

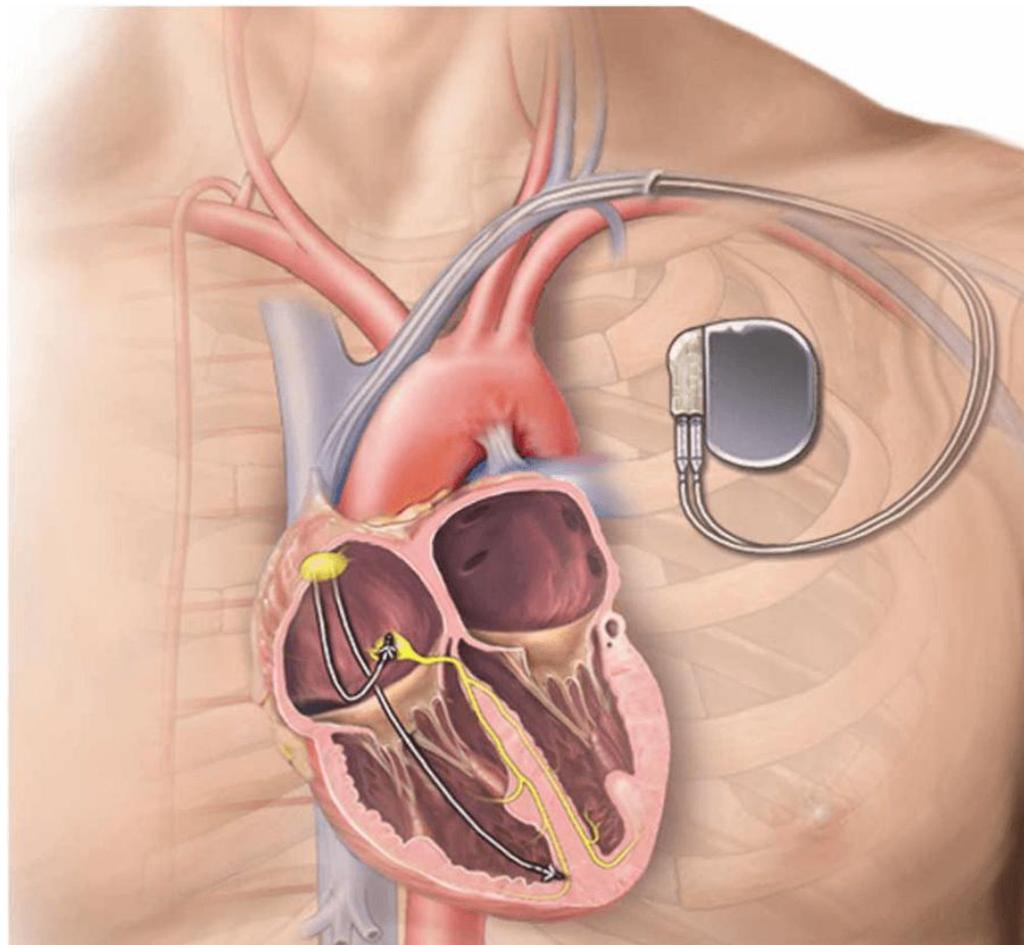
Arytmologické intervence

Komplikace katetrizačních intervencí

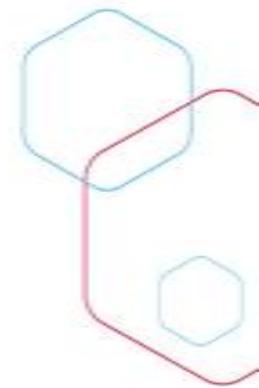
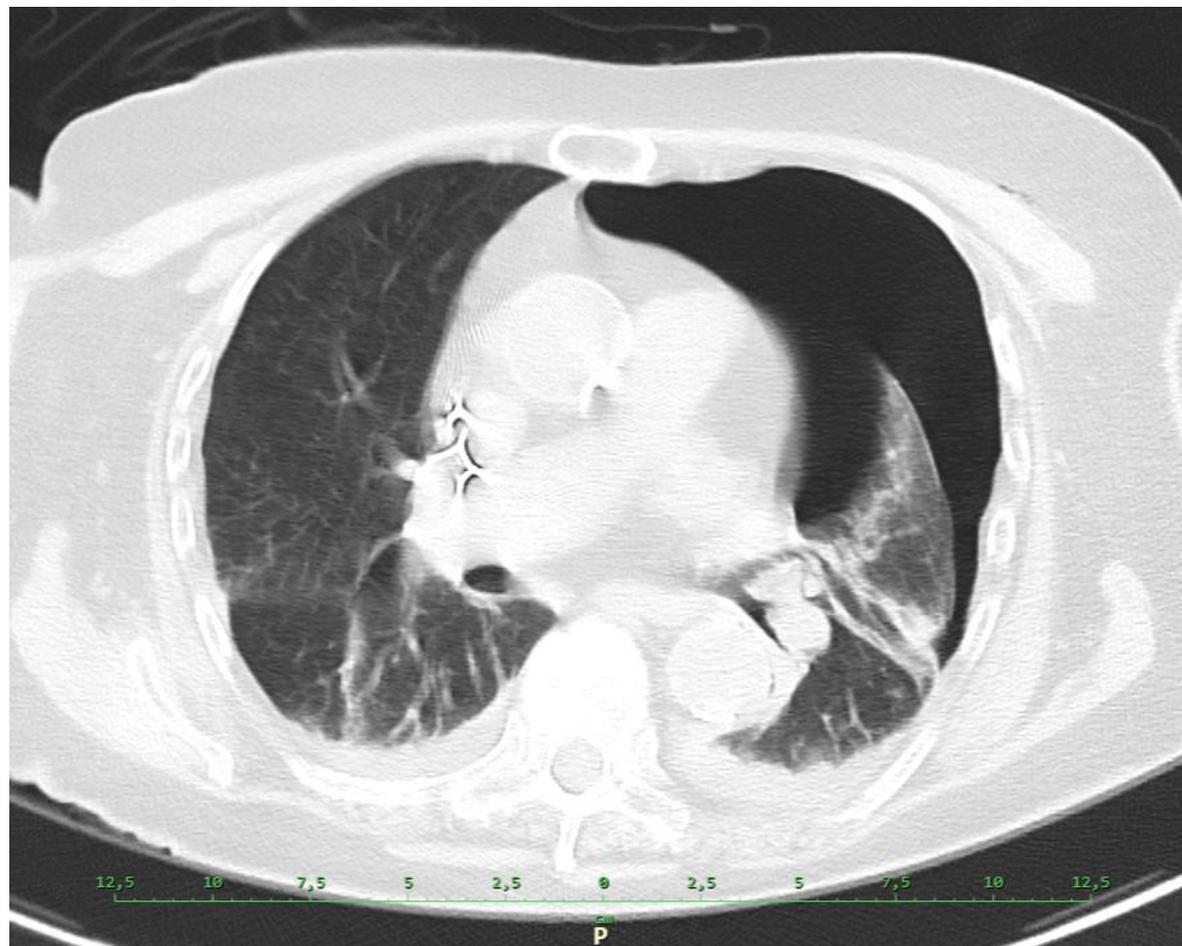
Radim Špaček



