Echokardiographie als Wegweiser in der Peri-Reanimation

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Disclosure Statement of Financial Interest

I, Marco Campo dell' Orto DO NOT have a financial interest/arrangement or affiliation with one or more organizations that could be perceived as a real or apparent conflict of interest in the context of the subject of this presentation.

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Should we make it „like always“?

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Diagnose und Therapie unter Zeitdruck

Vitale Bedrohung

Klinischer Blick

Ultraschall

Meßwerte

EKG, NBP, SaO_2, $etCO_2$

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Anforderung an das Ultraschallverfahren

Vergleich am Beispiel: „EKG“

- **Diagnostische Idee stützen**
- **Behandelbare Ursachen identfizieren**
- **Einfluss auf weitere Behandlung**

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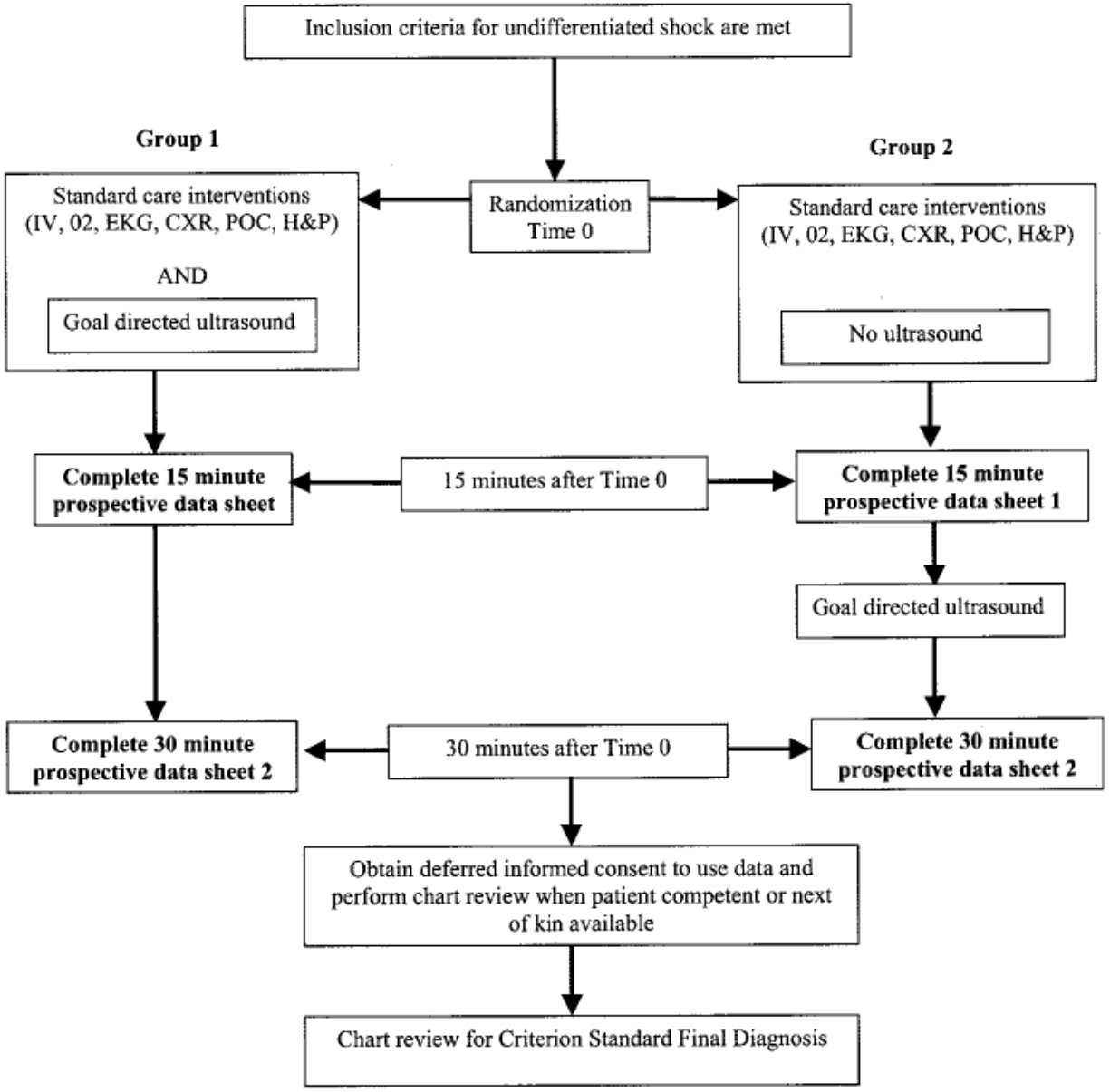
Eignet sich Sonographie für die Notfalldiagnostik ?

