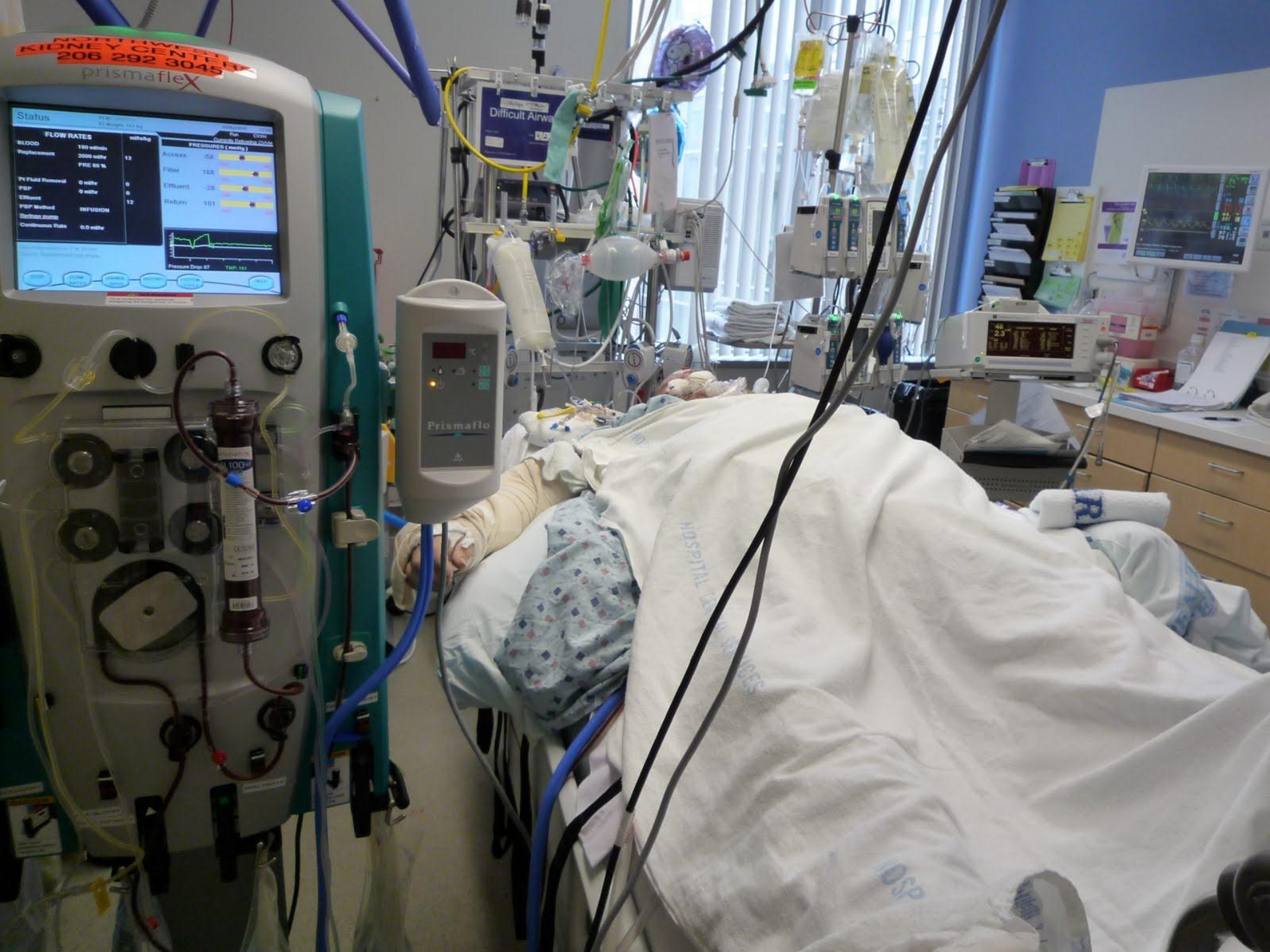
NORTHWEST
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