

# 10 YEARS OVERVIEW HIGH-RISK PULMONARY EMBOLISM SOPHIA CHILDREN'S HOSPITAL

- Karlijn van Balkom, fellow pediatric haematology
- Heleen van Ommen, pediatric haematologist

# CASE DESCRIPTION

## Massive pulmonary embolism (PE)

3 weeks old baby, no past medical history, part of twin

### Presentation:

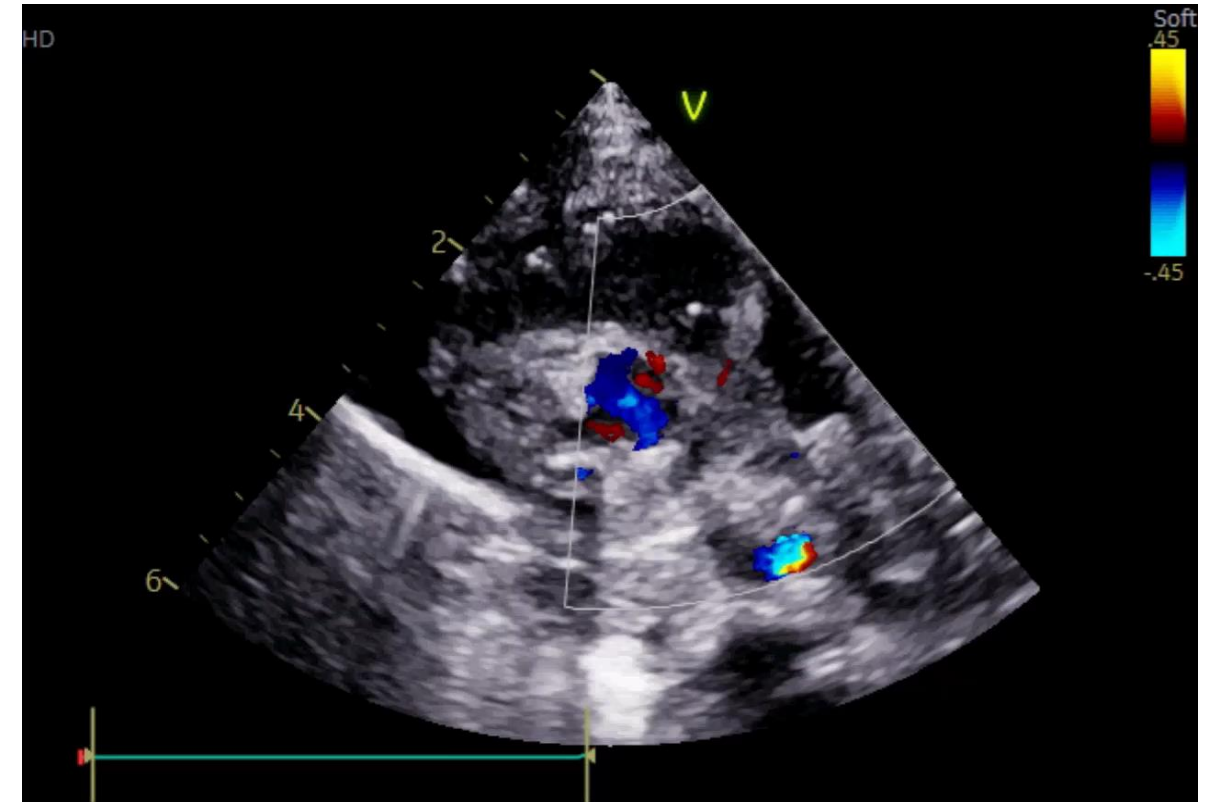
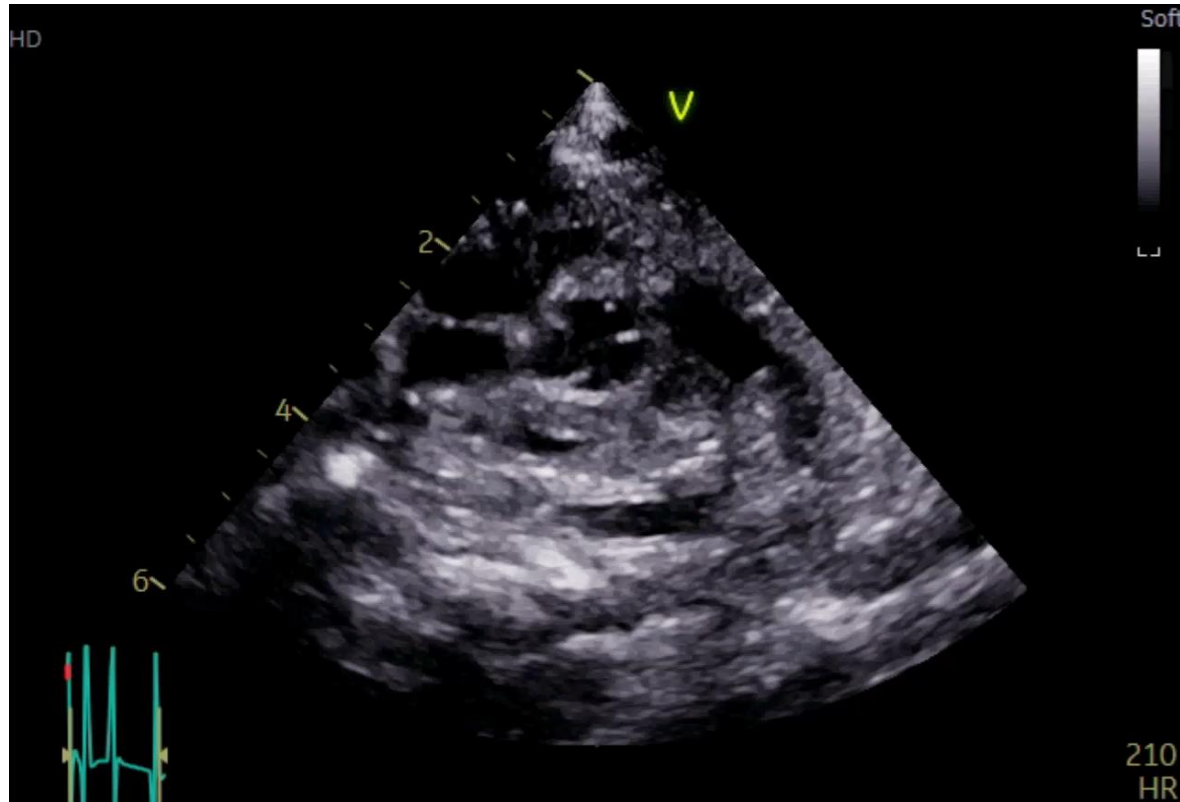
- Respiratory failure at home
- Emergency department Prostin and CPR was started