Randomized, controlled trial of immediate versus delayed goal-directed ultrasound to identify the cause of nontraumatic hypotension in emergency department patients*

Alan E. Jones, MD; Vivek S. Tayal, MD; D. Matthew Sullivan, MD; Jeffrey A. Kline, MD

Crit Care Med 2004, 32: 1703



Crit Care Med 2004, 32: 1703

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Randomized, controlled trial of immediate versus delayed goal-directed ultrasound to identify the cause of nontraumatic hypotension in emergency department patients*

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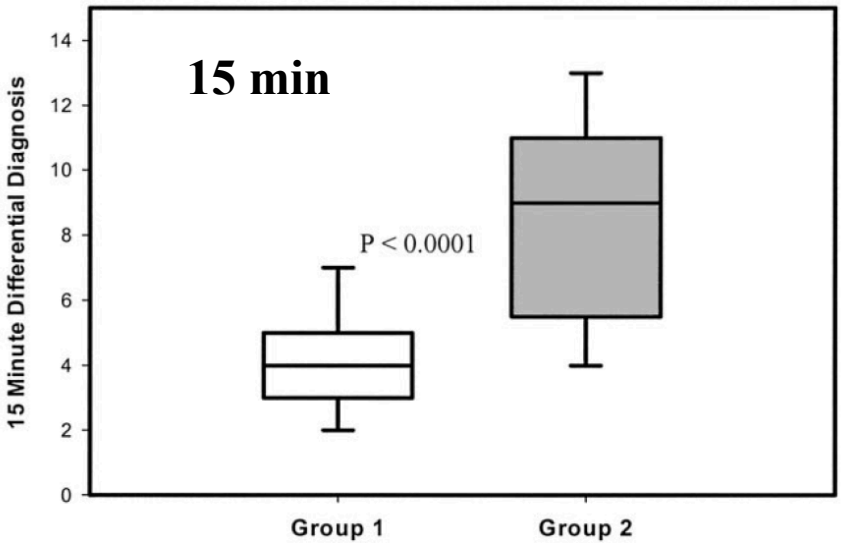

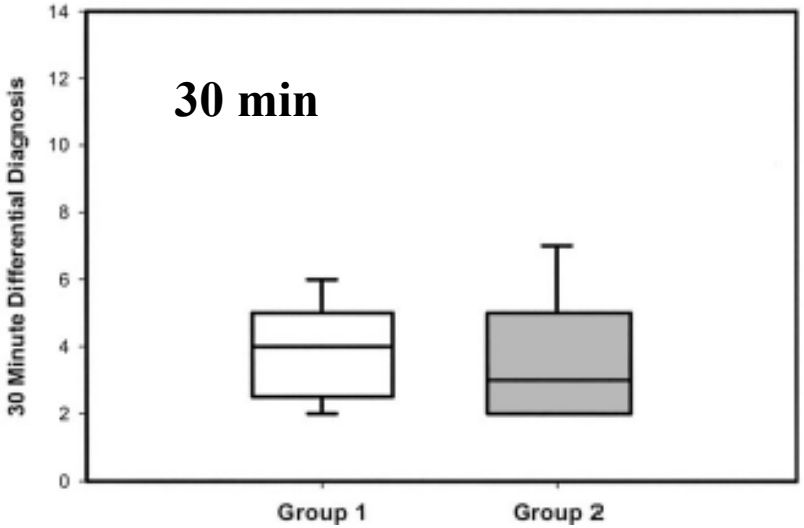

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Ziele der Notfallsonographie

Reduktion der Anzahl möglicher Differentialdiagnosen

Identifizierung behandelbarer Ursachen

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Resuscitation 81 (2010) 1219–1276

Contents lists available at ScienceDirect

Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation

European Resuscitation Council Guidelines for Resuscitation 2010 Section 1. Executive summary

Jerry P. Nolan[a,*], Jasmeet Soar[b], David A. Zideman[c], Dominique Biarent[d], Leo L. Bossaert[e], Charles Deakin[f], Rudolph W. Koster[g], Jonathan Wyllie[h], Bernd Böttiger[i], on behalf of the ERC Guidelines Writing Group[1]

Verwendung von	ERC 2010	ERC 2005
“ultrasound”/“sonography”	40	11 (8)
“echocardiography”	27	2

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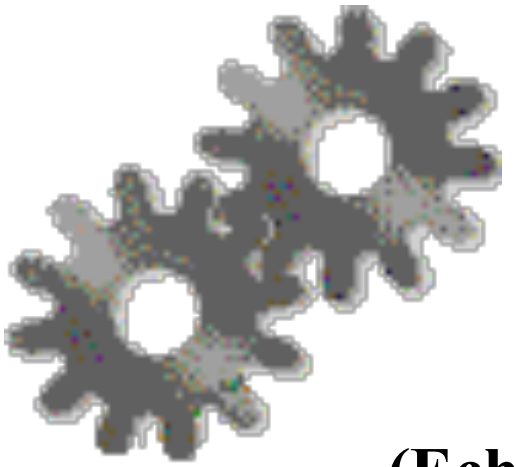
Use of ultrasound imaging during advanced life support

Several studies have examined the use of ultrasound during cardiac arrest to detect potentially reversible causes. Although no studies have shown that use of this imaging modality improves outcome, there is no doubt that echocardiography has the potential to detect reversible causes of cardiac arrest (e.g., cardiac tamponade, pulmonary embolism, aortic dissection, hypovolaemia, pneumothorax).[261–268] When available for use by trained clinicians, ultrasound may be of use in assisting with diagnosis and treatment of potentially reversible causes of cardiac arrest. The integration of ultrasound into advanced life support requires considerable training if interruptions to chest compressions are to be minimised. A sub-xiphoid probe position has been recommended.[261,267,269] Placement of the probe just before chest compressions are paused for a planned rhythm assessment enables a well-trained operator to obtain views within 10 s. Absence of cardiac motion on sonography during resuscitation of patients in cardiac arrest is highly predictive of death[270–272] although sensitivity and specificity has not been reported.