Implantologie - komplikace

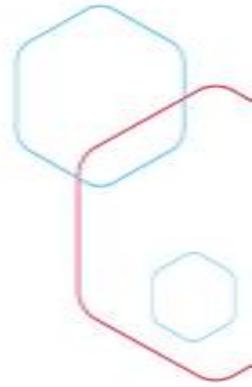


Pneumothorax



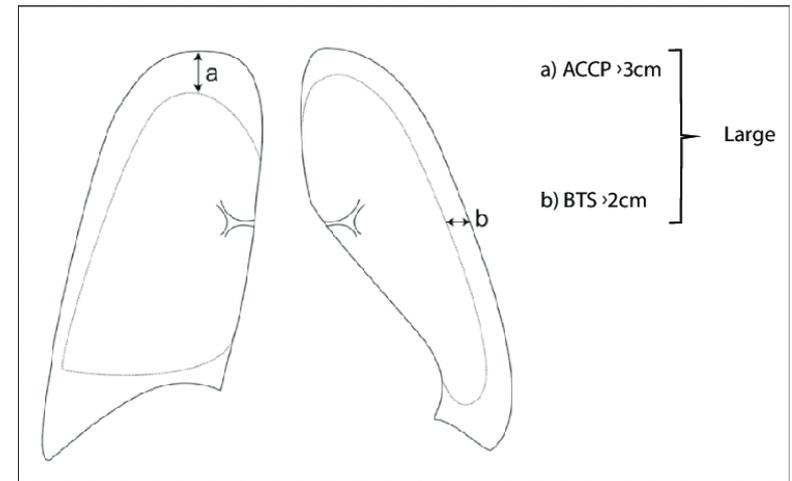
Pneumothorax

- Incidence 1-2% implantací
- Rizikové faktory:
 - Ženské pohlaví
 - Věk > 80 let
 - BMI < 20
 - CHOPN



Pneumothorax – kdy drénovat

- Symptomatický pacient
- Pacient na přetlakové ventilaci
- Hemodynamicky nestabilní pacient
- Dostatečně velký PNO

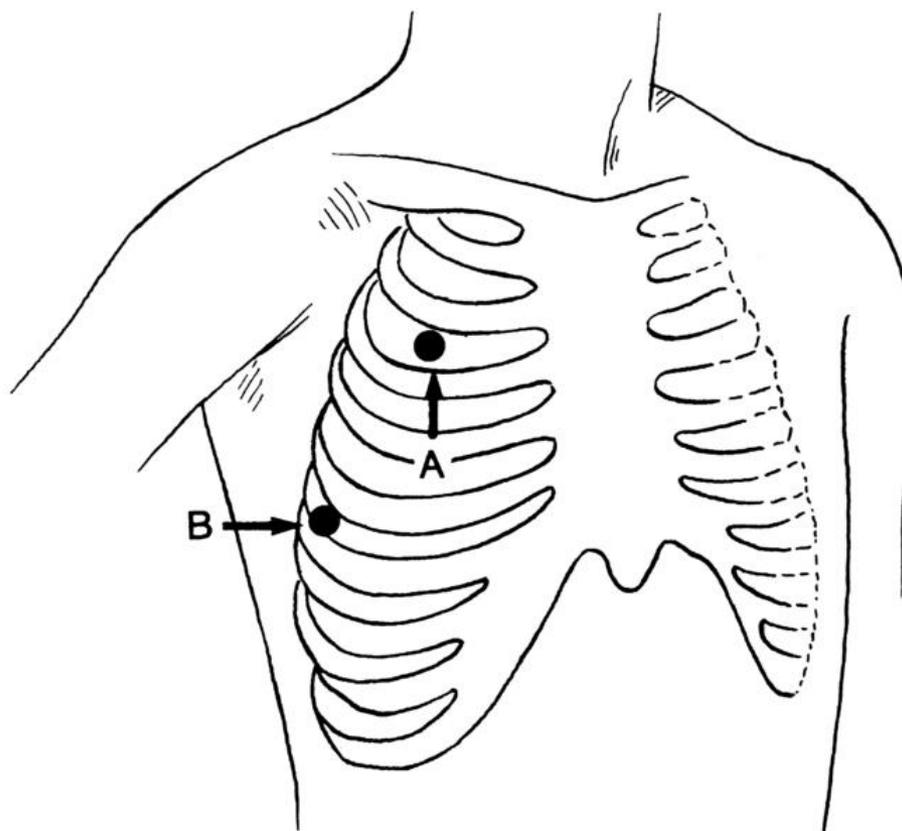


Čím drénovat?

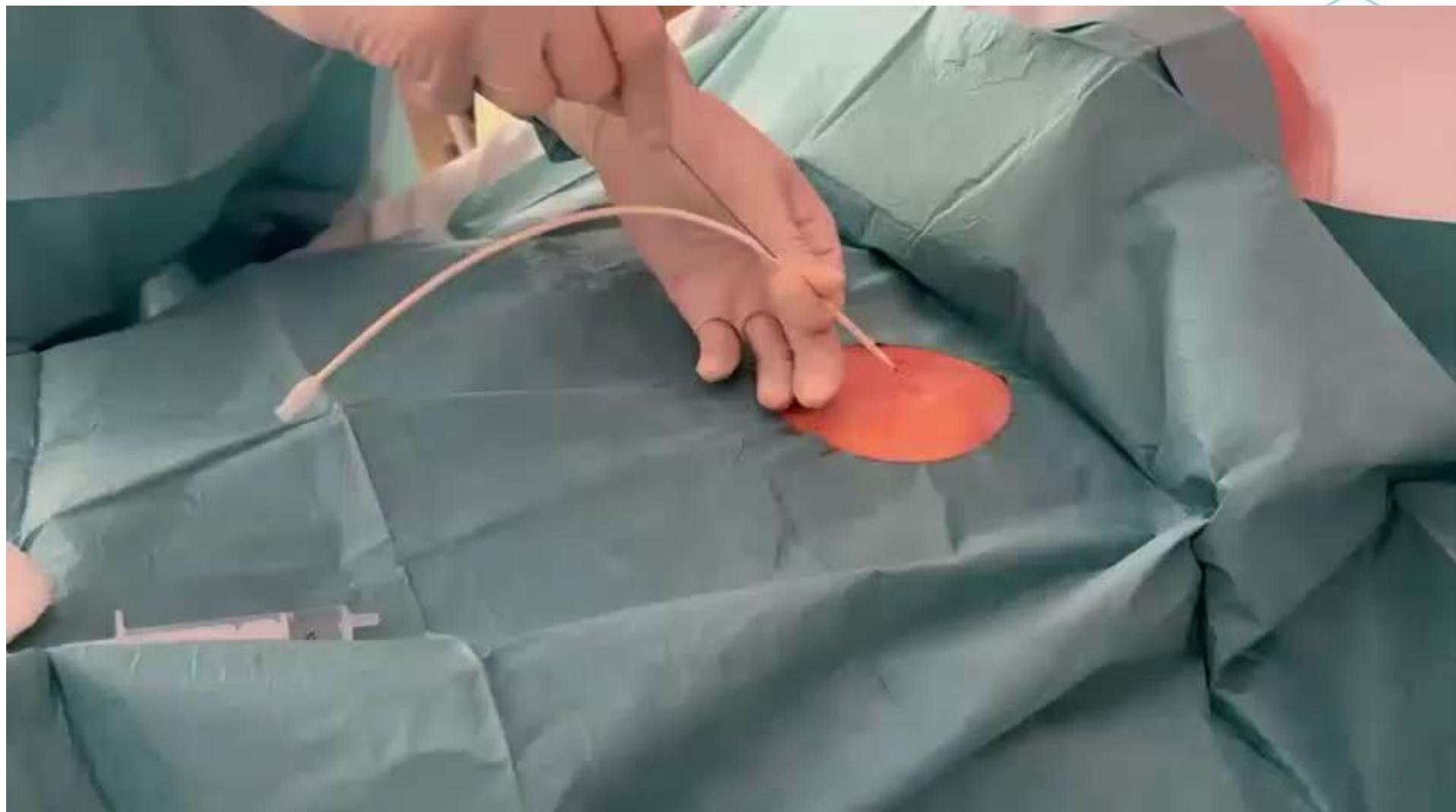


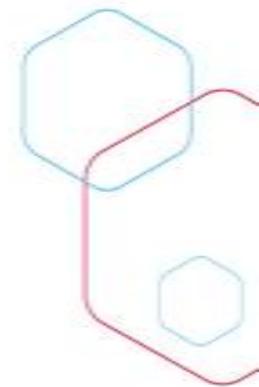
DOI 10.53555/1c84n469
DOI 10.1016/j.chest.2018.01.048

Z jakého přístupu drénovat?