### Diagnostics and treatment

- Emergency ultrasound: normal cardiac structures but no pulmonary branches → **suspicion PE**
- VA-ECMO
- CT-scan: massive saddle embolus
- Post CPR low dose thrombolysis was started
  
- Multidisciplinary digital meeting between different centers in the Netherlands: based on case series endovascular thrombectomy was decided (Angiojet)

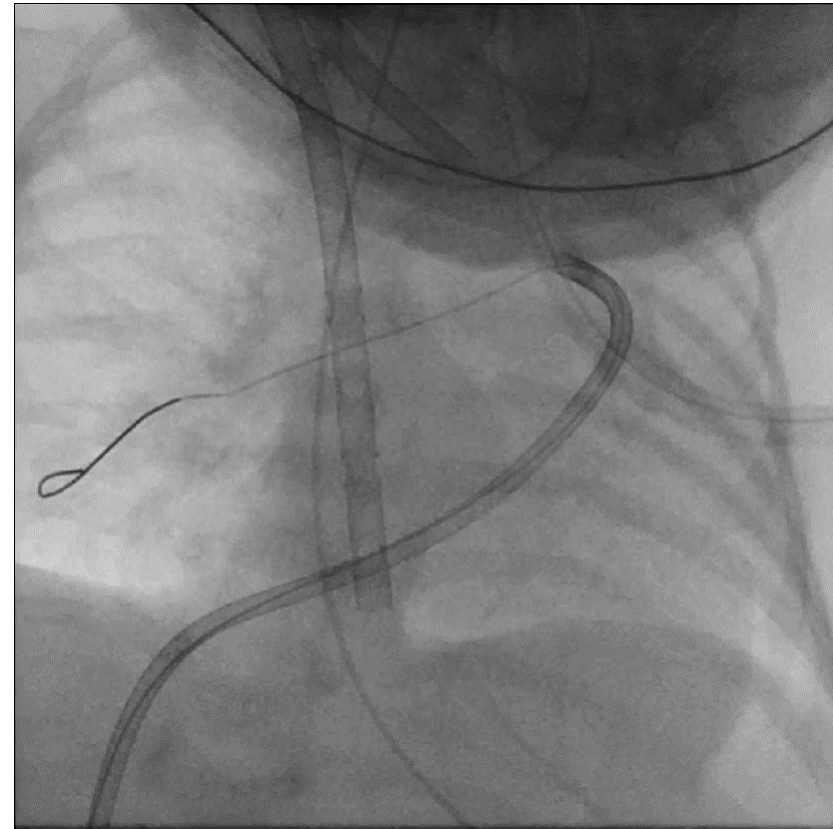
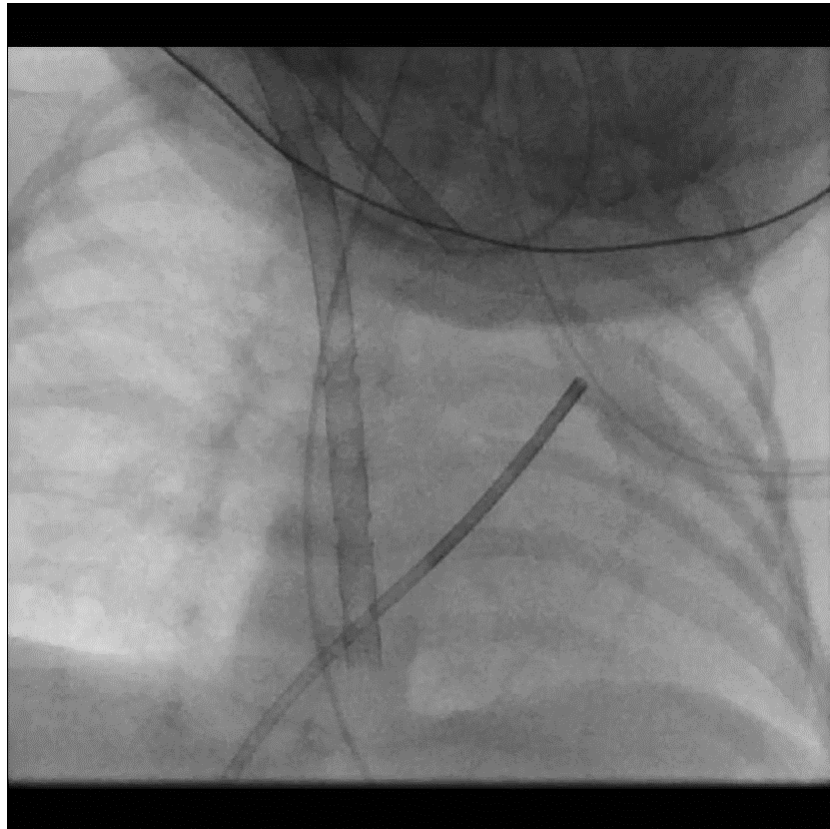
# IMAGES THROMBECTOMY