Resuscitation 2010:81; 1219-76

ALS/Peri-Reanimation
(treibende Kraft)



FEEL
(Echokardiographie/
Ultraschall)
nachgeordnet

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Integration des FEEL Konzeptes in den ALS

Table 1. Focused Echocardiographic Evaluation in Resuscitation (FEER) management examination in ten steps[a]

Phase	Step with Command, Element
High-quality CPR, preparation, team information	*1) Perform* immediate and accurate BLS and ACLS according to AHA/ERC/ILCOR guidelines, at least five cycles of chest compression/ventilation
	2) Tell the CPR team: "I am preparing an echocardiogram"
	3) Prepare portable ultrasound (let prepare) and *test* it
	4) Accommodate situation (e.g., best position of patient and doctor, removal of clothes), be ready to start
Execution, obtaining the echocardiogram	*5) Tell* CPR Team to count down 10 secs and to undertake a pulse check simultaneously
	6) Command: "Interrupt at the end of this cycle for echocardiography"
	7) Put the probe gently onto the patients subxiphoidal region during chest compressions
	8) Perform a subcostal (long axis) echocardiogram as quickly as possible. If you cannot identify the heart after 3 secs, stop the interruption and repeat again five cycles later and/or with the parasternal approach.
Resuming CPR	*9) Command* after 9 secs at the latest: "Continue CPR" and control it
Interpretation and consequences	*10) Communicate* (after continuation of chest compressions only) the findings to the CPR team (e.g. wall motion, heart is squeezing, cardiac stand still, (massive) pericardial effusion, no conclusive finding, suspected pulmonary artery embolism, hypovolemia) and *explain* consequences and follow-up procedure

Crit Care Med (2007), 15, 5 (Suppl.) 150-61

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Wie schwierig ist die Notfallechokardiographie zu erlernen ?

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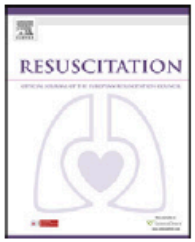

Clinical paper

Peri-resuscitation echocardiography: Training the novice practitioner☆

Susanna Price[a,1], Hendrik Ilper[b,1], Shahana Uddin[c], Holger V. Steiger[d], Florian H. Seeger[e], Sebastian Schellhaas[b], Frank Heringer[f], Miriam Ruesseler[f,g], Hanns Ackermann[h], Gabriele Via[i], Felix Walcher[f,g,1], Raoul Breitkreutz[b,f,j,*,1]

[a] Adult Intensive Care Unit, Royal Brompton & Harefield NHS Foundation Trust, London, United Kingdom
[b] Clinics of Anaesthesiology, Intensive Care and Pain Therapy, Johann Wolfgang Goethe-University Hospital, Frankfurt am Main, Germany
[c] Department of Anaesthesia, Barts & the London NHS Trust, London, United Kingdom
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[g] Trauma Surgery, Johann Wolfgang Goethe-University Hospital, Frankfurt am Main, Germany
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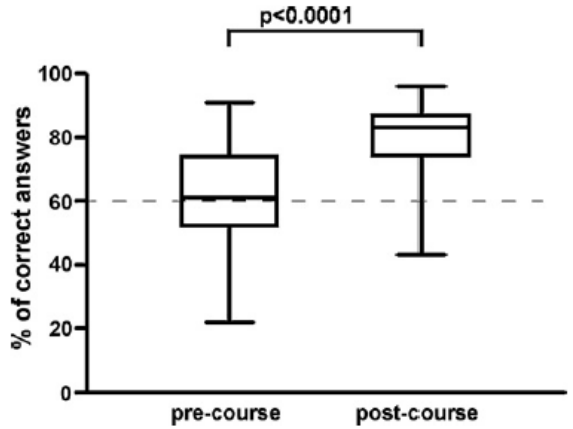

Fig. 1. Pre- and post-course exam results. Box-plots showing participants' results of the written and computerised peri-resuscitation echocardiography test undertaken before and after course completion. The box-plot indicates 25th and 75th percentile with the median (central line).

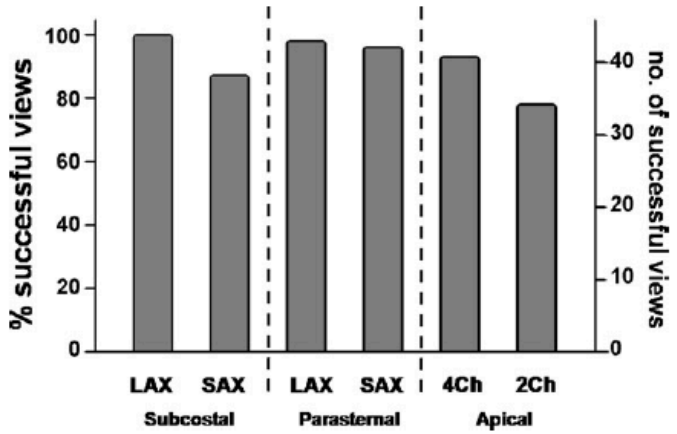

Fig. 2. Assessment of success of novice echocardiographers in achieving views of diagnostic quality. The percentage of views obtained of diagnostic quality by novice echocardiographers (n = 45) as judged by expert echocardiographers after attendance at a standard FEEL course. LAX; long axis, SAX; short axis, 4CH; 4-chamber, 2CH; 2-chamber.