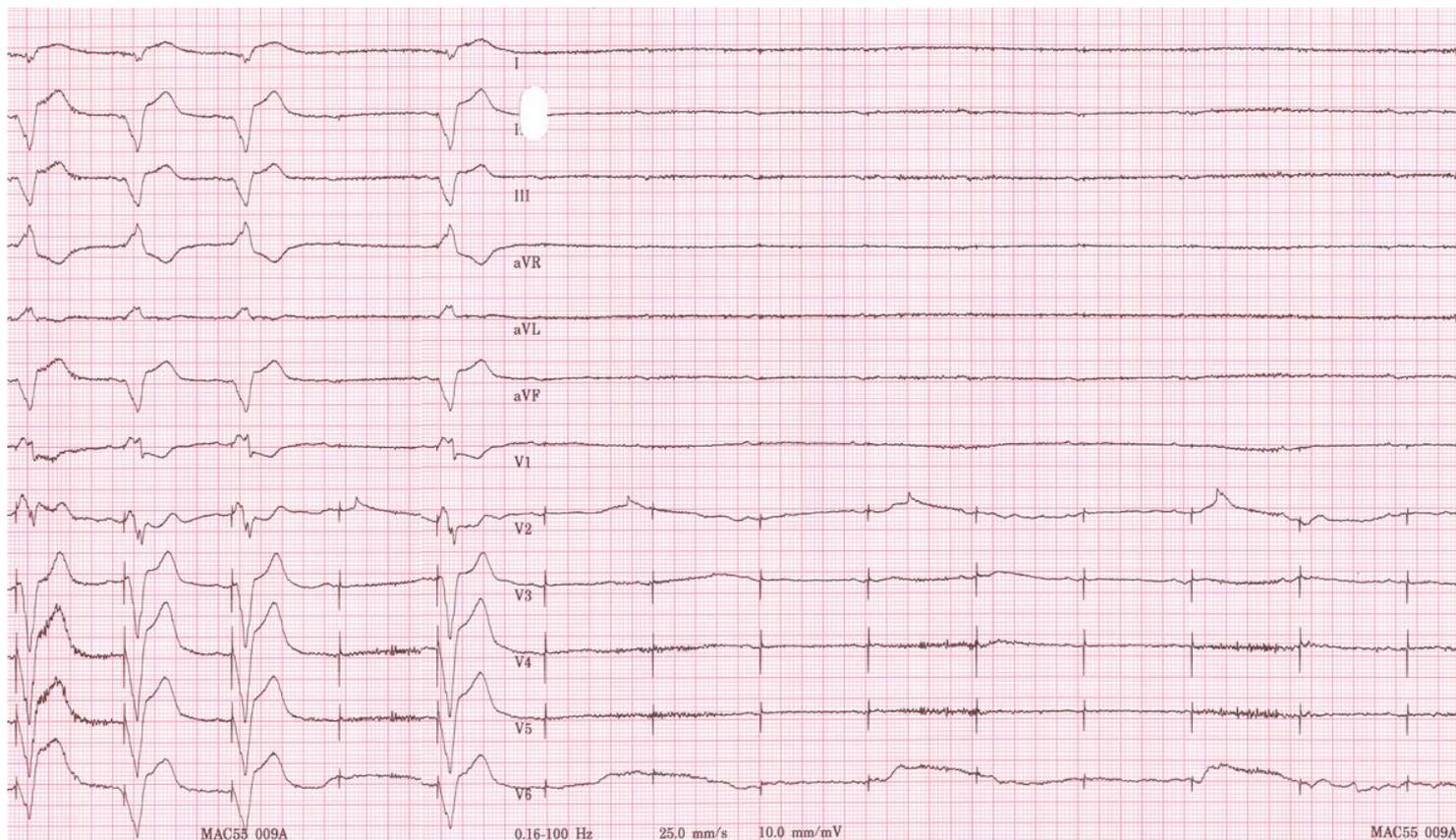


DOI 10.1007/s11748-020-01403-5
DOI 10.3978/j.issn.2072-1439.2014.09.23





Dislokace elektrody



Dislokace elektrody

AAIR+ Adapta ADDP01

60 bpm / 1,000 ms

ECG Lead II

Atrial EGM

Parameters - Therapy

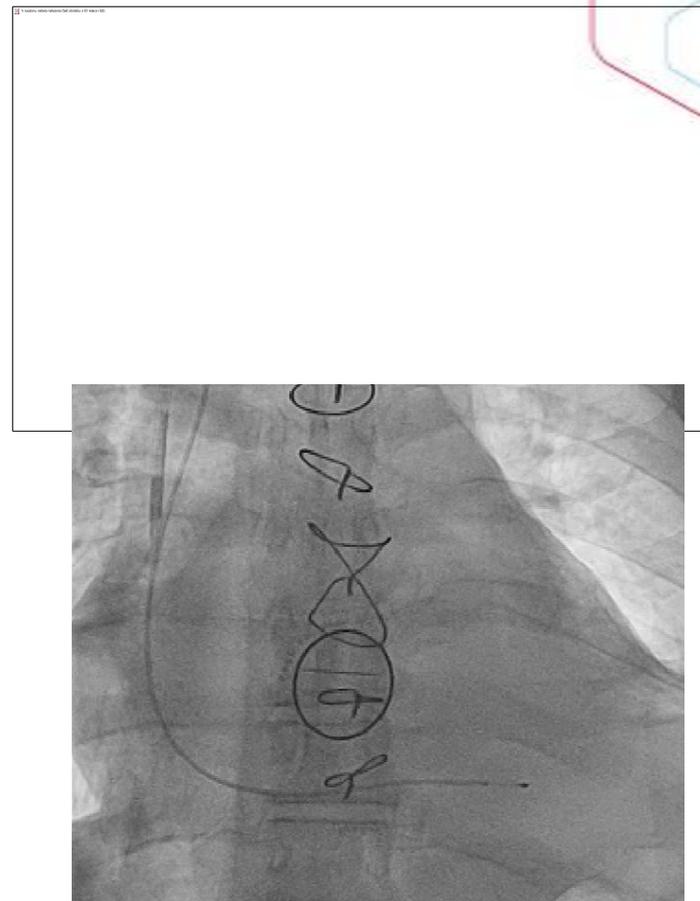
Modes/Rates		Atrial Lead		Ventricular Lead	
Mode	AAIR<=>DDDR	Amplitude	1.500 V	Amplitude	2.000 V
Mode Switch...	175 bpm	Pulse Width	0.40 ms	Pulse Width	0.40 ms
Lower Rate	60 ppm	Sensitivity...	0.50 mV	Sensitivity...	5.60 mV
Upper Track	130 ppm	Pace Polarity...	Bipolar	Pace Polarity...	Bipolar
Upper Sensor	130 ppm	Sense Polarity...	Bipolar	Sense Polarity...	Bipolar
Rate Response...	<input checked="" type="checkbox"/>	Capture...	Adaptive	Capture...	Adaptive

Intrinsic/AV		Refractory/Blanking		Additional/Interventions	
Intrinsic Activation...		PVARP...	Auto	Additional Features...	
Paced AV...	150 ms	PVAB	180 ms	Interventions...	
Sensed AV...	120 ms				

