

Notfallsonographie

Trend oder präklinische Notwendigkeit?



Notarztrefresher ÄK Tirol 2022

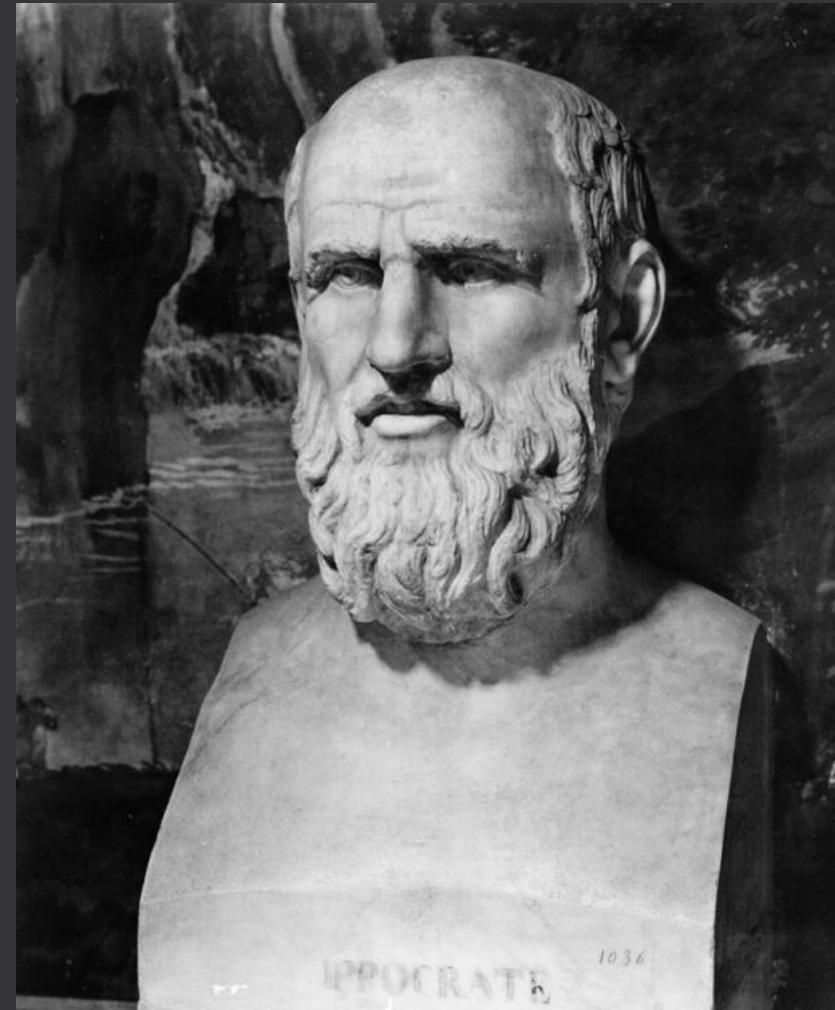
Matthias Somavilla





Abb. 39. Hellenistisches Relief: Der Arzt Jason, eine „Palpation“ der Lebergegend vornehmend. Charakteristische Stellung des Patienten. (Rechts unten ein riesiger Schriftkopf.)

Hippokrates (460-375 v.Chr.)