S. Price et al. Resuscitation 81 (2010) 1534-1539

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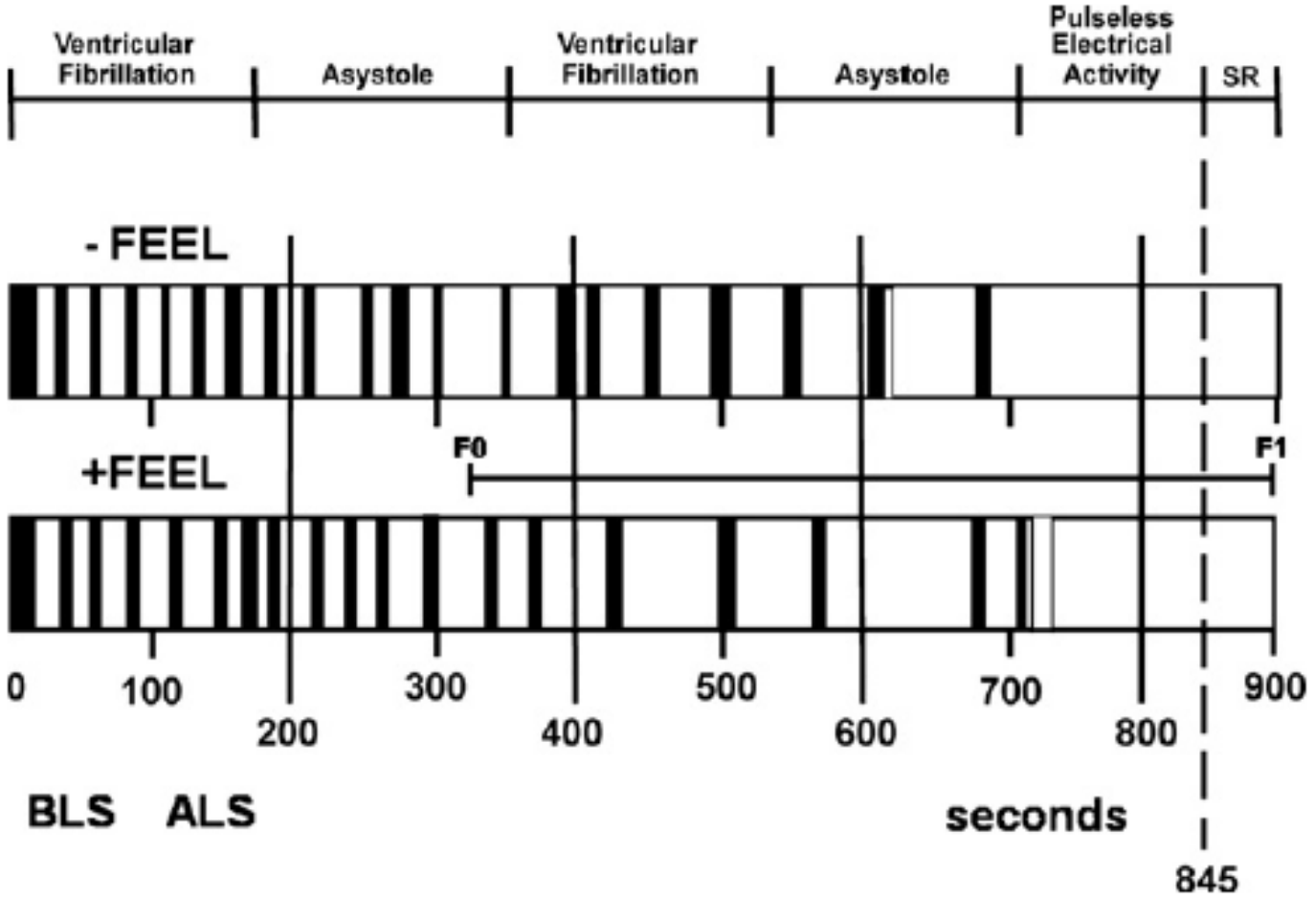

S. Price et al. Resuscitation 81 (2010) 1534-1539

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Verändert die fokkussierte Echocardiographie die initiale Therapie ?

Resuscitation 81 (2010) 1527–1533

Contents lists available at ScienceDirect

Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation

Clinical paper

Focused echocardiographic evaluation in life support and peri-resuscitation of emergency patients: A prospective trial☆,☆☆

Raoul Breitkreutz[a,e,*], Susanna Price[b], Holger V. Steiger[c], Florian H. Seeger[d], Hendrik Ilper[e], Hanns Ackermann[f], Marcus Rudolph[g], Shahana Uddin[h], Markus A. Weigand[i], Edgar Müller[j], Felix Walcher[k], from the Emergency Ultrasound Working Group of the Johann Wolfgang Goethe-University Hospital, Frankfurt am Main[1]

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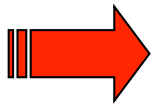
228 patients included into the protocol