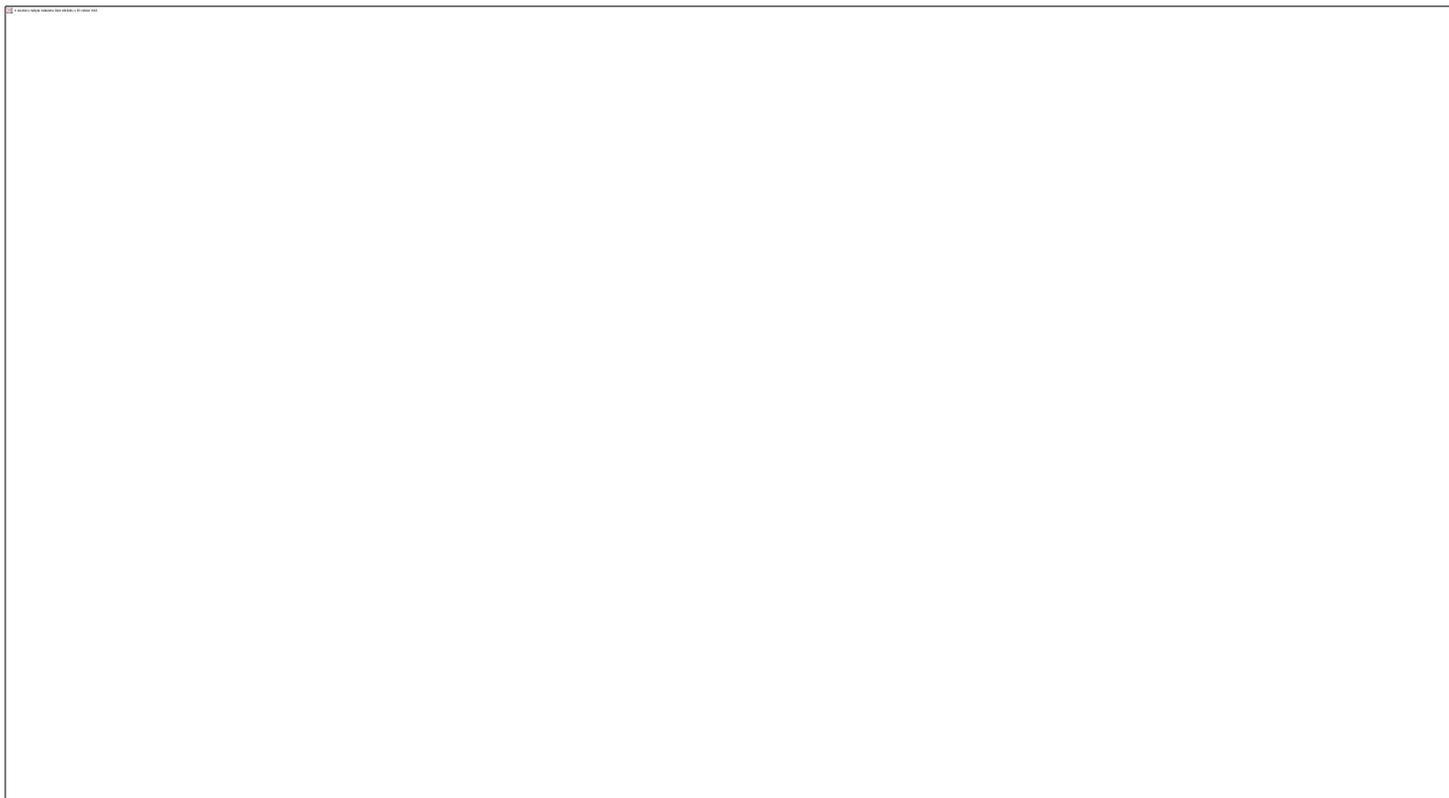
Save... Get... TherapyGuide Undo PROGRAM

Emergency Interrogate... End Session...

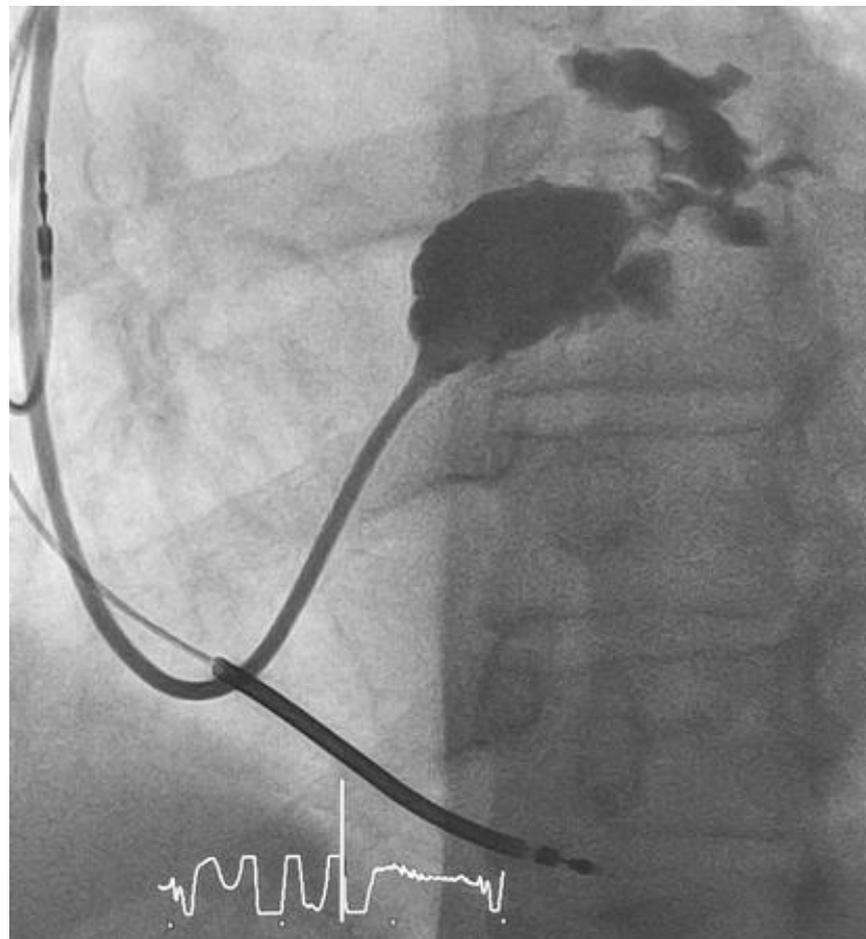
Freeze Strips... Adjust... Help... Checklist < Data Params < Tests < Reports < Patient < Session



