



# Sepsis course – II.

## The „debt” which can kill

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# Case

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- 40 year old female
- Drug overdose: 20 tbl antipsychotic drug
- Ambulance – Psychiatry
  - Gastric lavage
  - In a few hours: acute abdominal pain
- Surgery
  - Perforated stomach
- 4th postoperative day
  - Deterioration – acute abdomen?
  - ICU call



Why do patients get into trouble?



# The debt...

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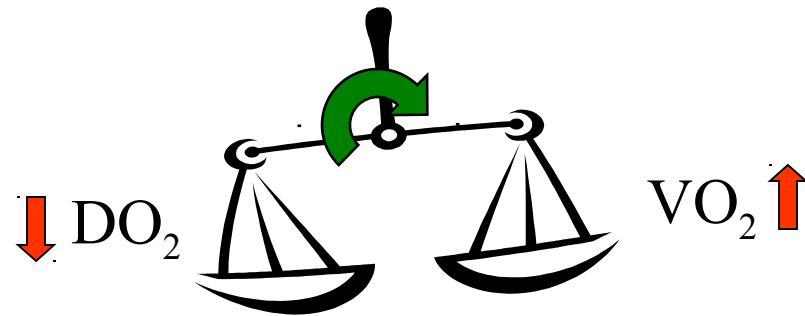
- $DO_2 = \underbrace{(SV \cdot P)}_{CO} \cdot \underbrace{(Hb \cdot 1.39 \cdot SaO_2 + 0.003 \cdot PaO_2)}_{CaO_2} \sim 1000 \text{ ml/p (SaO}_2 = 100\%)$
- $VO_2 = CO \cdot (CaO_2 - CvO_2) \sim 250 \text{ ml/p (ScvO}_2 \sim 70-75\%)$



# The debt...

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- In critical illness:

- $Sokk = VO_2 > DO_2$





# On arrival 02.10, 12:00

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- Sleepy, looks poorly
- Sweaty skin
- Tachypnoe
- Peripheral cyanosis
- Treatment: 22G („blue”) canule + LR

## First actions:

- 1 – Thorough physical examination
- 2 – Oxygen + venous access + fluid
- 3 – Immediate abd. X-ray/CT
- 4 – Immediate surgery



# 12:15

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- X-ray
  - Free air under the diaphragm
  - Dg: suture breakdown – acute laparotomy
- Ther's no free theatre...
- ICU
  - On mask:  $SpO_2 = 92\%$ , resp. rate =  $\sim 30/\text{min}$
  - 500 ml colloid: HR = 130/m, BP = 75/35 Hgmm

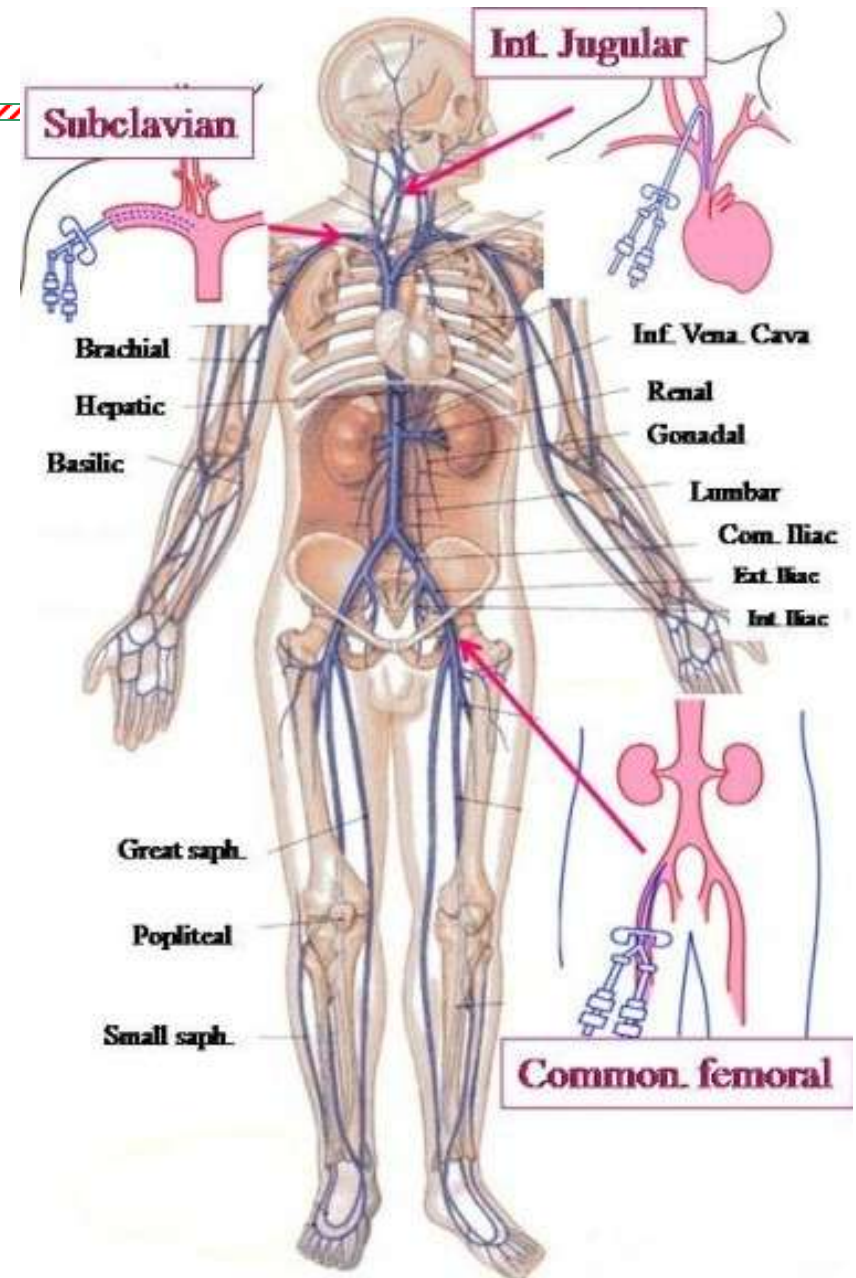
Which algorithm would you choose?

