

The background of the slide is a dense, repeating pattern of bright green clover leaves. Each leaf is a classic four-leaf clover shape, with the leaves being heart-shaped and pointed at the tips. The leaves are arranged in a way that they overlap and create a textured, natural-looking background.

# Case Report 1

## mitral valve stenosis in pregnancy

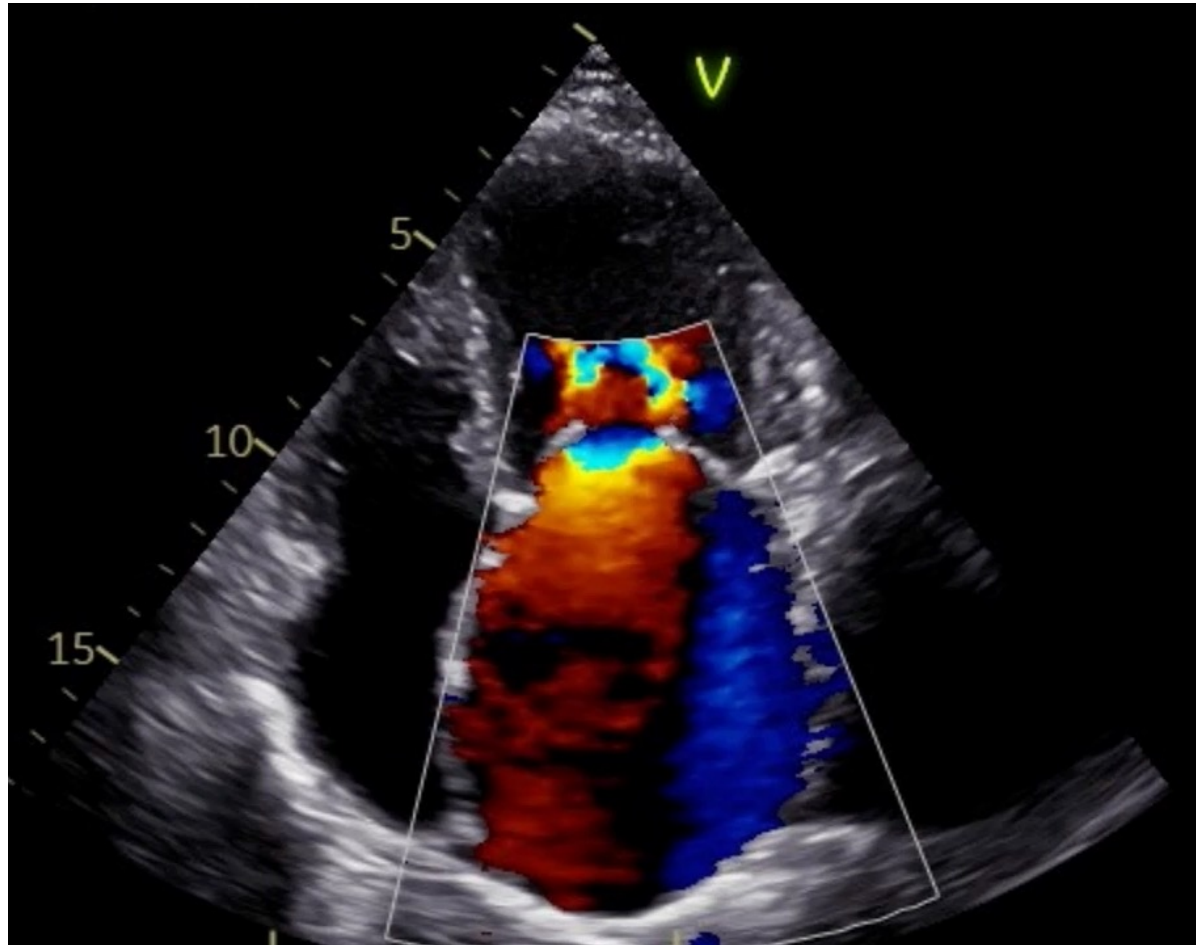
SAOA Spring Meeting 2023

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# First encounter



- **Approx. 40 years old pregnant woman from Eritrea** with post-rheumatic heart disease
- With **27 weeks of pregnancy** she was referred to our institution
- **TTE: severe combined mitral valve disease. Moderate mitral valve stenosis** with mitral valve area (MVA) of  $1.5\text{cm}^2$  and diastolic pressure gradient (dP mean) of  $20\text{mmHg}$ ; **severe mitral insufficiency**, severely dilated left atrium; **severely increased pulmonary artery pressure sPAP 66mmHg** (mPAP 48); dilated right ventricle with normal function, moderate tricuspid valve insufficiency ; excentric hypertrophic left ventricle with normal function (EF 63%)
- BP 101/62mmHg, HR 106/min. sinus rhythm. Dyspnoea NYHA II when climbing stairs, sleeps with elevated upper body, chronic light dry cough, slightly swollen ankles
- **Foetal ultrasound:** normal (no growth retardation), normal foetal and uterine hemodynamics