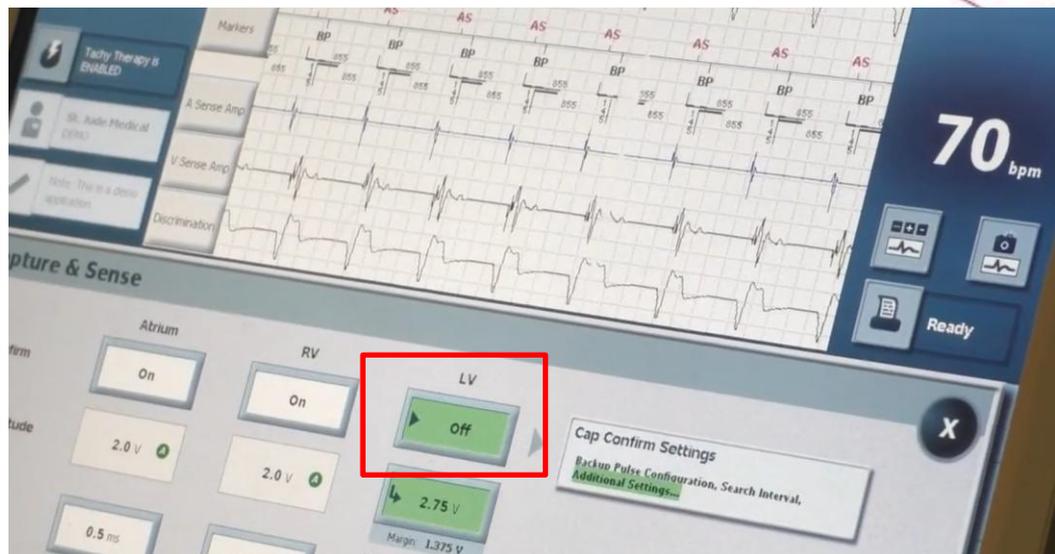
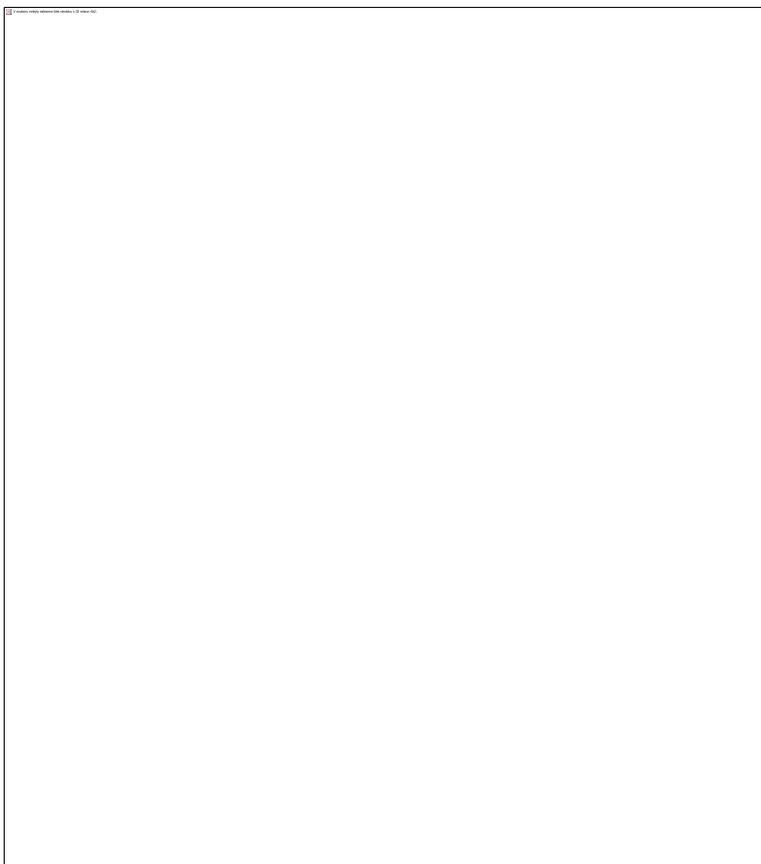
Pacemakerová tachykardie



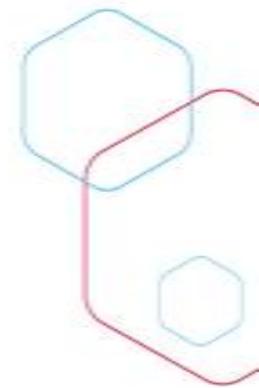
Biventrikulární systémy



Uchvacování bráničního nervu



Tamponáda srdeční



- Společná pro všechny arytmologické výkony
 - Perforace elektrodou
 - Extrakční výkony
 - Transseptální punkce
 - Perforace ablačním (či jiným) katetrem
 -

PHILIPS

JTA

MI 1,3

4.5.2022

Nemocnice Podlesi a.s.

TIS 0,4

19:32:17

Adult Echo

S5-1

40 Hz

12,0cm

2D

HGen

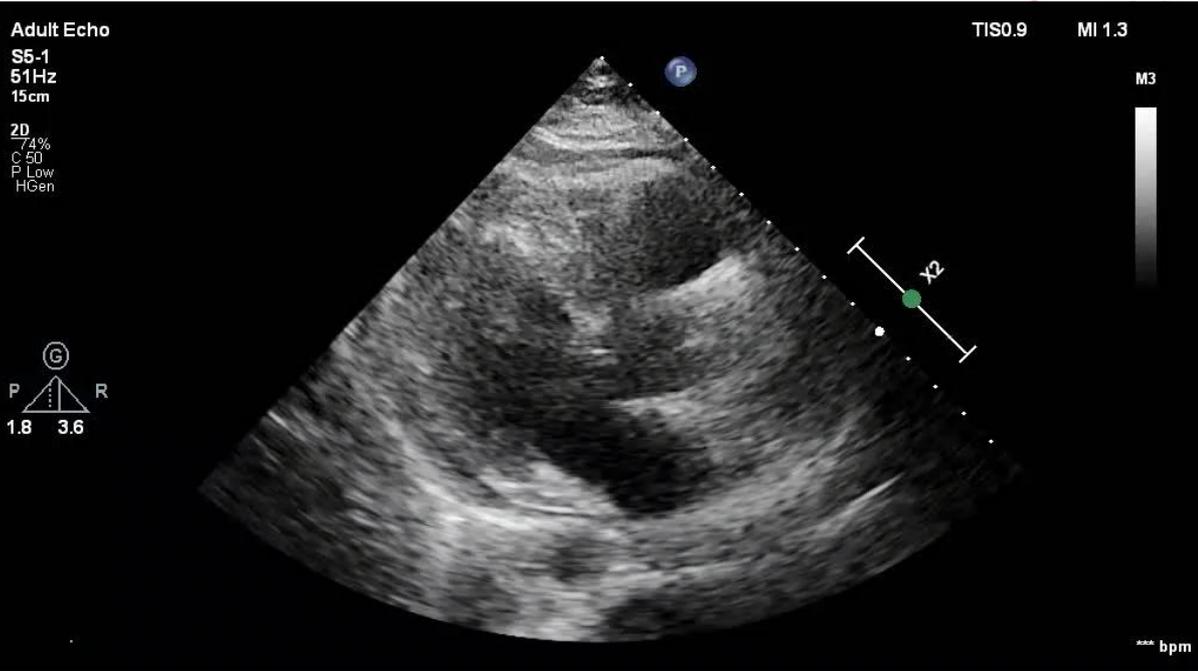
Gn 50

C 50

3 / 2 / 0

75 mm/s





PHILIPS

SLAV

MI 1.3

03/23/2023

Nemocnice Podlesi a.s.

TIS 0.4

11:40:29

Adult Echo

S5-1

39 Hz

13.0cm

2D

HGen

Gn 54

C 50

3 / 2 / 0

75 mm/s



Tamponáda po arytmio výkonech

- Protamin podat až po odsátí výpotku!
- Rozvaha o antikoagulaci v následujících dnech
- Délka drenáže
- Ve vybraných případech je nutná KCH revize

Tříselná krvácení

- Podkožní hematomy
- **Pseudoaneurysmata**
- AV píštěle



ALOIS

MI 1,2

13.10.2021

ALOIS

MI 1,3

13.10.2021

Nemocnice Podlesí a.s.

TIS 0,2

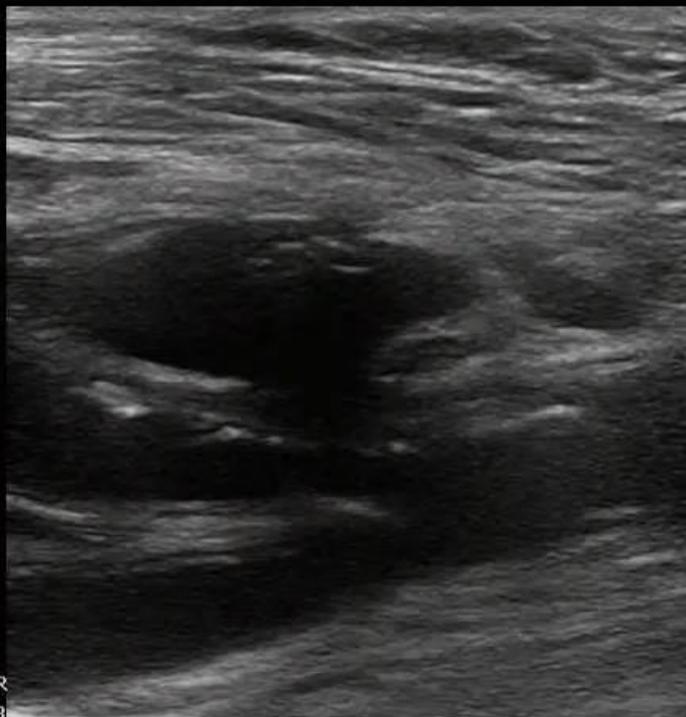
8:17:37

Nemocnice Podlesí a.s.