Performed at the Sophia MC



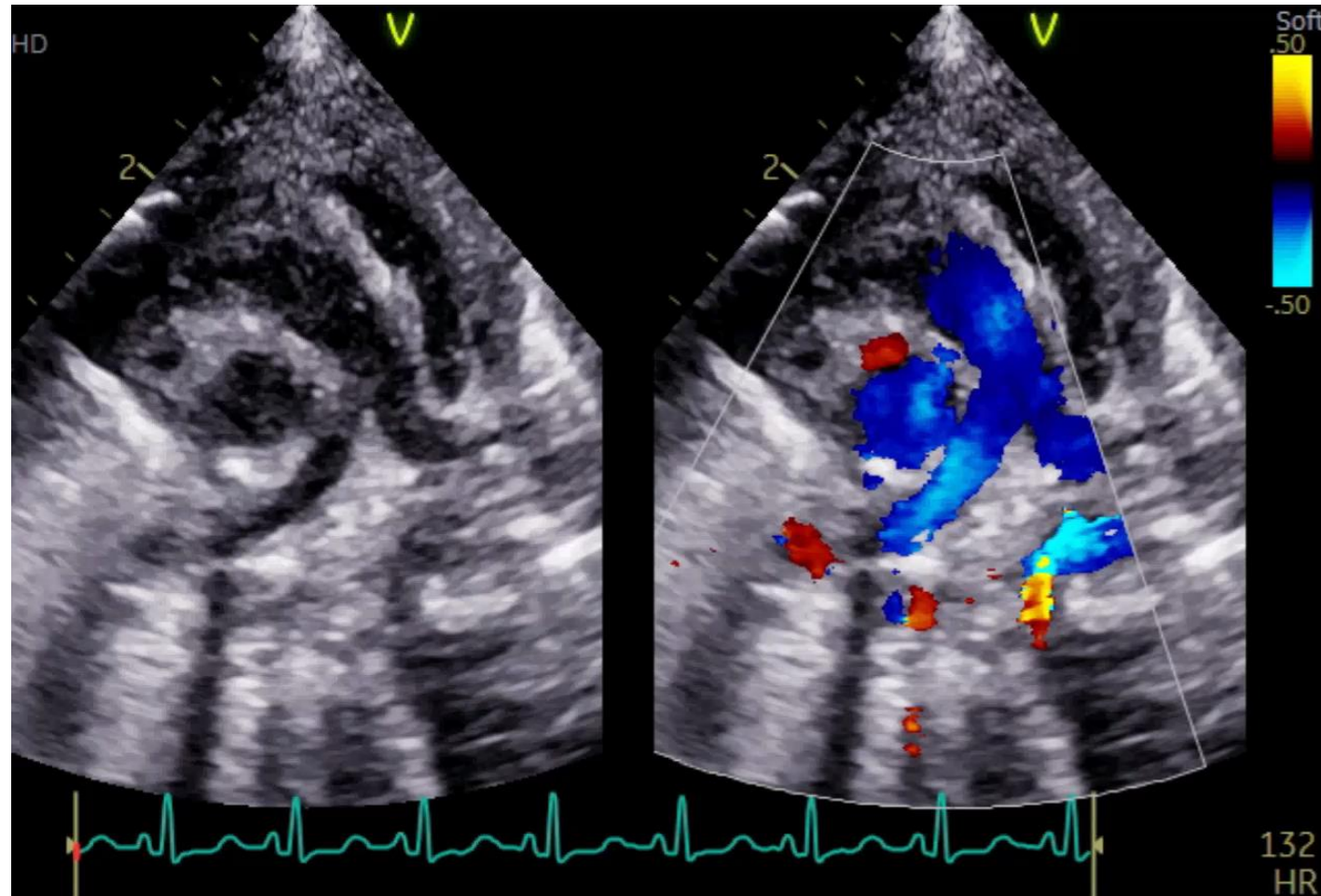
# IMAGES THROMBECTOMY

Performed at the Sophia MC



# IMAGES THROMBECTOMY

Performed at the Sophia MC



# BACKGROUND

## Pediatric PE

- Discussion after this case: necessity of specific pediatric PERT in the Netherlands
- PE in children vs PE in Adults <sup>1, 2</sup>
  - Rare condition
  - Delayed diagnosis
  - Mortality rates are lower<sup>3</sup>

- Classification:

**Table 8** Classification of pulmonary embolism severity and the risk of early (in-hospital or 30 day) death

Early mortality risk		Indicators of risk			
		Haemodynamic instability <sup>a</sup>	Clinical parameters of PE severity and/or comorbidity: PESI class III–V or sPESI ≥1	RV dysfunction on TTE or CTPA <sup>b</sup>	Elevated cardiac troponin levels <sup>c</sup>
High		+	(+) <sup>d</sup>	+	(+)
Intermediate	Intermediate–high	-	+ <sup>e</sup>	+	+
	Intermediate–low	-	+ <sup>e</sup>	One (or none) positive	
Low		-	-	-	Assesment optional; if assessed, negative

©ESC 2019

1. ESC Guidelines for the diagnosis and management of acute pulmonary embolism developed in collaboration with the European Respiratory Society (ERS), 2019
2. Pelland-Marcotte et al, Outcomes and risk factors of massive and submassive pulmonary embolism in children: retrospective cohort study, Lancet, 2019
3. Ross et al, Acute management of HR an IR PE in children, Chest 2022

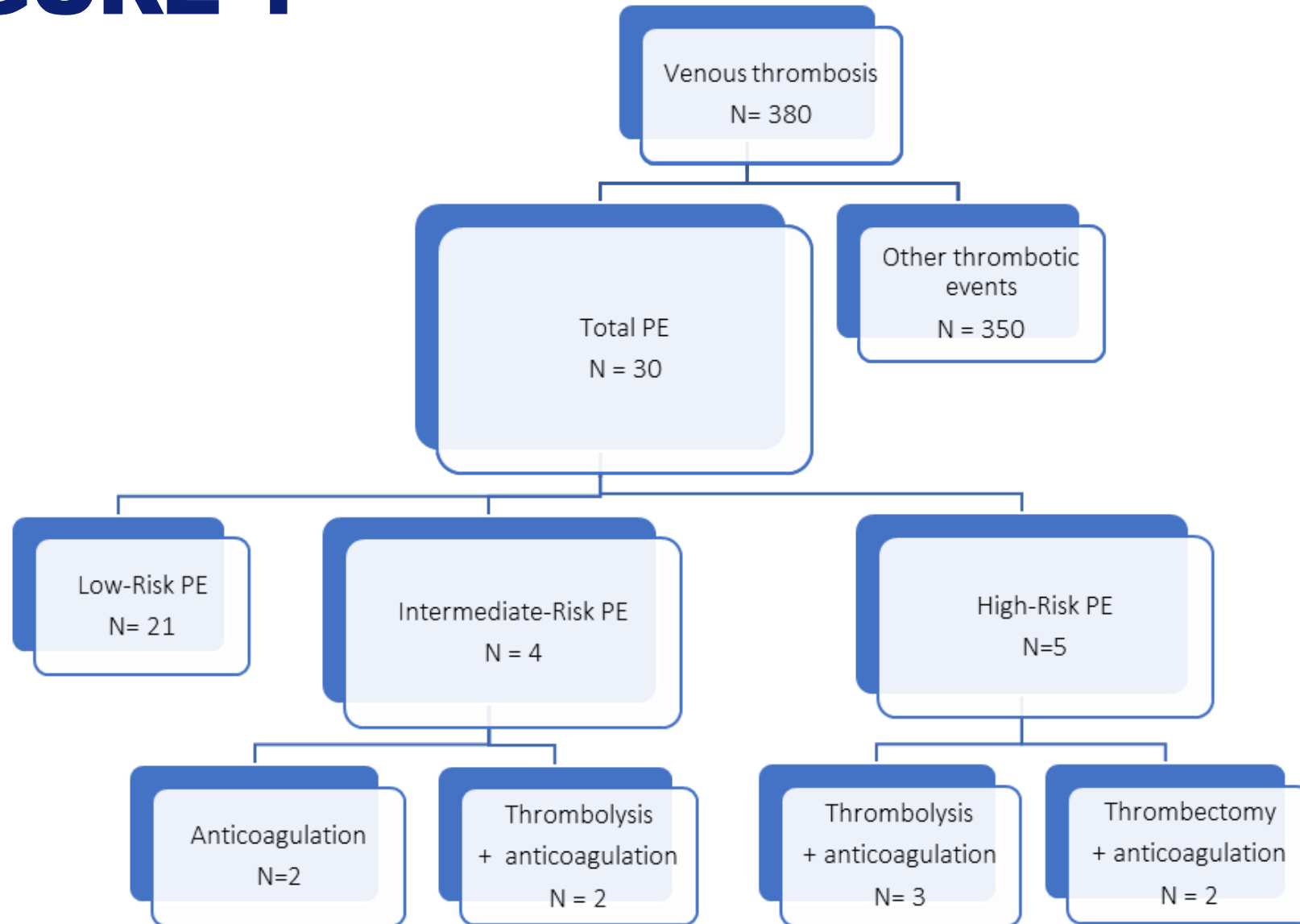
# GOAL OF THE STUDY

## High-risk pediatric PE in the Netherlands

- Question: Epidemiology pediatric PE and how many pediatric PE patients would benefit from a specific pediatric PERT?
- Methods:
  - 10 years retrospective chart review
  - Pediatric haematology department in Sophia Children's hospital in Erasmus MC
  - Collected data:  
type of venous thromboembolic event (VTE), age, gender, risk factors, presenting symptoms, echocardiography and laboratory results, treatment and outcome



# FIGURE 1





# TABLE 1

Patient	Age	gender	PE location	Right ventricular dysfunction (ultrasound)	Hemodynamic instability	Blood test*	Risk factors	Acute treatment	Chronic treatment
Intermediate-risk PE									