# Hemodynamic changes in pregnancy



- **Plasma volume and cardiac output (CO) reach a maximum of 40–50% above baseline at 32 weeks of gestation; 75% of this increase has occurred by the end of the first trimester.**  
  
→ In stenotic valve diseases, increased CO causes an increase in transvalvular gradient of 50%, mainly between the first and second trimesters, which increases the risk of maternal and foetal complications.
- The increase in CO is achieved by an increase in ***stroke volume*** in the first-half of pregnancy and a gradual increase in ***heart rate*** thereafter.

**Table 3** Modified World Health Organization classification of maternal cardiovascular risk

	mWHO I	mWHO II	mWHO II–III	mWHO III	mWHO IV
<b>Diagnosis (if otherwise well and uncomplicated)</b>	Small or mild – pulmonary stenosis – patent ductus arteriosus – mitral valve prolapse Successfully repaired simple lesions (atrial or ventricular septal defect, patent ductus arteriosus, anomalous pulmonary venous drainage) Atrial or ventricular ectopic beats, isolated	Unoperated atrial or ventricular septal defect Repaired tetralogy of Fallot Most arrhythmias (supraventricular arrhythmias) Turner syndrome without aortic dilatation	Mild left ventricular impairment (EF >45%) Hypertrophic cardiomyopathy Native or tissue valve disease not considered WHO I or IV (mild mitral stenosis, moderate aortic stenosis) Marfan or other HTAD syndrome without aortic dilatation Aorta <45 mm in bicuspid aortic valve pathology Repaired coarctation Atrioventricular septal defect	Moderate left ventricular impairment (EF 30–45%) Previous peripartum cardiomyopathy without any residual left ventricular impairment Mechanical valve Systemic right ventricle with good or mildly decreased ventricular function Fontan circulation. If otherwise the patient is well and the cardiac condition uncomplicated Unrepaired cyanotic heart disease Other complex heart disease Moderate mitral stenosis	Pulmonary arterial hypertension Severe systemic ventricular dysfunction (EF <30% or NYHA class III–IV) Previous peripartum cardiomyopathy with any residual left ventricular impairment Severe mitral stenosis Severe symptomatic aortic stenosis Systemic right ventricle with moderate or severely decreased ventricular function Severe aortic dilatation (>45 mm in Marfan syn-

Caesarean section is advised in severe forms of PH

**Post-partum period** is associated with significant haemodynamic changes and fluid shifts, particularly in the first 24–48 h after delivery, which may precipitate HF

<b>Risk</b>	Extremely high risk of maternal mortality or severe morbidity
<b>Maternal cardiac event rate</b>	40–100%



# Next steps

- **Betablocker** → HR <80/min.; **Diuretics** to reduce volume overload; Weekly echo-controls. Always sinus rhythm, no anticoagulation.
- **Round Table**: obstetricians, cardiologist, anaesthetist; informations to heart surgeon, intensive care:

## → Plan:

- **elective caesarean section** at 37 weeks of pregnancy in heart surgery operating room
- **Anaesthesia**: PDA, arterial catheter, central venous catheter left jug. vein – Plan B: ECMO. Oxytocin very slow infusion of 1-2 Units
- **Postoperative care on the ICU**