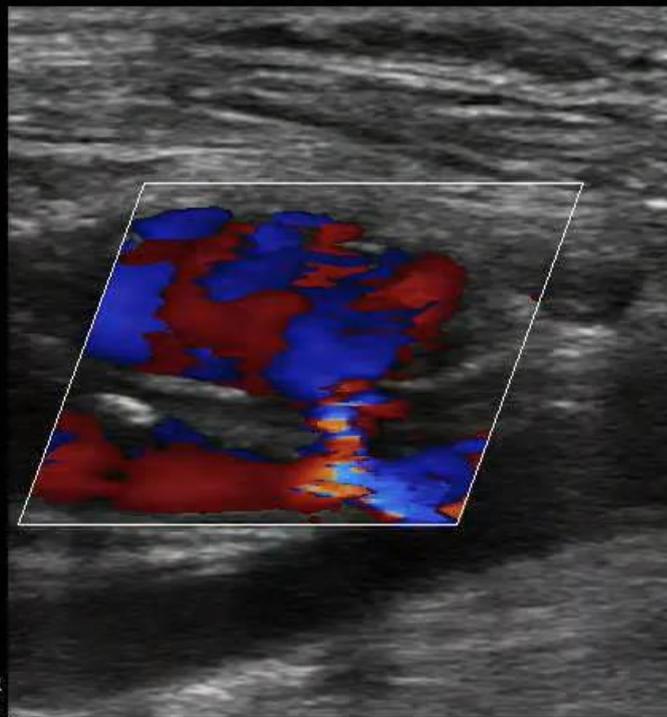
TIS 0,6

8:17:46

P

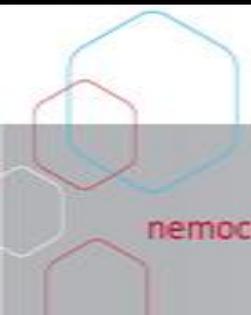


4,0cm 8,8



+18
cm/s
-18

4,0cm



PHILIPS

ALOIS

MI 1,3

13.10.2021

Nemocnice Podlesi a.s.

TIS 0,6

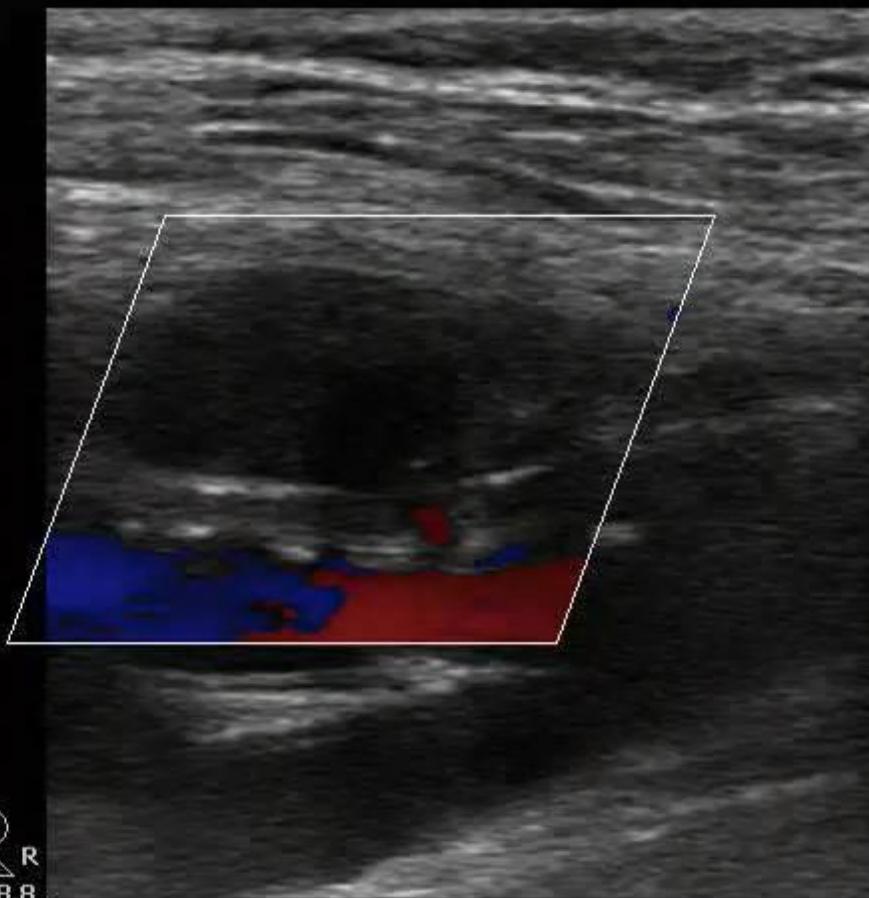
8:32:44

Arterial
L12-3
27 Hz
4,0cm

2D
HGen
Gn 50
C 41
3 / 3 / 2

Color
5,0 MHz
Gn 55
3 / 7 / 4
Filtr Med

P



G
P R
4,4 8,8

+18
cm / s
-18

2
cm

4,0cm

PHILIPS

ALOIS

MI 1,3

13.10.2021

Nemocnice Podlesi a.s.

