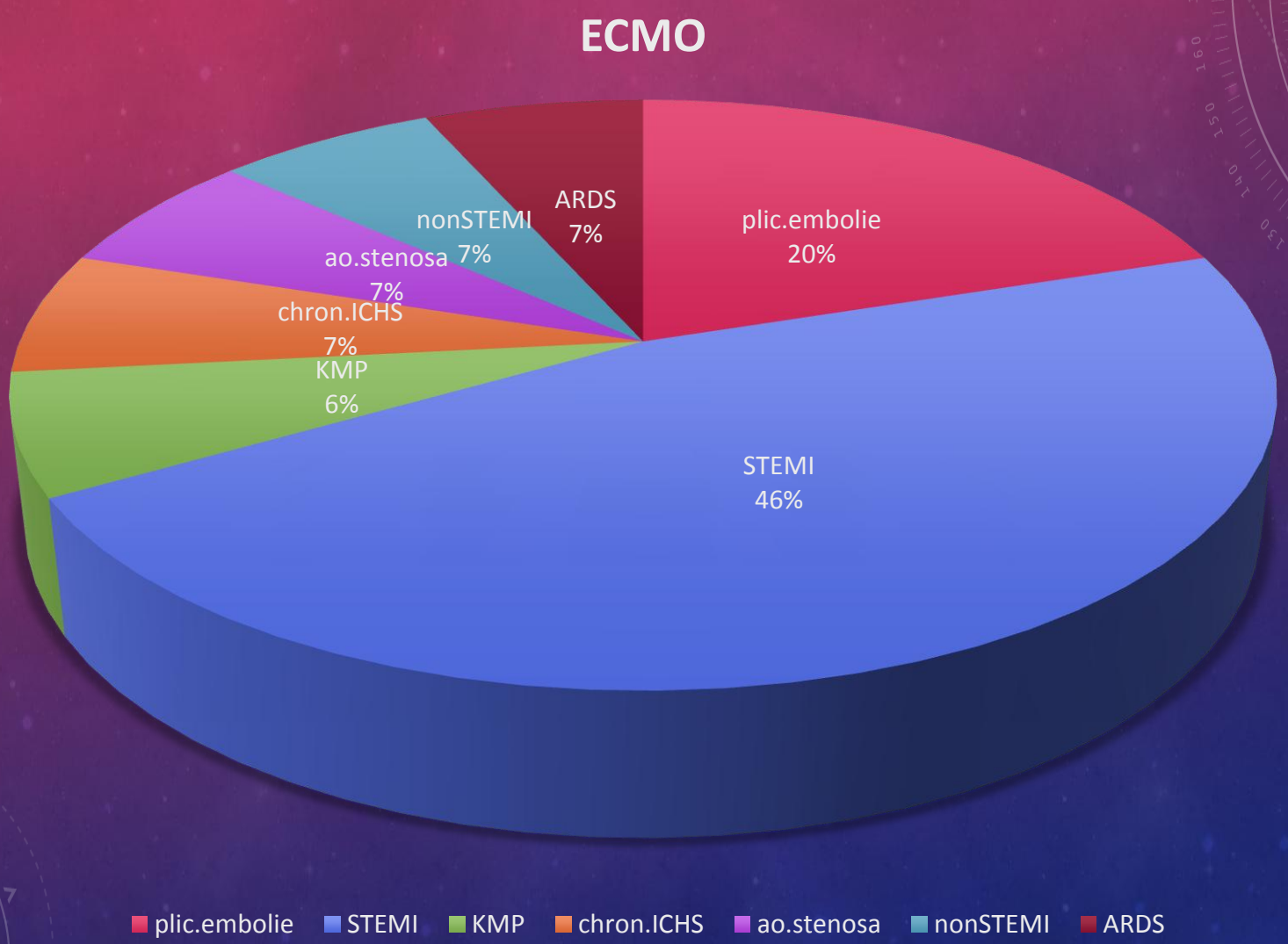
ECMO vs. Impella/TandemHeart bez stat. významnosti (-3%, 95% CI -21% - 14%;p=0.7;NNH=30)

Ouweneel DM, Schotborg JV, Limpens J, Sjauw KD, Henriques JPS et al. Exctracorporeal life suppert during cardiac arrest and cardiogenic shock: a systematic review and meta-analysis, Intensive Care Med. 2016;