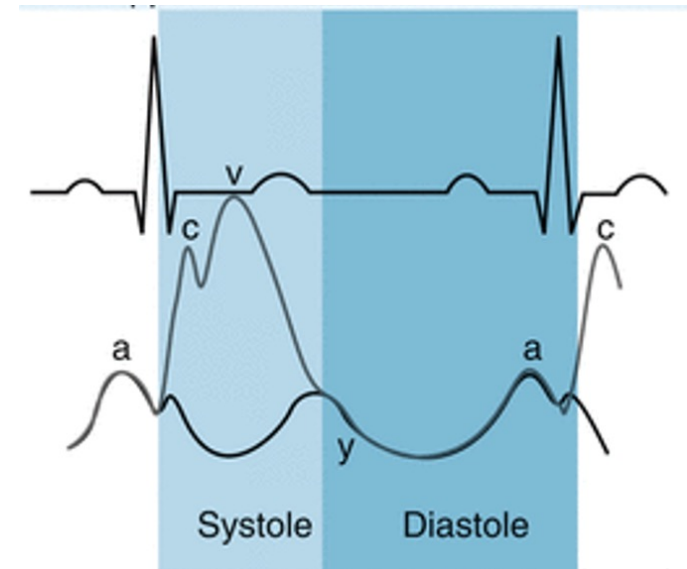
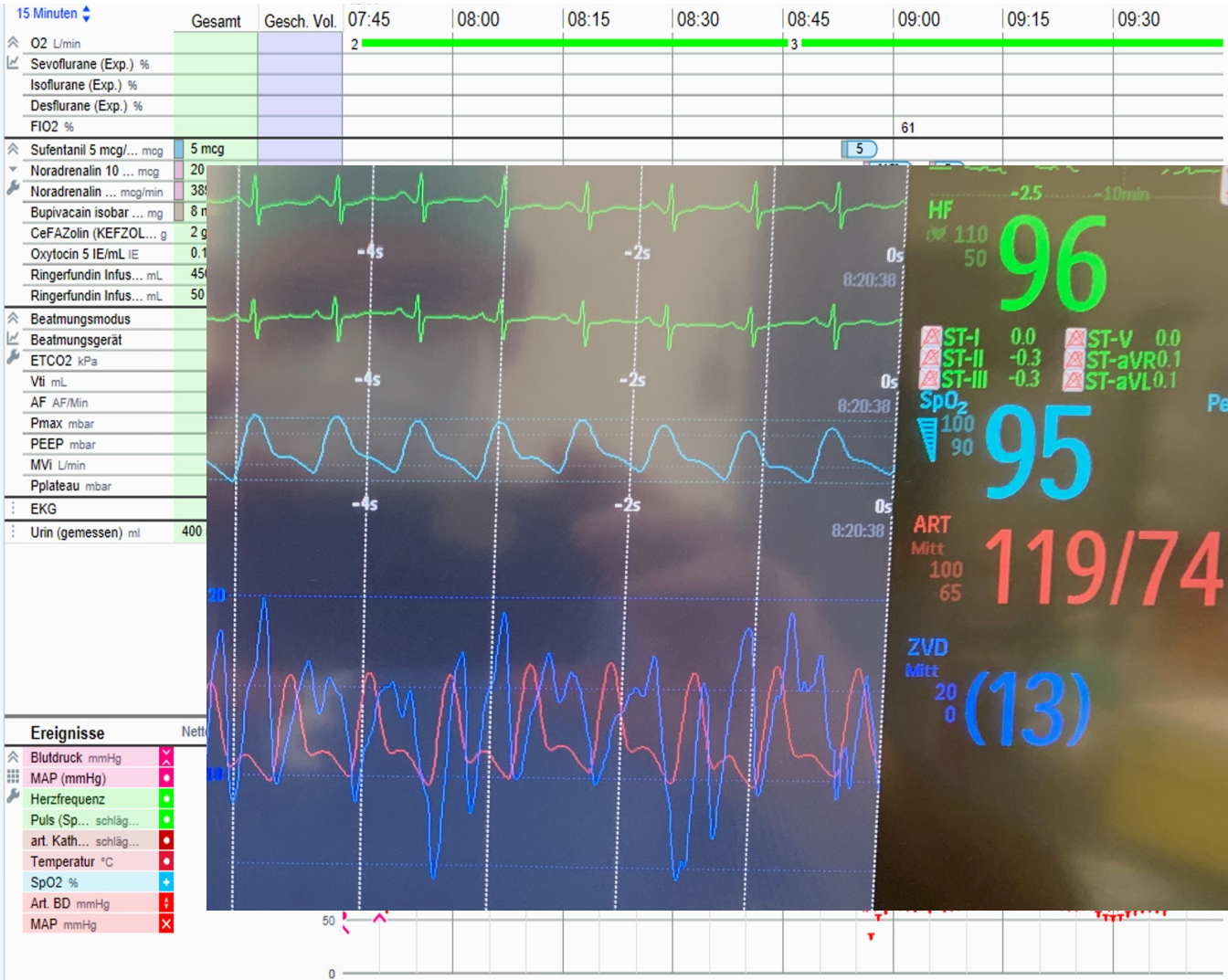


# Some difficulties

- Placement of **central venous catheter** (in half sitting position):  
Dyspnoea, wet cough and desaturation.