TIS 0,6

8:38:54

Arterial
L12-3
27 Hz
4,0cm

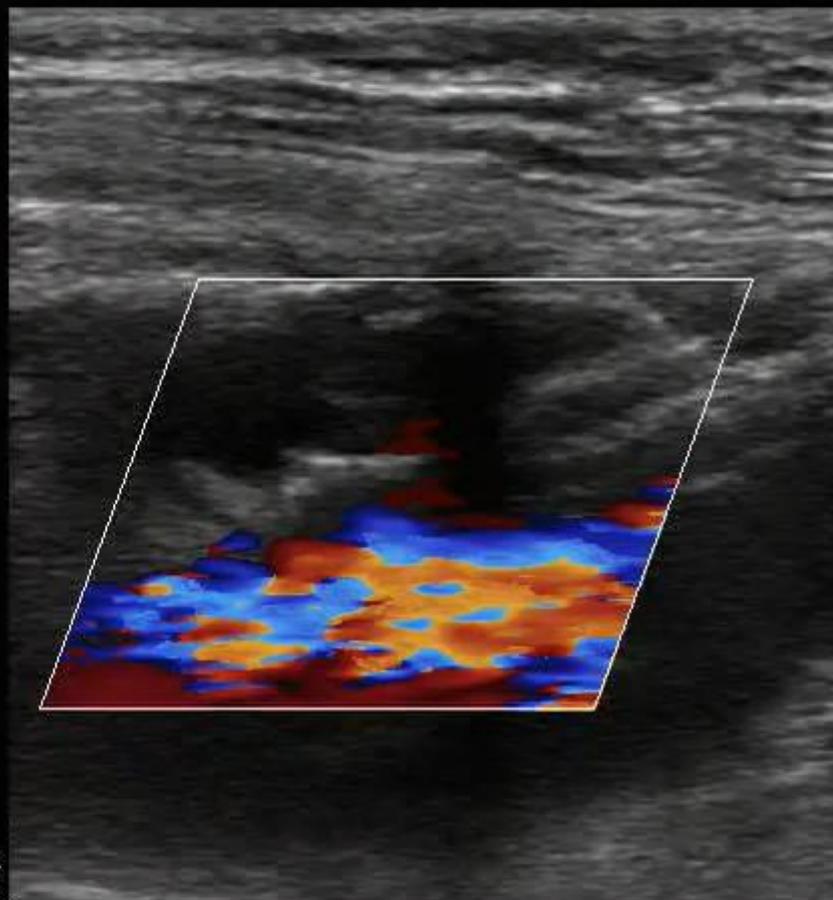
P

2D

HGen
Gn 50
C 41
3 / 3 / 2

Color

5,0 MHz
Gn 55
3 / 7 / 4
Filtr Med



+18

cm
/
s

-18

2

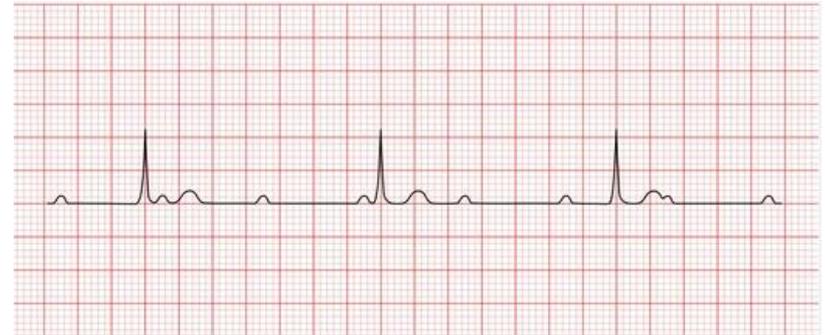
cm

G
P R
4,4 8,8

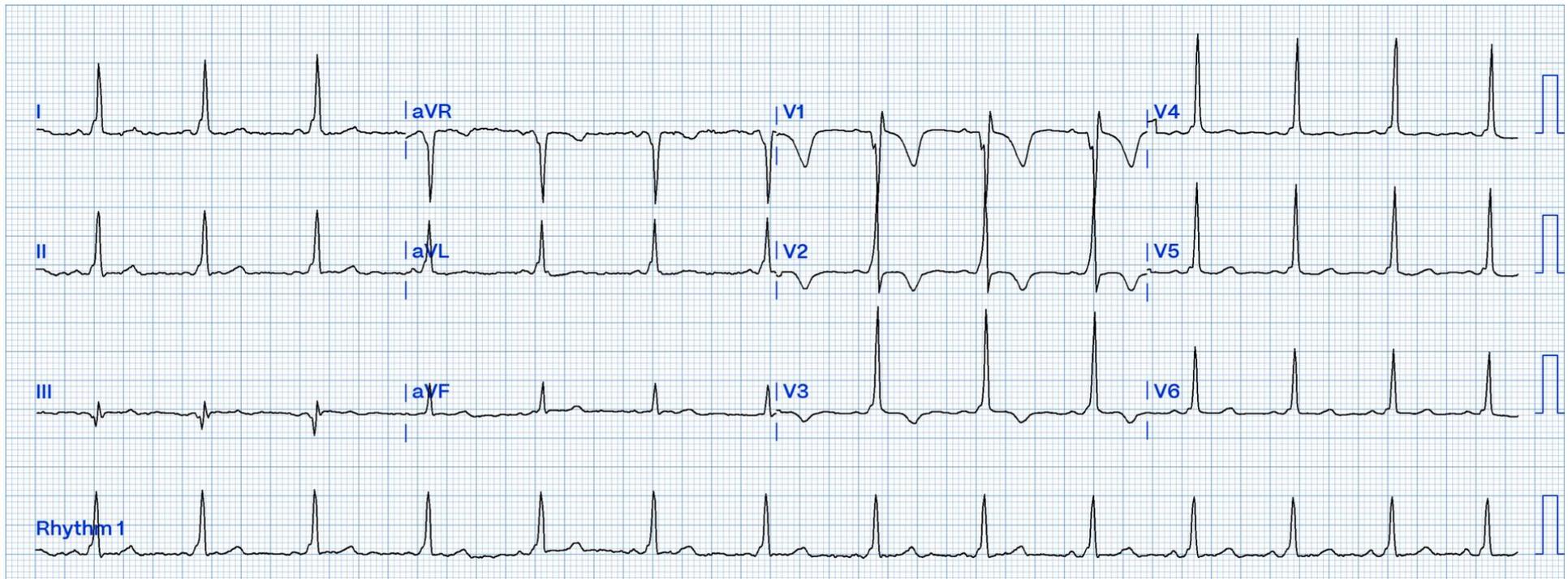
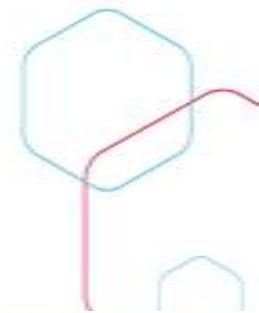
4,0cm