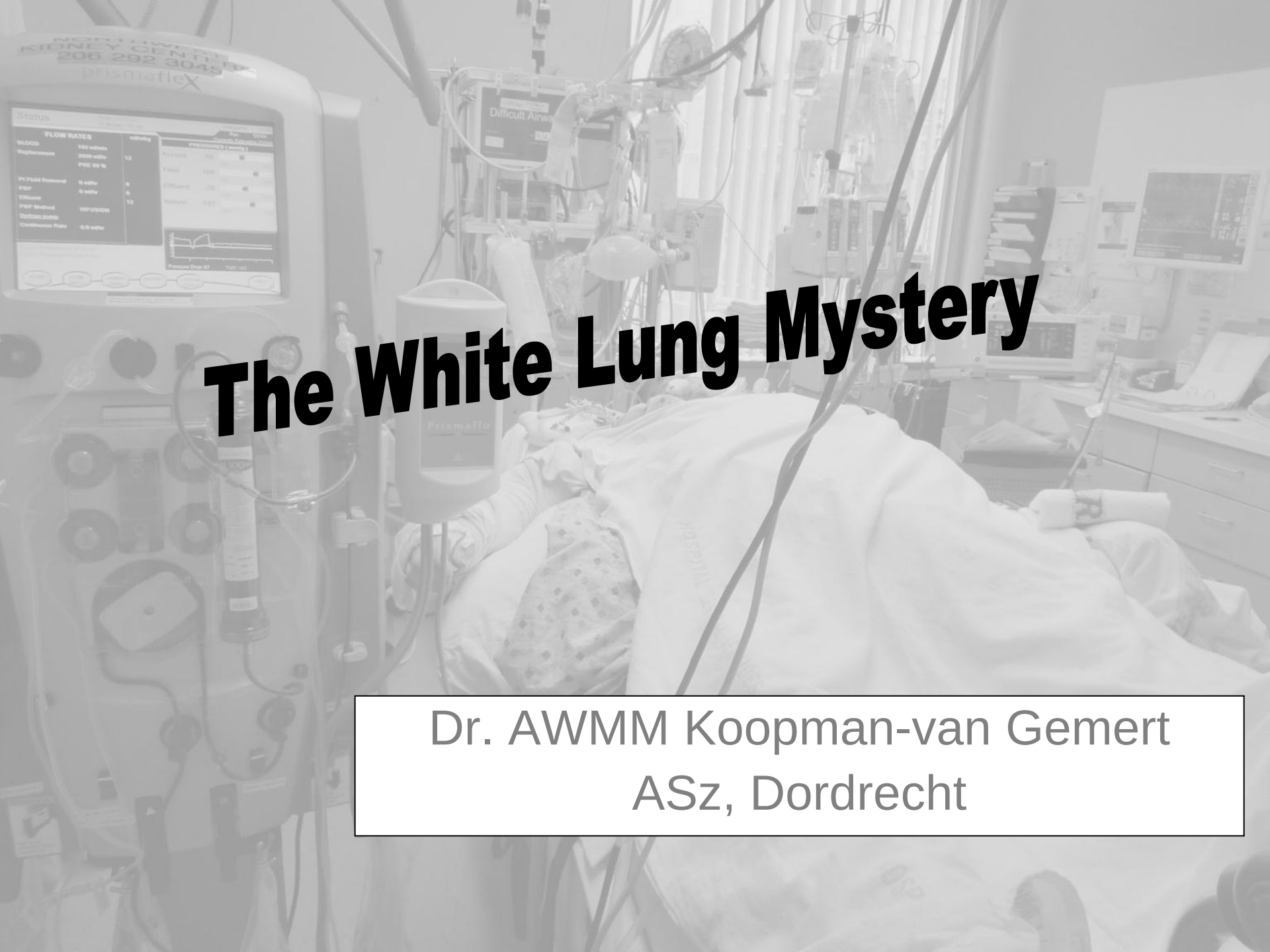
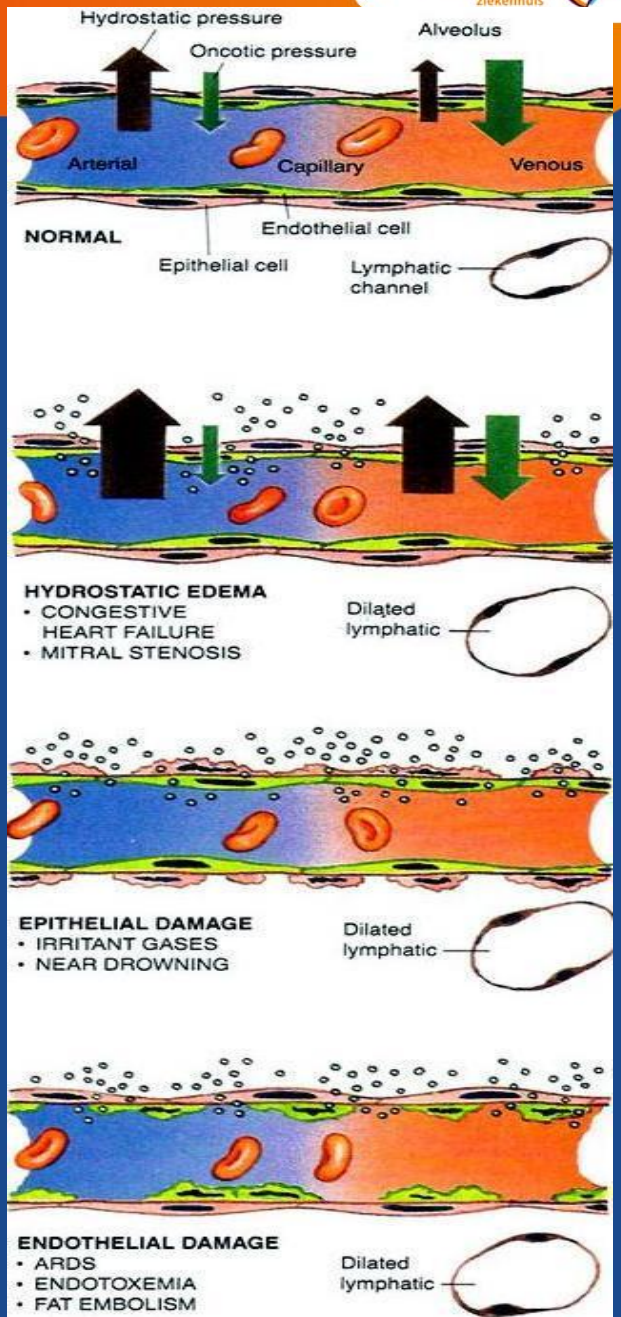