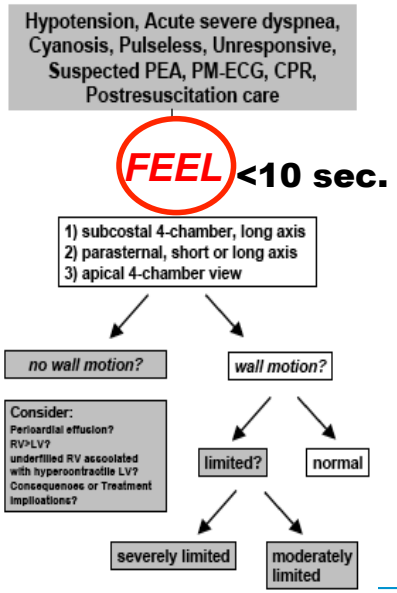
98
CPR

Clinical diagnoses
ECG, RR, SpO_2

51/98
susp. PEA



complete exam



39/51
„Pseudo-PEA“

12/51
„true-PEA“

Breitkreutz et al. Resuscitation 81 (2010) 1527-1533

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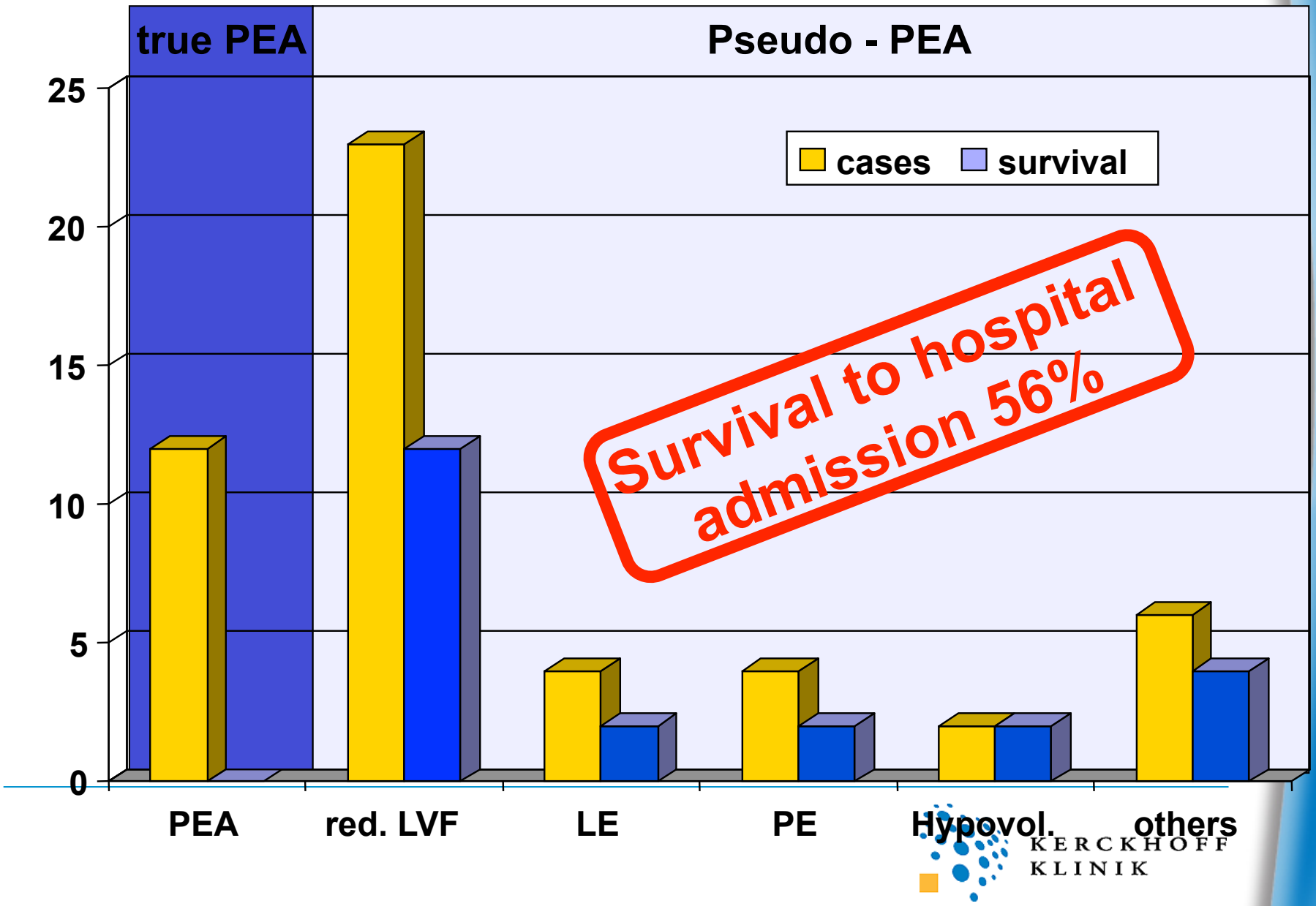
PEA: Reversible Ursachen