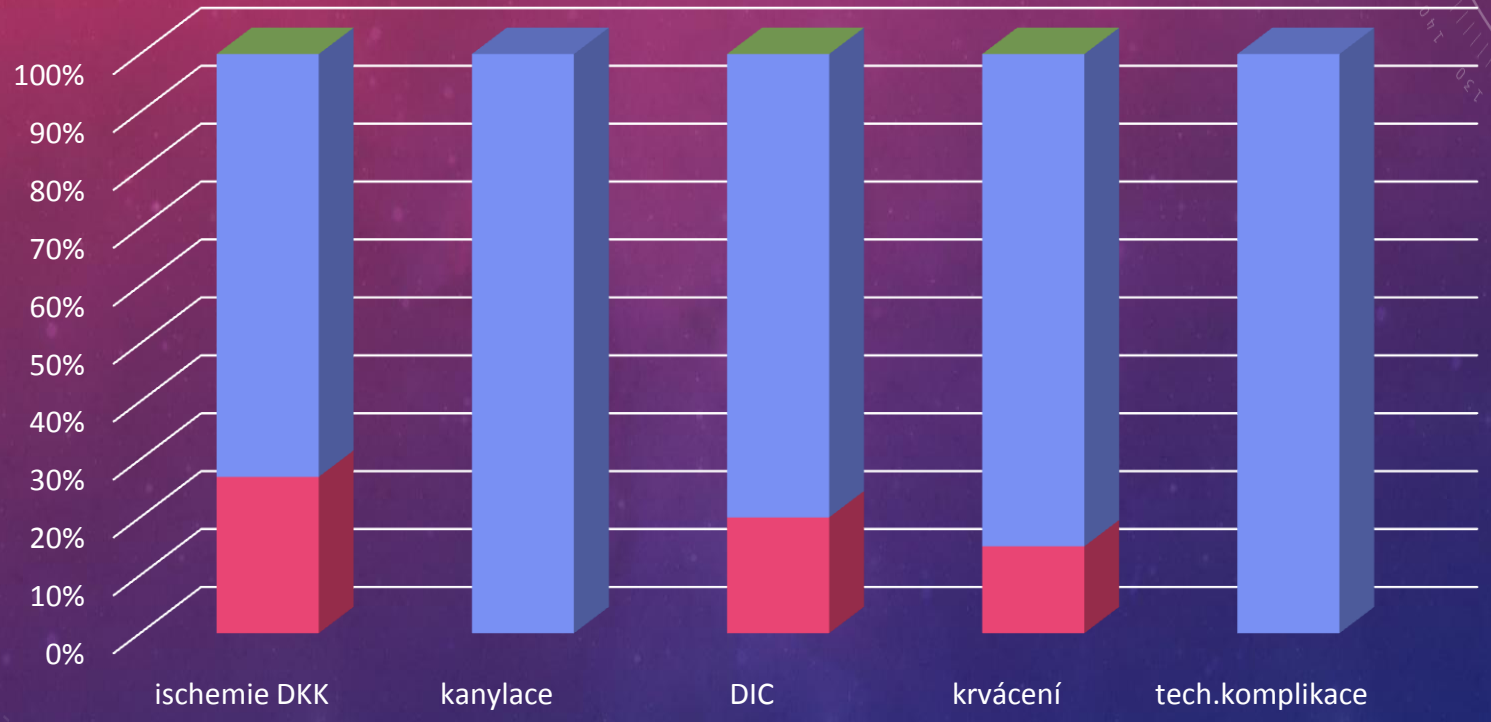
ECMO-15 PACIENTŮ ZA 18 MĚSÍCŮ



ETIOLOGIE

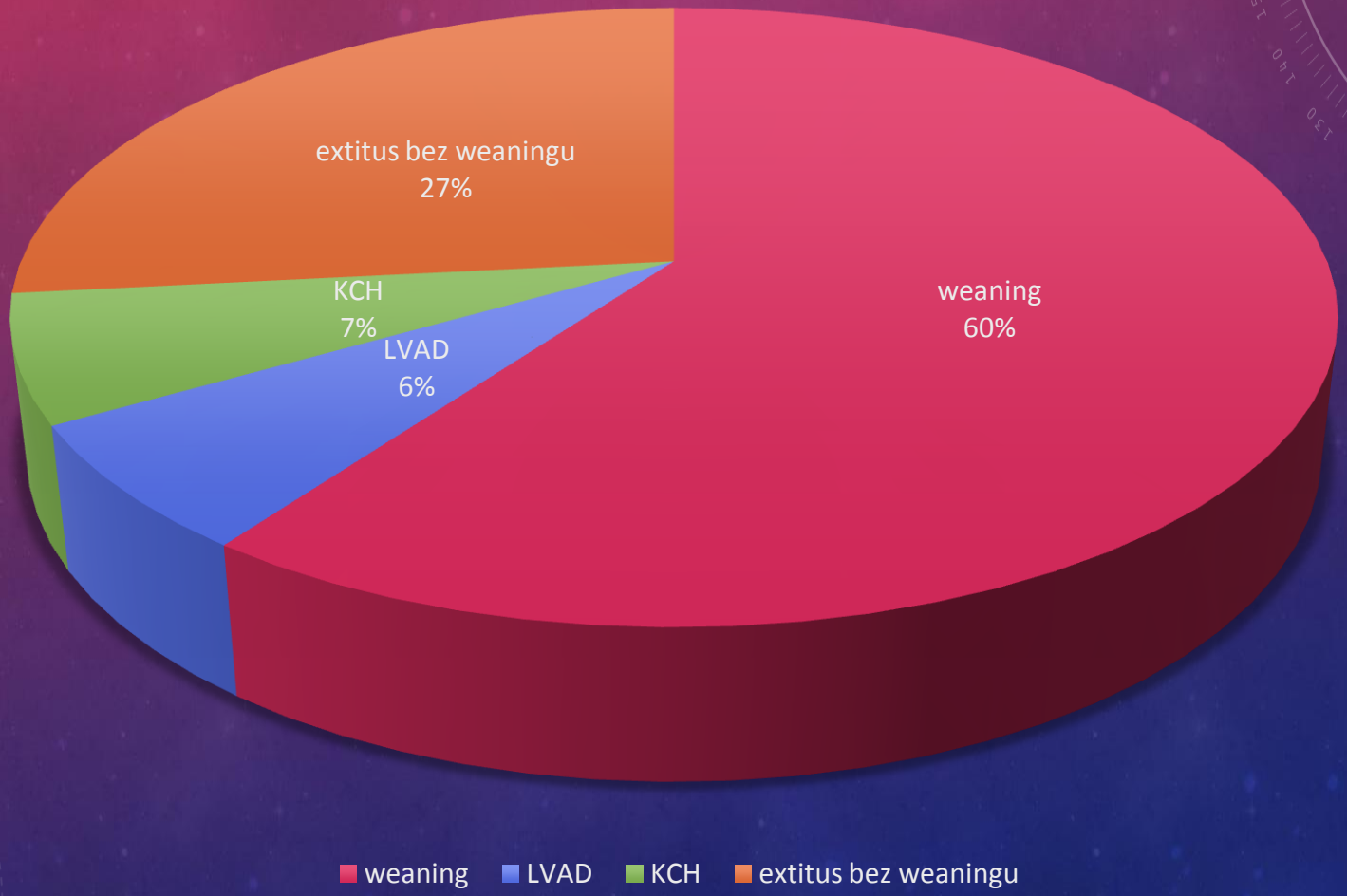

ECMO
plic.embolie 20%
STEMI 46%
KMP 6%
chron.ICHS 7%
ao.stenosa 7%
nonSTEMI 7%
ARDS 7%
plic.embolie
STEMI
KMP
chron.ICHS
ao.stenosa
nonSTEMI
ARDS