The White Lung Mystery

Dr. AWMM Koopman-van Gemert
ASz, Dordrecht

Pulmonary Edema

- Accumulation extravascular fluid
- Imbalance fluid filtration and resorption
- Traditionally:
  - Hydrostatic = cardiogenic
  - Non-hydrostatic = noncardiogenic
- When lung edema occurs < 6 hours after a BT:
  - Diagnostic challenge



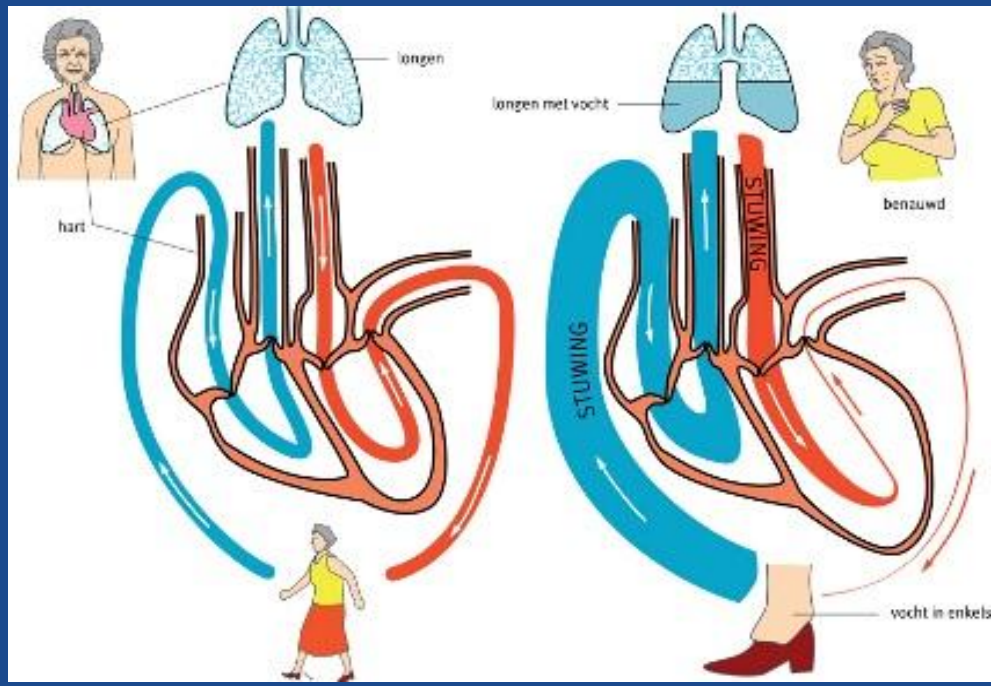
Is it a problem??