1	15yr	F	Bilateral PE	Yes	No	hsTNT 31 ng/L, NT pro-BNP 886 pg/ml	OAC, FVL, recent orthopedic surgery	Nadroparin	Rivaroxaban during 3 months
2	17 yr	M	Bilateral PE	Yes	No	-	Endocarditis	Nadroparin	Vitamin K antagonist
3	16yr	F	Bilateral PE	Yes	No	hsTNT 57 ng/L NT pro-BNP 815 pmol/L	OAC	Thrombolysis systemic during 6 hours	Rivaroxaban during 6 months
4	15yr	F	Bilateral PE	Yes	No	hsTNT 170 ng/L NT-proBNP 363 pmol/L	OAC	Thrombolysis systemic during 6 hours	Rivaroxaban during 6 months
High-risk PE									
5	14yr	F	Massive saddle embolism	Yes	Yes, inotropes	hsTNT 144 ng/L	Antithrombin III deficiency	Thrombolysis during 2 hours	Rivaroxaban life long
6	16yr	F	Bilateral PE	Yes	Yes, Inotropes and ECMO	hsTNT 102 ng/L CK MB 3.8 mcg/L NT-proBNP 1550 pmol/L	Rhabdomyosarcoma	Thrombolysis systemic and locally 6 days, placement device (EKOS catheter)	Nadroparin until 1 year later removed PAC
7	13yr	F	Massive saddle embolism	Yes	Yes, Inotropes	hsTNT 660 ng/L NT-proBNP 32 pmol/L	OAC and protein S deficiency	Thrombolysis during 12 hours systemic	Edoxaban life long
8	1 mn	M	Massive saddle embolism	Yes	Yes, CPR and ECMO	NT-proBNP: 27.000pg/ml	Unknown	Thrombolysis systemic/ thrombectomy vascular	Nadroparin
9	16yr	F	Bilateral PE, intra-cardial	Yes	Yes, CPR and ECMO	CK-MB 12,8 mcg/L	Obesity, OAC, Family history with thrombosis	Thrombectomy surgical sternotomy	Vitamin K antagonist life long

# FUTURE DIRECTIONS

## Pediatric PERT

- Our case showed the value of multidisciplinary multicenter meeting
- Small number of high-risk/intermediate-risk PE, no PE related mortality
- Additional efficacy and usefulness specific pediatric PERT?
- Future:
  - Combination with an adult PERT
  - National pediatric PERT
- Gain more knowledge about pediatric PE: IPTN database