KOMPLIKACE

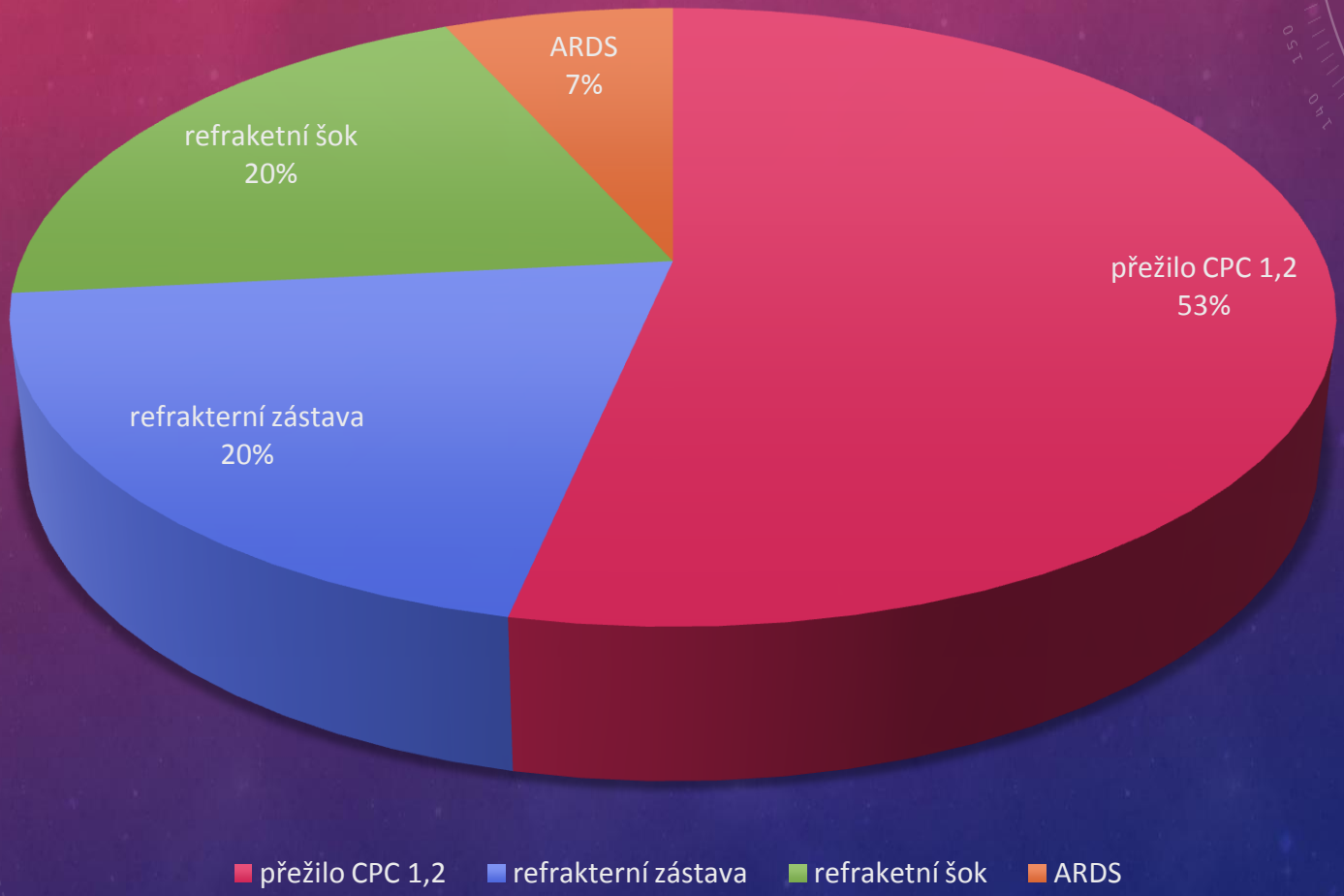

100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
ischemie DKK
kanylace
DIC
krvácení
tech.komplikace

WEANING

ECMO průměr: 6,6± 2,5 dní



MORTALITA


ARDS
7%
refraketní šok
20%
přežilo CPC 1,2
53%
refrakterní zástava
20%
přežilo CPC 1,2
refrakterní zástava
refraketní šok
ARDS