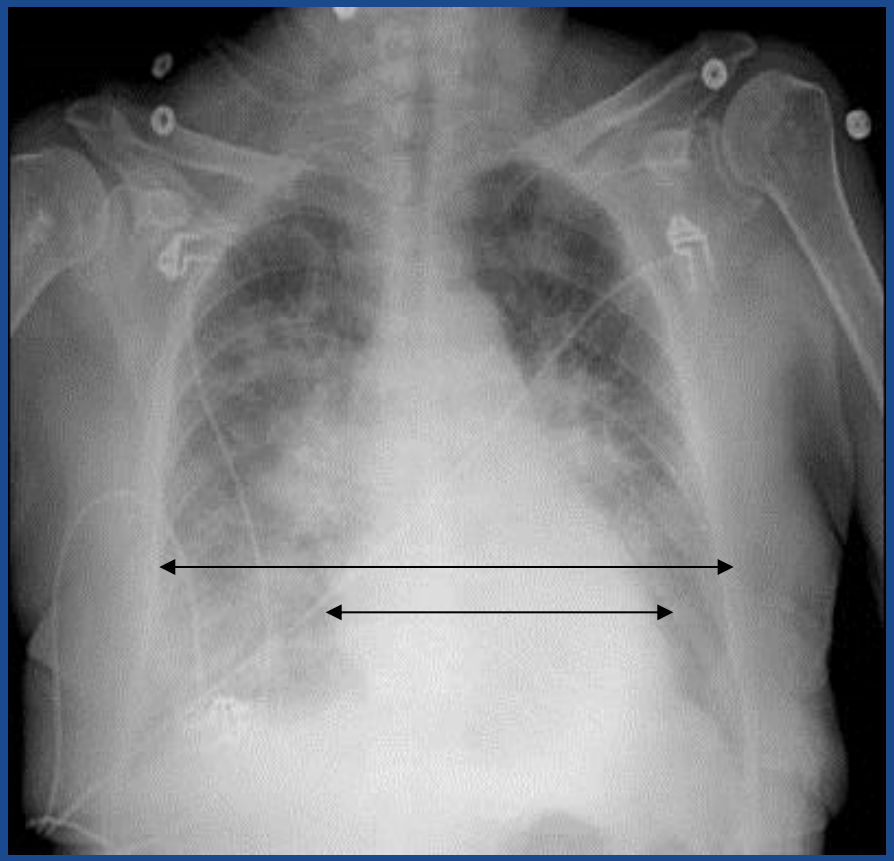
Reactie	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
AHTR	12	8	14	9	19	11	18	18	21	16	7
Anafylactische reactie	13	8	21	26	19	54	65	71	73	67	55
Andere allergische reactie	98	132	171	219	222	202	171	181	184	191	174
Hemosiderose				4	5	3	5	2	4	2	
Milde NHKR	247	326	341	375	363	328	275	360	363	366	353
NHTR	240	318	345	435	490	452	453	488	506	504	426
Nieuwe antistofvorming	117	244	428	571	607	602	610	757	814	831	771
Onvoldoende info										5	
Overige reactie	48	54	64	67	61	55	101	136	164	217	206
Post-tf bacteriëmie/sepsis	12	9	5	10	7	19	37	55	41	61	45
Post-tf overige besmetting										1	
Post-tf purpura	1						1			2	
Post-tf virale infectie	1	5	7	8	7	7	7	3	1	5	1
TA-GVHD							1				
TRALI	**9**	**7**	**9**	**17**	**25**	**31**	**21**	**13**	**17**	**12**	**9**
VHTR	21	19	14	12	14	11	18	8	7	9	8
Volume overbelasting	**1**	**7**	**6**	**27**	**34**	**31**	**39**	**42**	**47**	**39**	**51**

- Pathogenese and risk factors
  - TACO
  - TRALI
- Possible usefull diagnostic tools
- Prevention
- Conclusion

Pathogenesis TACO

- Volume overload
- Increase $P_{Hydrostatic}$
- Protein poor fluid in interstitium / lung alveoli
  - Transudatee
- Circulatory overload
  - Pressure measurements
    - CVD, Swan Ganz
  - Echo
  - BNP
  - Lung fluid: protein poor
  - WBC: leukopenia