- 1 – CVP – fluid – vasopressor - anaesth/ET
- 2 – Vasopressor – art. line – anaesth/ET – CVP
- 3 – Anaesth/ET – art. line – CVP – vasopressor



# Central lines

- Int. jugular vein
- Subclavian vein
- Femoral vein





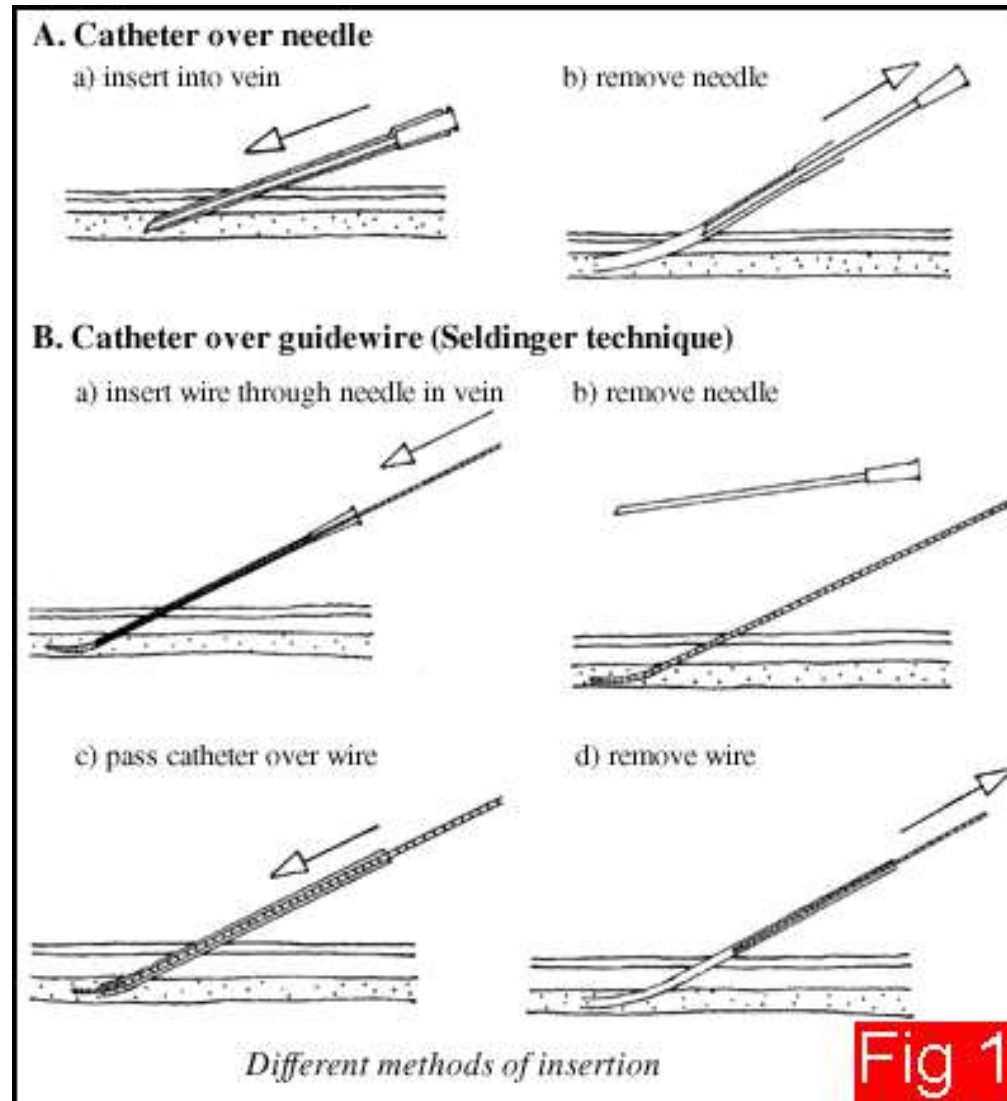


# Central venous catheter set





# Seldinger's technique





# Int. jug. vein puncture

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# 12:15

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- Cardio-respiratory stabilisation
- Surgery
- To continued...



# Examples



# 1. case

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- On assessment (cardiac arrest call)
  - Middle aged man, after lung surgery
  - Few minutes CPR
  - ICU
- History
  - Age: 58 years
  - Complaints:
    - Lobectomy 4 days ago
    - Sputum retention
    - Bronchoscopy ...
- What happened?
  - Severe hypoxia



# The debt...

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- $DO_2 = \underbrace{(SV \cdot P)}_{CO} \cdot \underbrace{(Hb \cdot 1.39 \cdot SaO_2 + 0.003 \cdot PaO_2)}_{CaO_2} \sim 600 \text{ ml/m (SaO}_2 = 70\%)$
- $VO_2 = CO \cdot (CaO_2 - CvO_2) \sim 400 \text{ ml/m (ScvO}_2 \sim 20\%)$

- Possible explanation:
  - There was no monitoring
  - SaO<sub>2</sub> – DO<sub>2</sub> was reduced
  - VO<sub>2</sub> increased
- What should have been done?
  - O<sub>2</sub> + SpO<sub>2</sub> monitoring
  - If SpO<sub>2</sub> „low” (~<94%)
    - Altatás + ET tubus + monitorozás
  - Aim: safe bronchoscopy





## 2. case

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- On assessment on A&E:
  - Elderly female
  - Sweaty, agitated
  - Laboured breathing, „bubbly” noise
- How to proceed?
  - Semi sitting position, O<sub>2</sub>, venous access, monitoring (SpO<sub>2</sub>, NIBP, EKG)