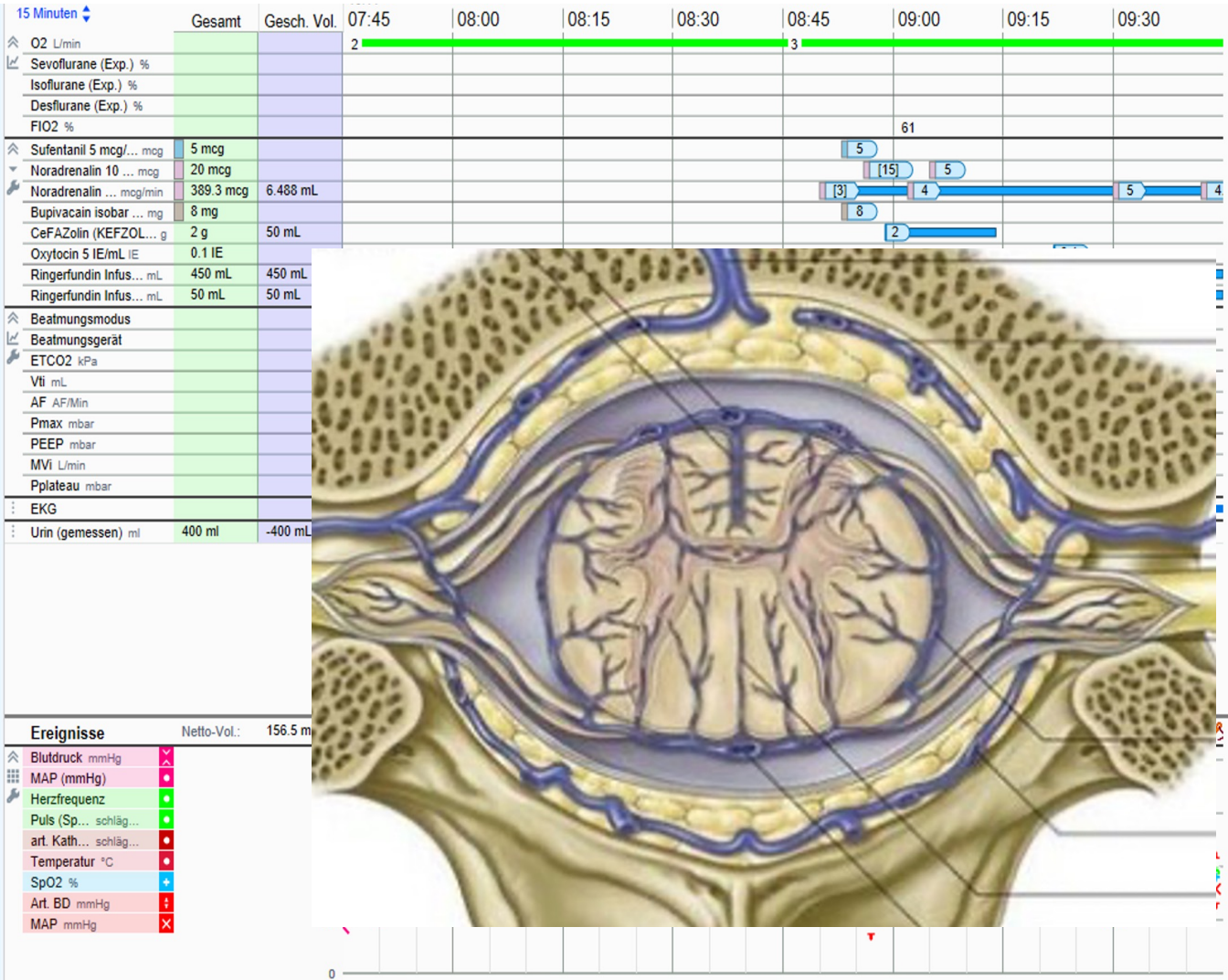
→ NIV-trial → Patient refuses

- ❖ CVP curve: pattern of tricuspid insufficiency





# Some difficulties

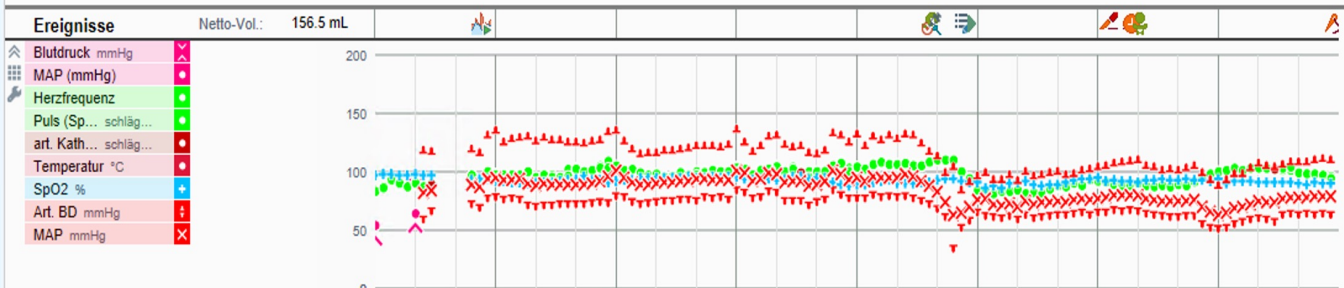


- **CSE**: left lateral position (& reverse Trendelenburg position)
  - No problem to find the epidural space, but difficulties in finding the intrathecal room.
  - Intrathecal application of **8mg isobaric bupivacaine 0.5%** and **5µg sufentanil** followed by the placement of the epidural catheter.
  - **Level of spinal anaesthesia: Th 3!**
  - ❖ enlarged epidural venous plexus



# Cesarean section

15 Minuten	Gesamt	Gesch. Vol.	07:45	08:00	08:15	08:30	08:45	09:00	09:15	09:30
O2 L/min			2				3			
Sevoflurane (Exp.) %										
Isoflurane (Exp.) %										
Desflurane (Exp.) %										
FIO2 %								61		
Sufentanil 5 mcg/... mcg	5 mcg						5			
Noradrenalin 10 ... mcg	20 mcg						[15]	5		
Noradrenalin ... mcg/min	389.3 mcg	6.488 mL					[3]	4	5	4
Bupivacain isobar ... mg	8 mg						8			
CeFAZolin (KEFZOL... g	2 g	50 mL					2			
Oxytocin 5 IE/mL IE	0.1 IE								0.1	
Ringerfundin Infus... mL	450 mL	450 mL								
Ringerfundin Infus... mL	50 mL	50 mL								
Beatmungsmodus			Standby	Standby	Standby	Standby	Standby	Standby	Standby	Standby
Beatmungsgerät			Perseus A500	Perseus A500	Perseus A500	Perseus A500	Perseus A500	Perseus A500	Perseus A500	Perseus A500
ETCO2 kPa							4.6			
Vti mL							0			
AF AF/Min							0			
Pmax mbar							0			
PEEP mbar							0			
MVi L/min										
Pplateau mbar										
EKG			ST							
Urin (gemessen) ml	400 ml	-400 mL						300		