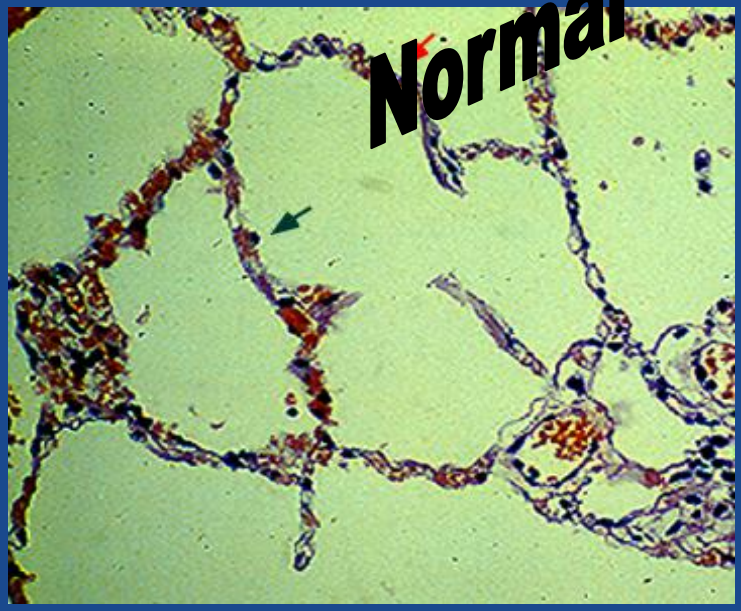


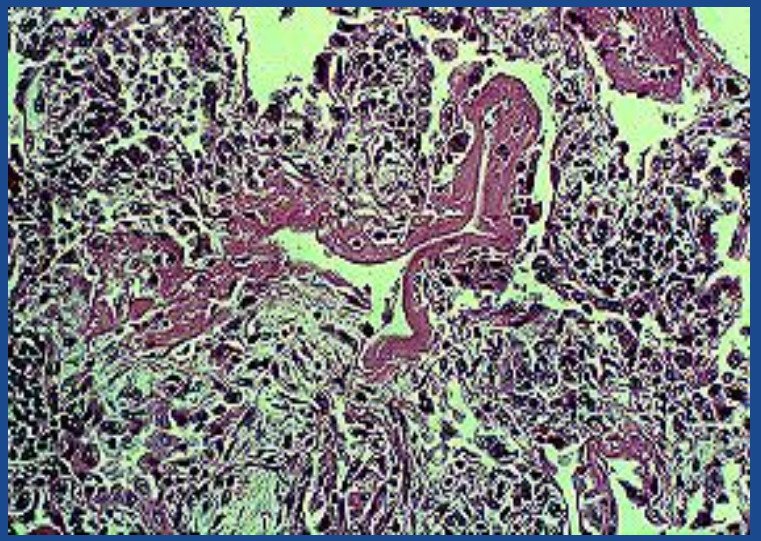


TRALI

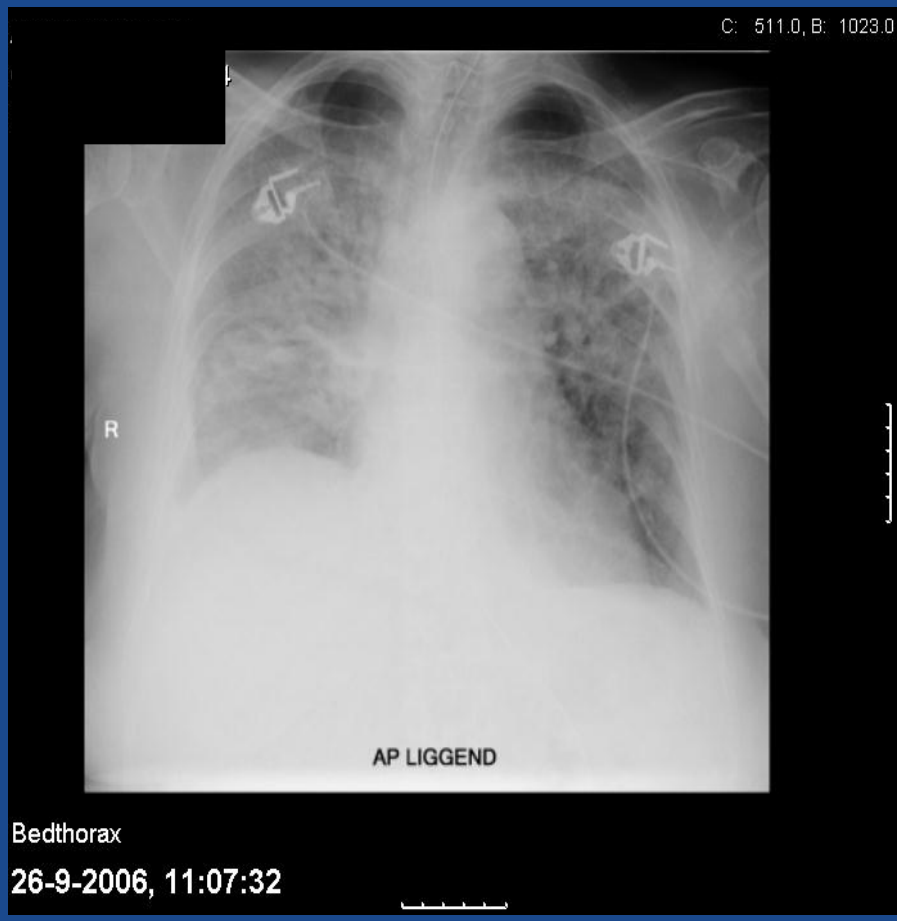
- “activation pulmonary endothelium” leading to sequestration neutrophiles and other cells.
  - First hit
  - Pre-existing endothelial injury??
- BT: Factor in BT, causing inflammatory damage
  - Second hit