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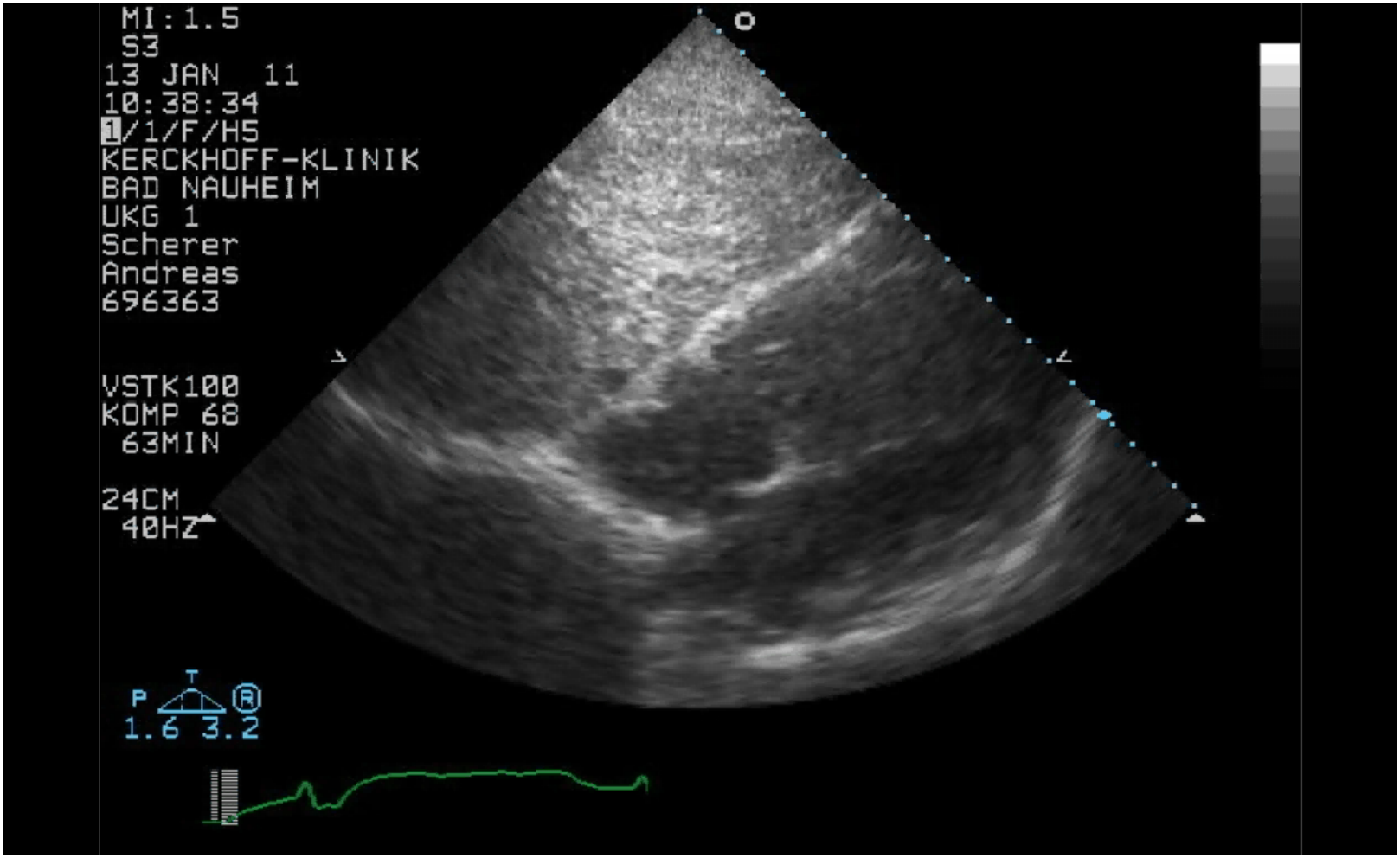
Fallbeispiel

- 40 jähriger Mann
- Hypoton, normofrequent
- Ausgeprägte Dyspnoe, Zyanose
- Anamnese durch Ehefrau: Meniskus OP vor 2 Tagen, Mono Embolex bekommen