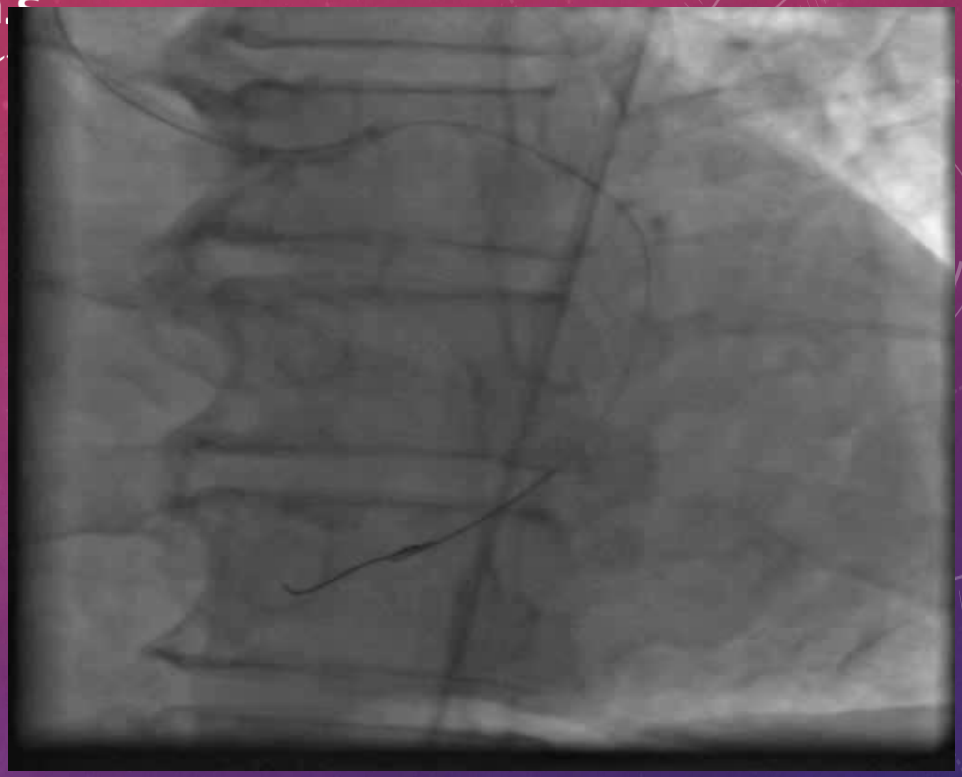
MORTALITA


100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
refrakterní zástava
kard. šok bez KPR
kard. šok+KPR
plicní embolie
moratlita
CPC 1,2

KAZUISTIKA

- Pacient 72 let, DM II, hypertenze
- Přijat do spád. nemocnice pro bolesti na hrudi, synkopu
- Vstupně bradykardický, hypotenzní, EKG: hluboké ST deprese V2-V6
- Podán Heparin, Cardégic, překlad do kardiocentra, při transportu intubován pro plicní edém a kard. šok
- Při příjmu sinus 40/min, TK 65/35, EF 20%, akineza inferolaterálně
- Indikována koronarografie

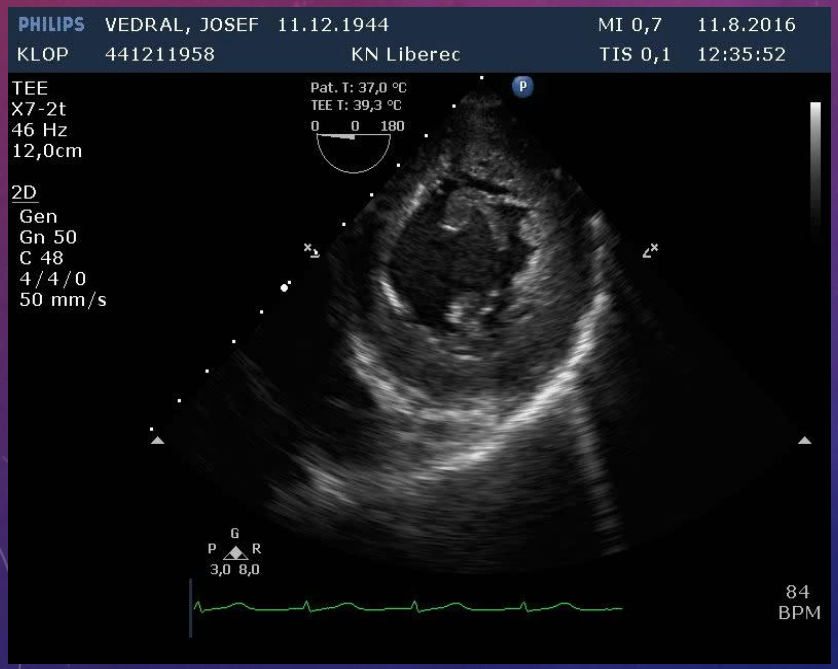
KAZUISTIKA



- Nemoc tří tepen: RIA 50%, RC uzávěr, ACD hypoplastická
- Trombaspirace+ PCI na RC, zavedena IABK
- Během výkonu 2 x EMD, po ukončení výkonu TK 100/60