- Predisposing patients factors





- High protein content in lung fluid
  - Exsudate
- Exclusion cardiac reasons

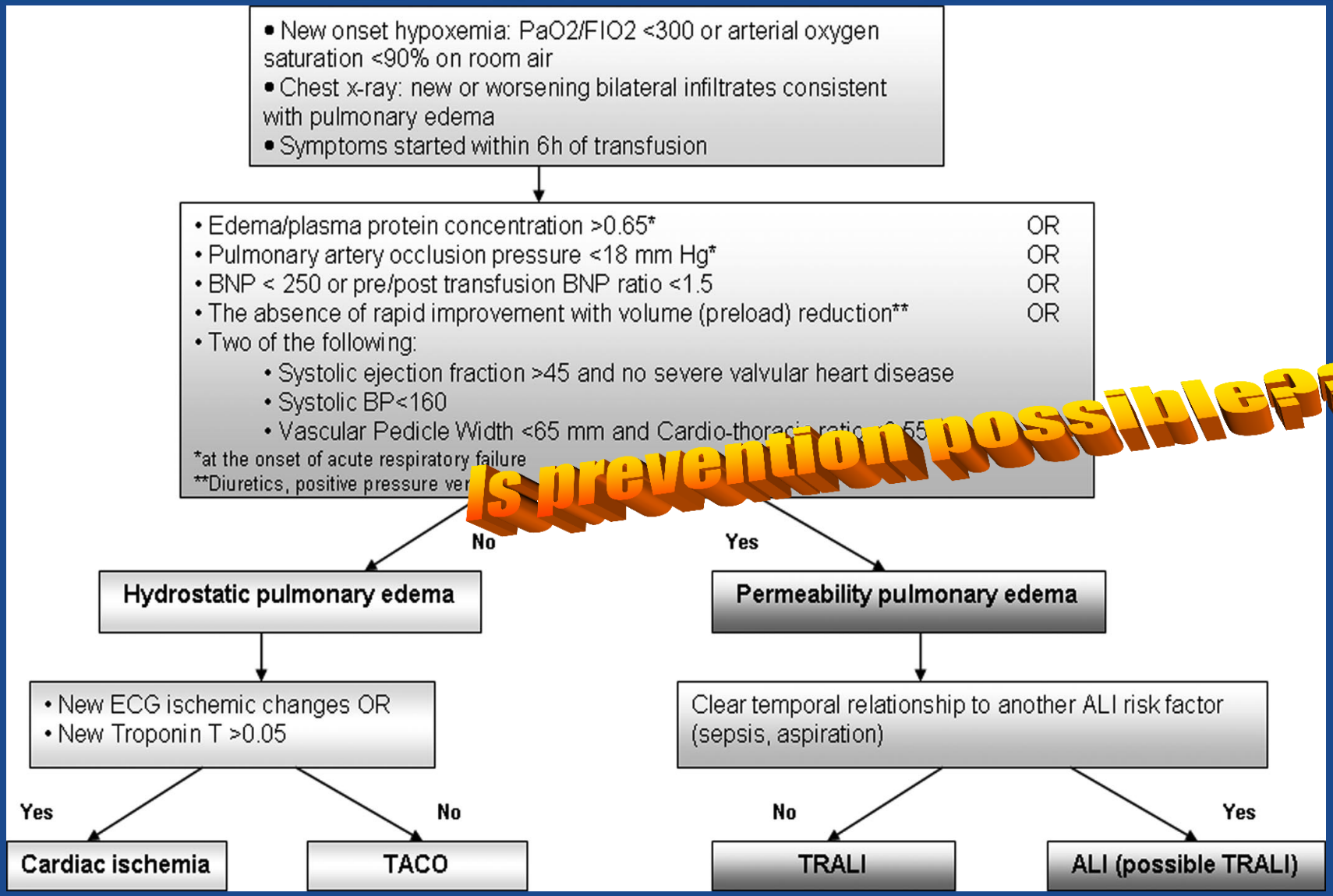


Patient Risk factors TRALI

- Higher IL-8
- Shock
- Liver surgery: transplantation
- Chronic alcohol abusus
- Positive fluid balance
- Peak airway pressure > 30 cm
- Current smoking
  - **These are conditions that predispose to ALI**

	TACO	TRALI
Acute onset	yes	yes
Respiratory failure	yes	yes
Symptoms of heart failure •echo, CVD, •BNP, RR, •diuretics release	yes	no
Protein content lung fluid	Pr. Poor: transudate	Pr. Rich: exsudate

Tool to discriminate



Prevention TRALI

- Follow Transfusion guidelines
- Male donors for high volume components?
  - Jo Wiersum showed 33%↓
- Solveng detergent plasma pools??
- Alternatives?
- Test apheresis donors?

Prevention TACO (1)

- Identify the high risk patient before transfusion
  - Age
  - Positive fluid balance
  - Cardiac dysfunction
  - Renal dysfunction
  - Acute myocardial infacrtion
  - High volume plasma needed

Prevention TACO (2)

- Speed of administration
- Number needed to treat
- Pre-emptive diuretics
- Supervision: nurses

PATIENT IDENTIFICATION:

Albert Schweitzer ziekenhuis

Pre-Transfusion Assessment & Ordering Tool

Hospital Diagnosis:

Reason for Transfusion (Be Specific):

Transfusion Product Requested & Amount (if more than 1 indicate reason):