- History
  - Age: 68 years
  - High BP, IHD
  - Complaints:
    - Difficulty in breathing for a few hours
    - BP: 195/100 mmHg, HR: 112/min, SpO<sub>2</sub> = 88%



# The debt...

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- $DO_2 = \underbrace{(SV \cdot P)}_{CO} \cdot \underbrace{(Hb \cdot 1.39 \cdot SaO_2 + 0.003 \cdot PaO_2)}_{CaO_2} \sim 800 \text{ ml/p (SaO}_2 = 88\%)$
- $VO_2 = CO \cdot (CaO_2 - CvO_2) \sim 400 \text{ ml/p (ScvO}_2 \sim 50\%)$

- Possible explanation:
  - Acute LVF
  - Reduced myocardial contractility (CO) – pulmonary oedema (hypoxia)
  - High systemic vascular resistance (SVR)
- Treatment
  - O<sub>2</sub> + SpO<sub>2</sub> monitoring
  - Reducing SVR („afterload”): vasodilator (nitroglycerin spray)
  - Pain relief/sedation: morphine i.v. (2-4-... mg)
  - +/- diuretics, positive inotrope treatment



## 2. case

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- Effects
  - SpO<sub>2</sub>=93 %
  - BP: 140/80 mmHg, HR: 100/min
- Diagnostics
  - EKG, CXR, blood tests
  - Is there time?
- Dg: Acute LVF
  - Conservative treatment: A&E - Cardiology



# Instead of summary

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- „Early Goal-Directed Therapy” (EGDT)

Rivers E et al. *N Engl J Med* 2001; 345: 1368

- Septic patients treated on A&E for 6 hours:

- Control group (n=133):

- O<sub>2</sub>
- CVP: 8-12 mmHg
- MAP >65 mmHg

- EGDT group (n=130):

- Same as above
- ScvO<sub>2</sub> > 70%



• More fluid, blood  
• More dobutamine

Mortality: 46 vs. 30% (p=0.009)



# Motto

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Diagnosis can wait, but cells can't!

The question isn't whether we've made the right decision, but whether we've done everything to make the right decision