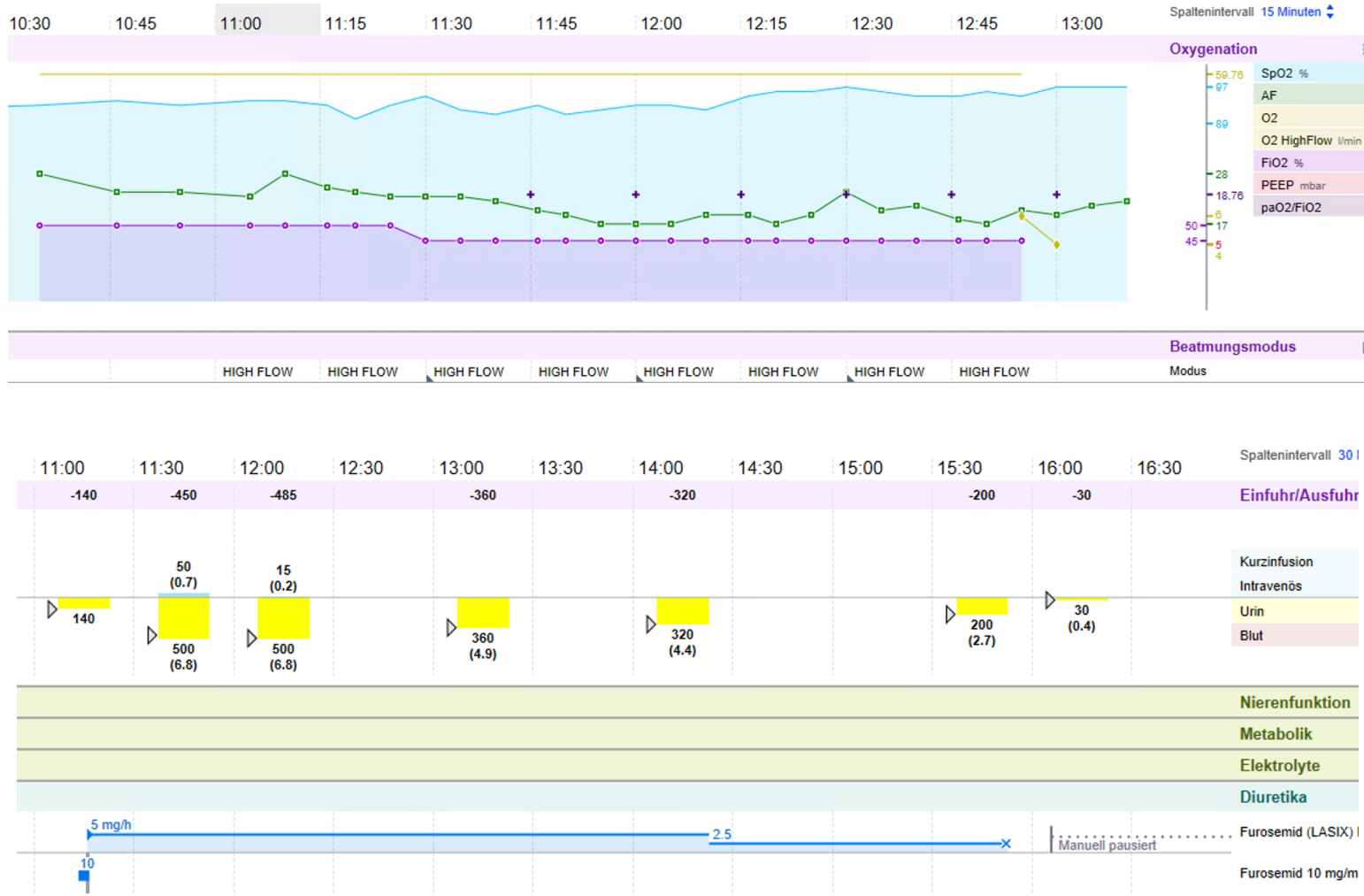
- **Cesarean section** without any difficulty.  
→ APGAR 8/6/9, art. pH 7.19; Light infant respiratory distress syndrome (IRDS).

→ Good uterine contraction with 1U oft oxytocin. Blood loss 500ml.

- **Hemodynamic:** Use of noradrenalin infusion to maintain systolic BP >100mmHg. HR around 100/min.
- **Pulmonary side:** Gradual decline of saturation at the end of the operation  
→ 89% at time of transfer on ICU.  
Increasing Dyspnea, again wet cough



# ICU-stay (1 day)



- NIV refused by patient → **High Flow** therapy for 2h
  - **Diuretics:** Furosemide Bolus and Infusion → negative liquid balance of 2 litres in 5 hours
  - **Beta-blocker**
- Dyspnoea and cough disappeared

# What I didn't tell you...

History of a past pregnancy 4 years ago:

- **Spontaneous delivery** with labour-induction 10d after term in a smaller private clinic. Cardiac disease was unknown!
- increasing cough during labour and **postpartum dyspnoea & desaturation**
- First treatment with salbutamol for „asthma“. Then chest X-Ray showing a white lung.
- **Treatment with NIV(?)**, diuretics and diagnosis with TTE





# Foresight

- **TTE 5 month after delivery:**  
much lower diastolic pressure gradient (dP mean) 7mmHg and light increase of pulmonary artery pressure sPAP 40mmHg
- Patient declines the recommended mitral valve replacement surgery

## **Take home message “Mitral stenosis”:**

- **Control HR  $\approx$  80/min.**
- **No volume overload  $\rightarrow$  diuretics**
- **Take care of the right ventricle:  
avoid hypoxia & hypercarbia**