Does the patient have any risk factors for Transfusion Associated Circulatory Overload (TACO)?

History Findings	Yes	No
Myocardial Infarction (<4 weeks)	❑	❑
History of CHF	❑	❑
Prescribed Diuretics (Previously)	❑	❑
History of Renal Dysfunction	❑	❑

Vital Sign	Yes	No
Respiratory Rate (RR) >20	❑	❑
SaO_2 <92% on RA	❑	❑
JVP > 3 cm ASA	❑	❑
Chest Rales (Bilaterally)	❑	❑
Fluid Balance (> 2L in 24 hours)	❑	❑
Extra Heart Sounds Present (S3, S4)	❑	❑

Furosemide Orders:

1. If yes to any of the above, consider prescribing: Furosemide _____mg IV X 1 dose pre-transfusion.
   ☑ Transfuse one unit at a time, slow the rate of transfusion to _____ (suggest <85 ml/hr); on an infusion pump
   ☑ Vital Signs q30 minutes until transfusion completion, then q6h X 24hours post-transfusion
2. If no to all of the above, but age >60, consider prescribing: Furosemide _____mg PO X 1 dose pre-transfusion.
   ☑ Transfuse one unit at a time, slow the rate of transfusion to _____(suggest <85 ml/hr); on an infusion pump
3. If no to all of the above and age <60 years, diuretics are not recommended
   ☑ Transfuse one unit at a time, slow the rate of transfusion to _____ (suggest <120 ml/hr); on an infusion pump

Other orders:

☑ Physician to re-examine patient after each transfusion
☑ Nofity MD immediately if SaO_2<5% from baseline, RR>10/min from baseline or sBP >20mmHg from baseline