KAZUISTIKA-DEN 2

- Pacient na IABK, Noradrenalin 1 mcg/kg/min, Dobutamin 10 mcg/kg/min
- pH 6,9, laktát 7 mmol/l, MAP 45 mm Hg, diuréza 15 ml/hod., CI 1,9 l/min/m2
- Zavedeno V-A ECMO, bifemorálně, 3 l/min, FiO2 0,5, flow 2 l/min
- Kontrolní SKG –dobrý efekt PCI na RC, TEE EF 10%



KAZUISTIKA-DEN 3-5

- Den 3: na ECMO 3,5 l/min, diuréza 200 ml/hod, laktát 3,9 mmol/l, CI 2 l/min
- dominuje těžký distribuč. šok na podkladě capillary leak sy., masívní objem. resuscitace-23 l/ 48 hod., opakovaně pulsy albuminu, noradrenalin+ terlipressin, dobutamin+milrinon
- Den 5: recovery komory, EF40%, CI 2,4 l/min,m2, MAP 85 mmHg
- zahájen weaning ECMO 1 l/min, dekanylace femostopem, ponechána IABK

KAZUISTIKA DEN 6-16

- 6-10 den: mobilizace tekutin z periferie, rozvoj těžkého plicního edému s nutností agresivní UPV, významná MR- restrikce objemu, který jen ve formě ČZM, max. diuretická podpora, postupně mobilizace tekutin s navozením negativní bilance
- 11-16 den: pacient odtlumován, weaning , 13.den extubace, intermitentně nutnost NIV, IABK ukončena 16.den, EF 40%, akineza inferolaterálně, MR středně až více významná

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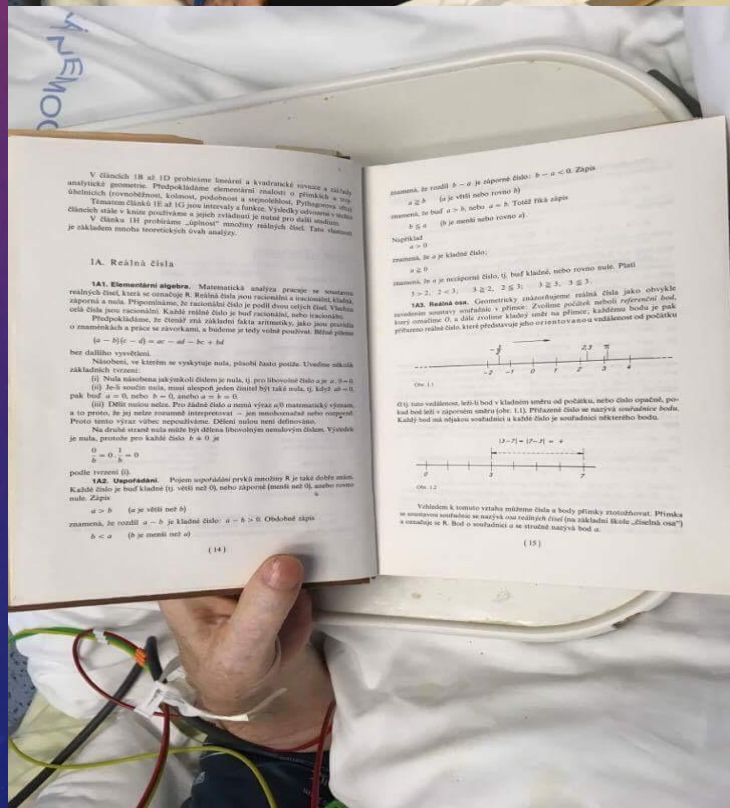
KAZUISTIKA DEN 17-37

- Dechová a funkční rehabilitace,implanatce dvoudut. KS pro intermitentní AV blok III.st.
- Den 25 přeložen z KJ na JIMP
- Realimentace,vertikalizace
- Den 37 dimitován do ambul.péče NYHA II, CPC 1



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DĚKUJI ZA POZORNOST