Radiofrekvenční ablace – „pravostranné“

- AVNRT
- AVRT s parahisální dráhou
 - Pokročilé AV blokády



Parahisální přídavná dráha

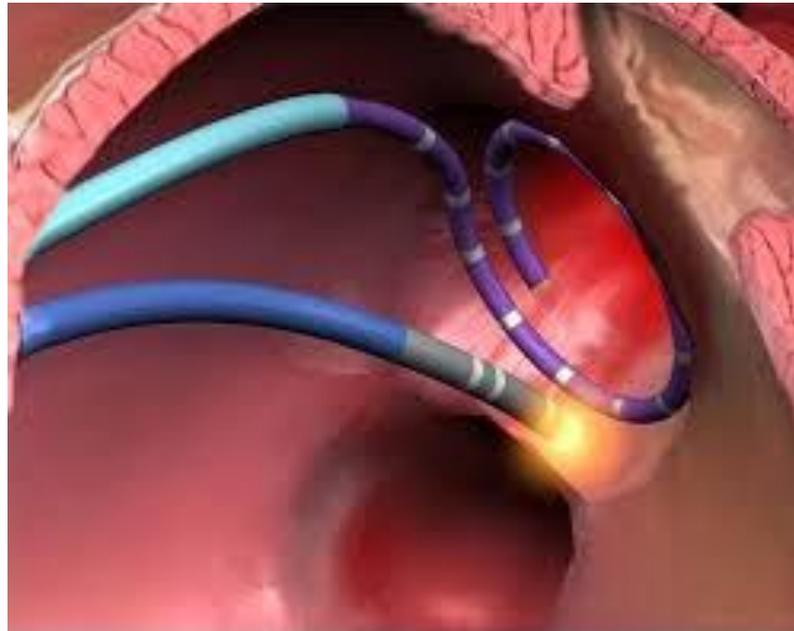


Radiofrekvenční ablace – „pravostranné“

- Typický flutter
– Poškození ACD

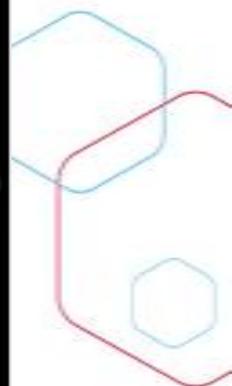
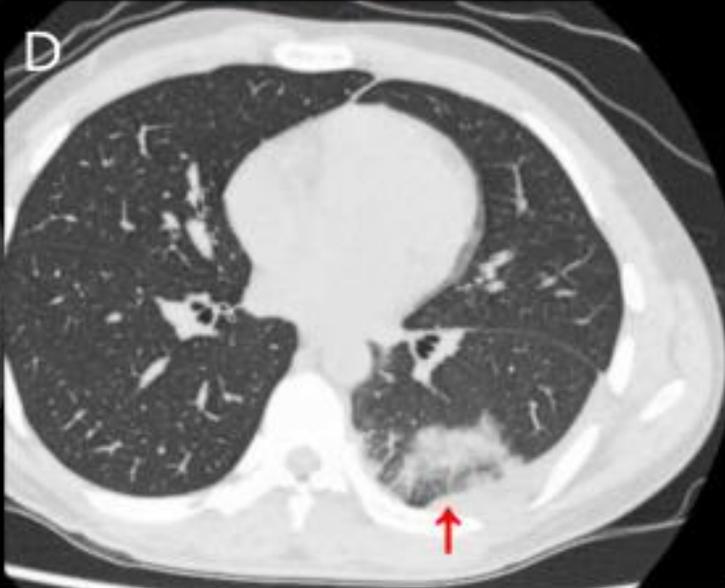
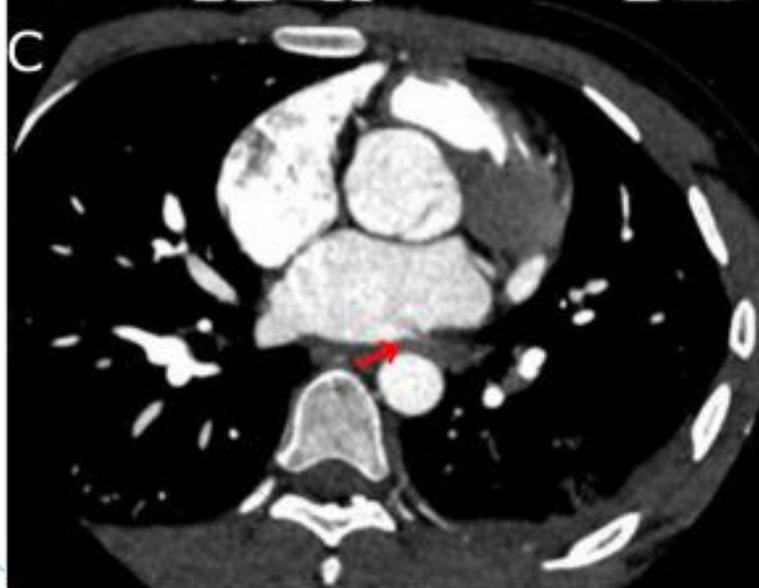
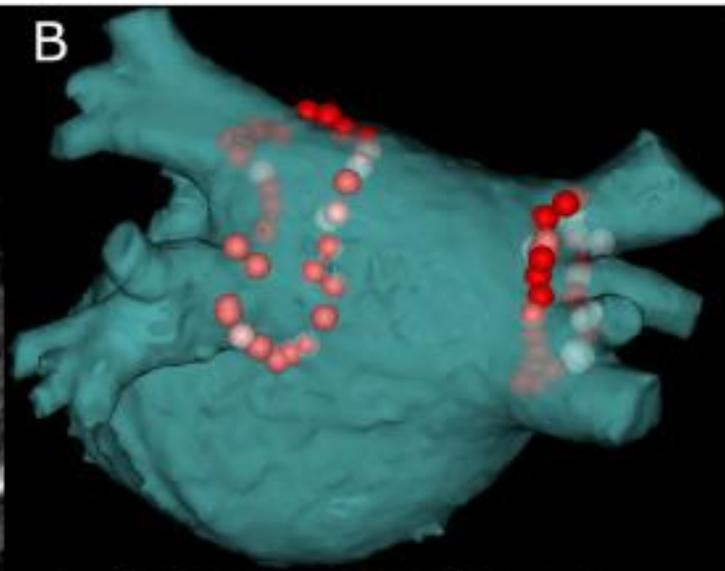


Radiofrekvenční ablace – „levostranné“



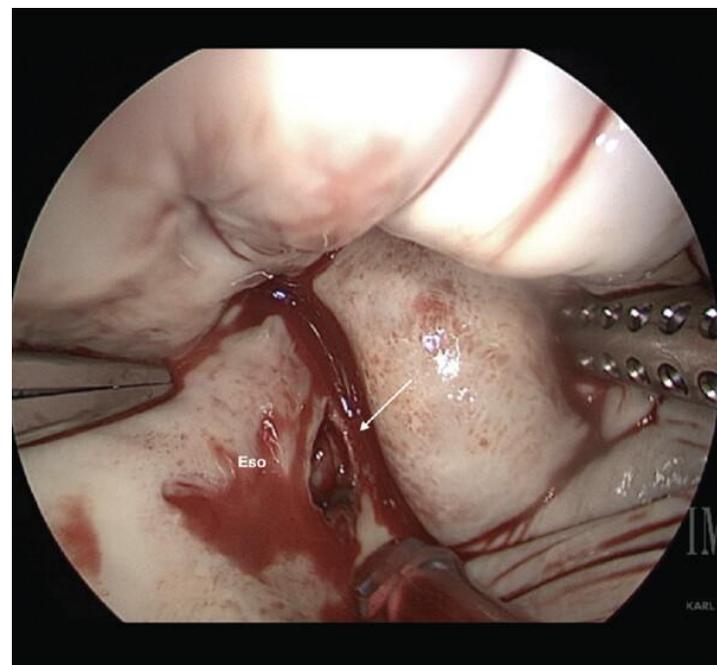
Stenóza plicních žil

- Vzácné, incidence závažných kolem 1%, max do 3%.
- Nezávažné častější, až 30%



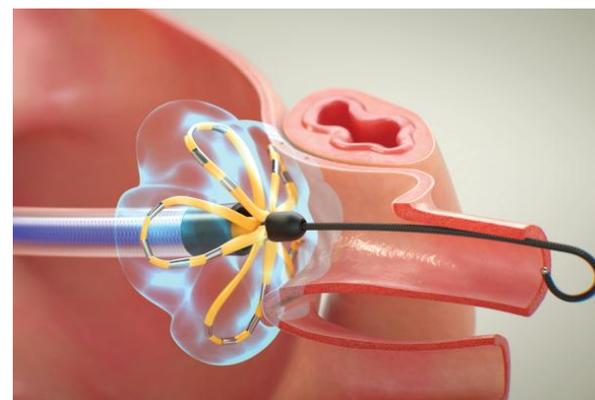
Atrio-esofageální píštěl

- Velmi vzácné
- Dramatická klinika
- Řešení chirurgické



Ablace pulzním polem

- Komplikace typické pro RFA jsou vzácnější
- Významně častější je hemolýza



215 consecutive patients receiving catheter ablation for paroxysmal/persistent AF at 4 high-volume centers



Pulsed field ablation
biphasic, bipolar waveform
n = 145

Radiofrequency ablation
40-50 W/20 s or 90 W/4 s
n = 70



Serial measurements of circulating biomarkers for hemolysis, anemia and renal function



Incidence of hemolysis after PFA: >90%

Optical analysis



94.3% plasma samples are hemolytic immediately after PFA

Characterization of hemolysis

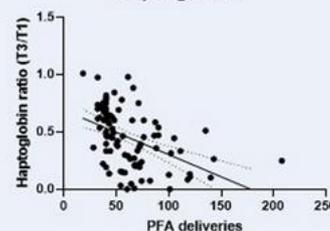
Biochemical analysis of biomarkers

	PFA vs. RFA
Free Hb	4.0 x ↑
Haptoglobin	2.0 x ↓
Bilirubin	1.4 x ↑
LDH	1.4 x ↑

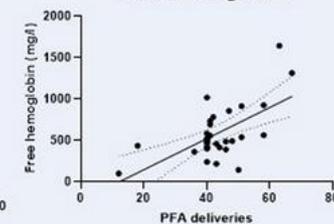
Highest severity ≥54 PFA deliveries

Correlation of hemolysis severity with PFA deliveries

Haptoglobin



Free hemoglobin



Clinical impact of PFA-associated hemolysis

- No relevant anemia
- Acute kidney injury in 4/124 (3.2%) patients
- Hemoglobinuria in 16/44 (36.4%) patients

Future directions

- Careful titration of PFA deliveries based on patients characteristics
- Further investigations of the biological impact and nephrotoxic effects of PFA-associated hemolysis

DOI 10.1161/CIRCEP.124.012732

Děkuji za pozornost!