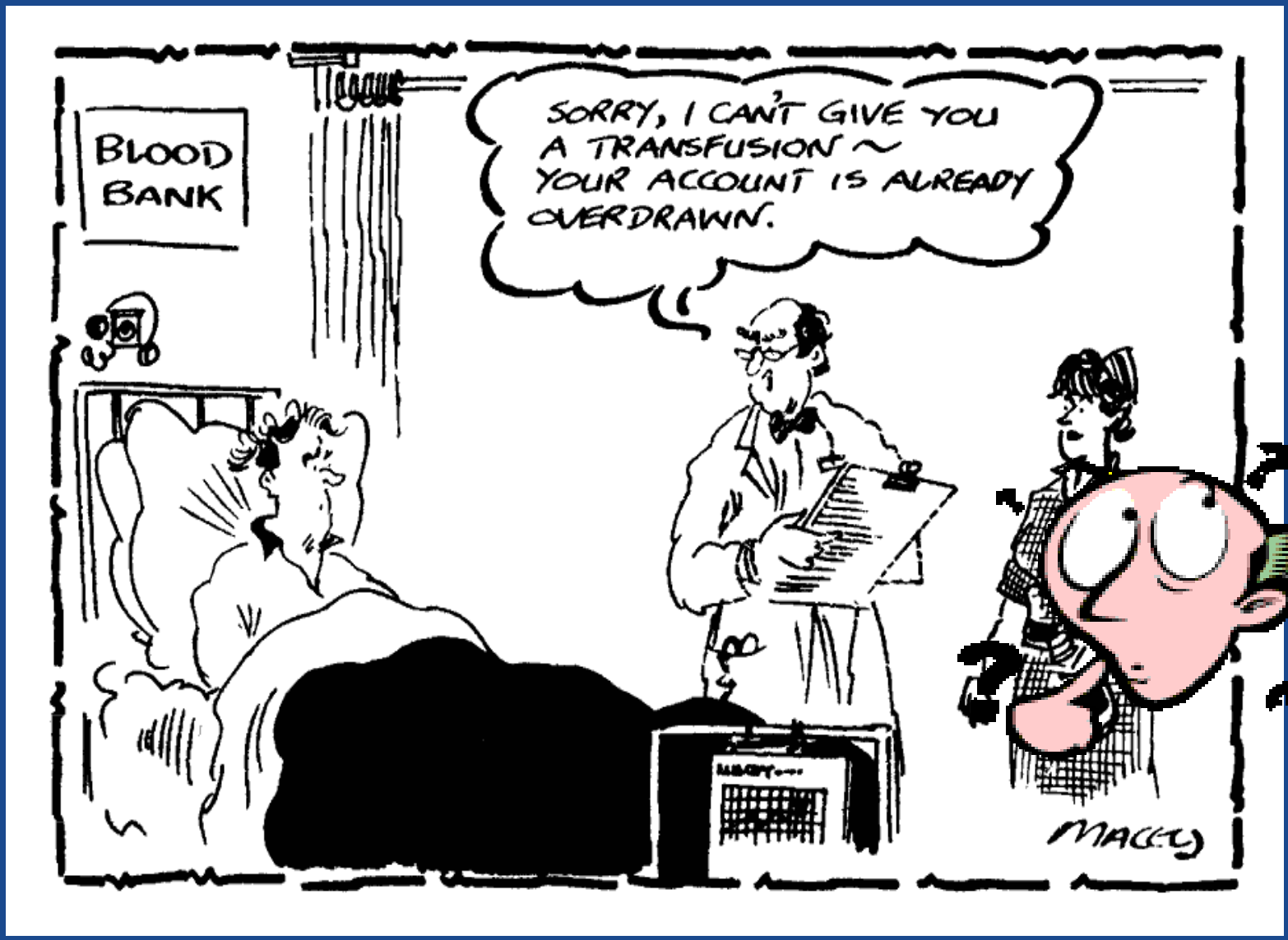
MD Signature: _____ Date: _____

Abbreviations: ASA=above the sternal angle, CHF=congestive heart failure, JVP=jugular venous pressure, RA=room air, SaO2 = oxygen saturation, sBP = systolic blood pressure

Conclusion and future advise

- BT acquired lung edema is still a problem
- Diagnosis may be difficult
- Transfusion Overload is a rising problem
  - And maybe for a great deal preventable
- Make effort in improving National Guidelines
  - And create awareness for this problem and methods to prevent
- Perform research to find the best checklist

Thank you for your attention



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