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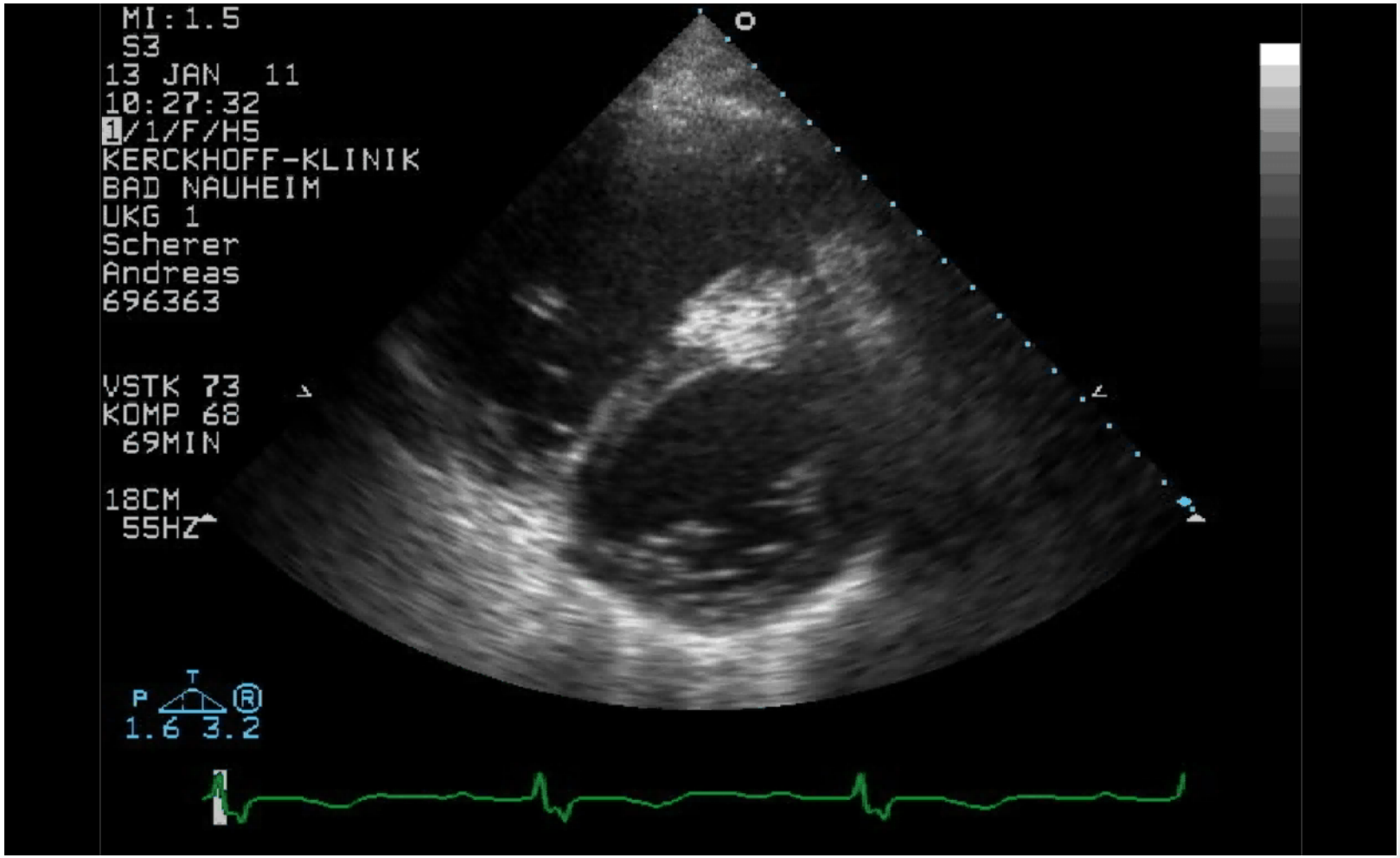

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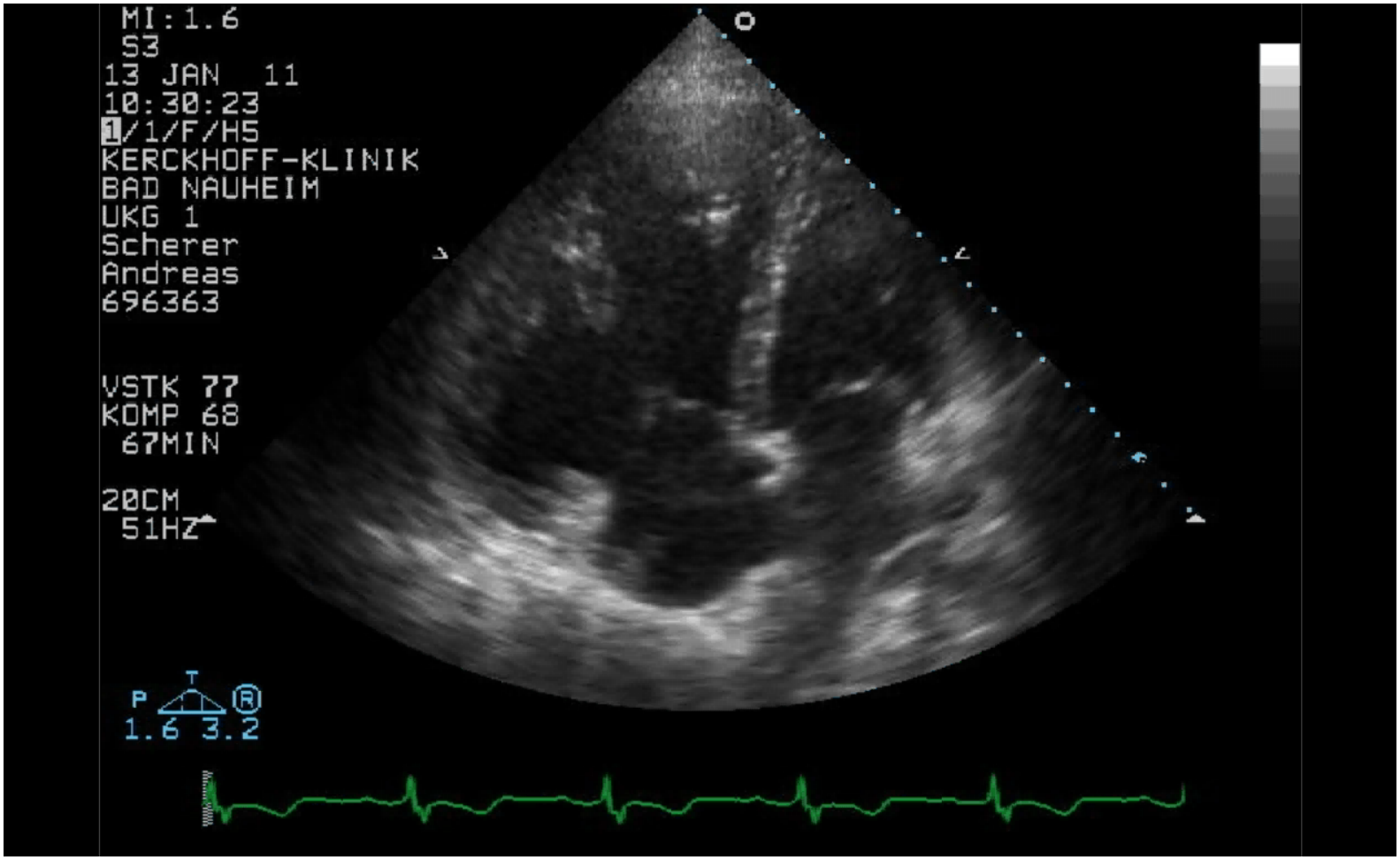

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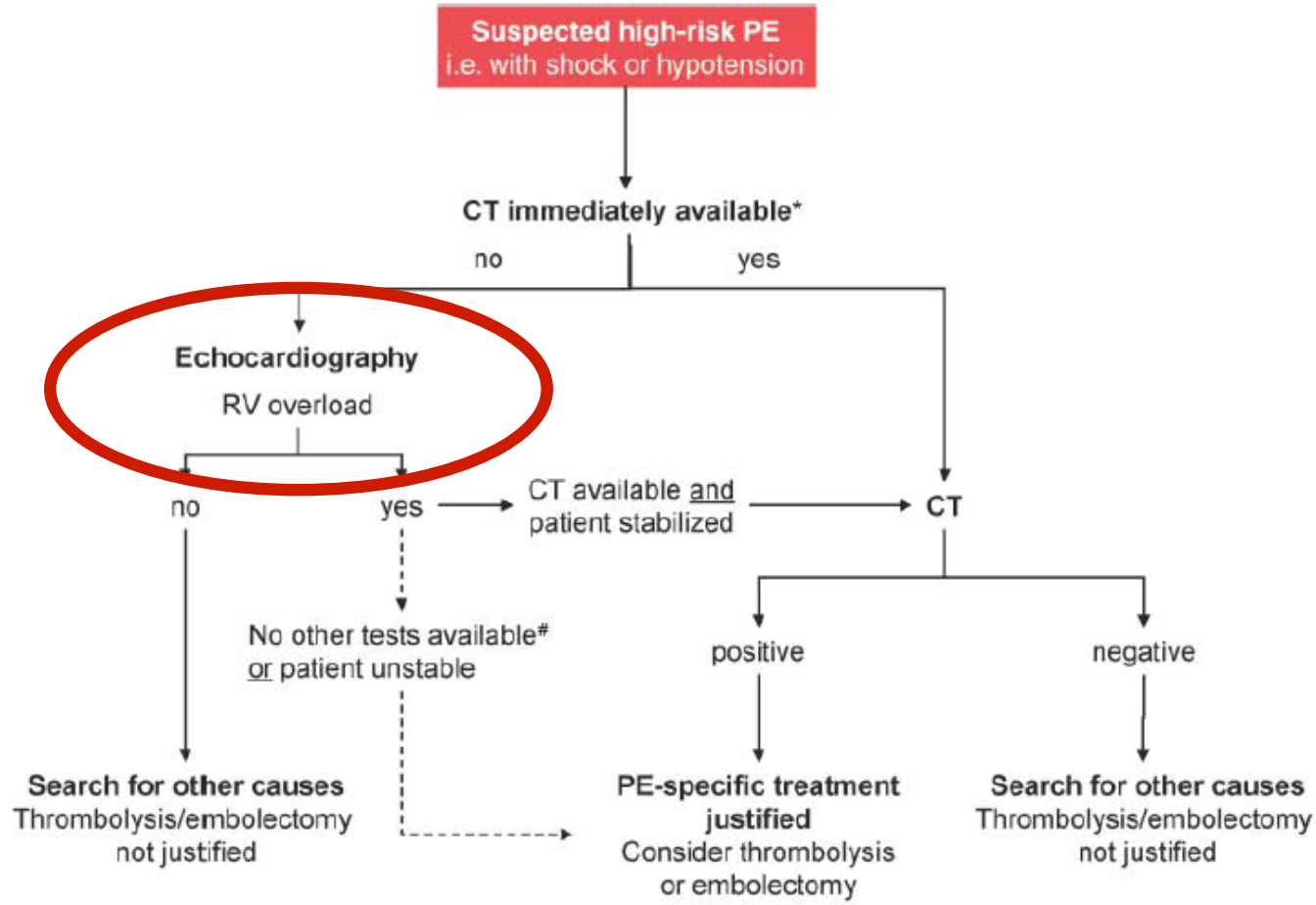
Leitlinien zur Behandlung einer Lungenembolie



Torbicki Eur J Cardiol (2008)

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Zusammenfassung

- Die Anzahl der Differentialdiagnosen bei kritisch Kranken kann reduziert werden
- Schnellere zielgerichtete Therapie kann eingeleitet werden
- Bei geschulter Anwendung werden die „Hands Off“ Phasen während der Reanimation nicht verlängert

Take home message

“Among the blind, the one-eyed man is king”

Erasmus of Rotterdam, 15th century

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