Palpation



Perkussion

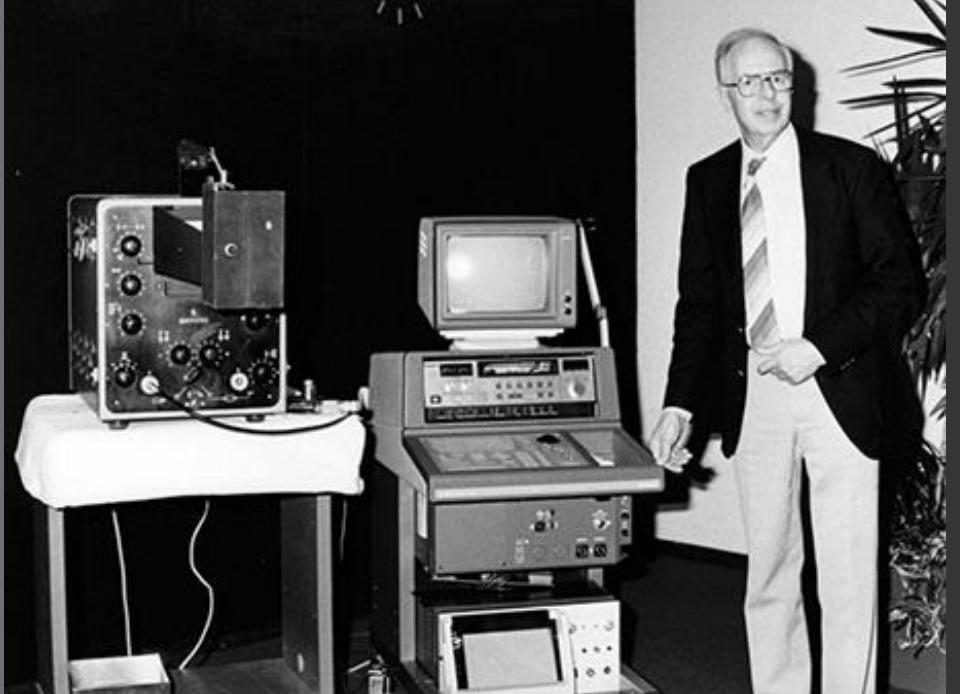


Auskultation

Stethoskop:

1816 von René Laënnec in Frankreich





Hellmuth Hertz
1953

Ralph Soldner
1961
Vidason



LIFE

BEGINNING A NEW SERIES ON THE
Profound and Astonishing
Biological Revolution

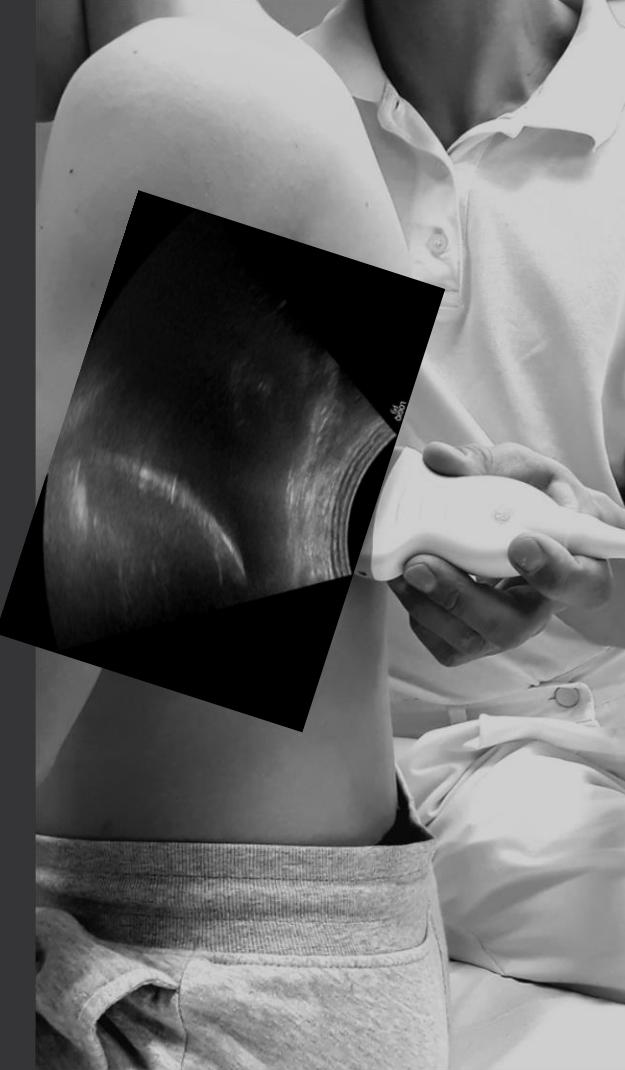
Control of Life

Image of baby's head in womb is projected onto screen by ultrasonic waves transmitted through water-filled bag

Audacious experiments promise decades of added life, superbabies with improved minds and bodies, and even a kind of immortality

SEPTEMBER 10 • 1965 • 35¢

Palpation



Perkussion



Dyspnoe: Vergleich Auskultation, Röntgen Thorax, Lungen US

Table 1. Sensitivity and Specificity of Auscultation, Chest Radiography, and Lung Ultrasonography for Diagnosing Pleural Effusion, Alveolar Consolidation, and Alveolar–Interstitial Syndrome in 384 Lung Regions in 32 Critically Ill Patients with ARDS

	Auscultation, %	Chest Radiography, %	Lung Ultrasonography, %
Pleural effusion			
Sensitivity	42	39	92
Specificity	90	85	93
Diagnostic accuracy	61	47	93
Alveolar consolidation			
Sensitivity	8	68	93
Specificity	100	95	100
Diagnostic accuracy	36	75	97
Alveolar–interstitial syndrome			
Sensitivity	34	60	98
Specificity	90	100	88
Diagnostic accuracy	55	72	95

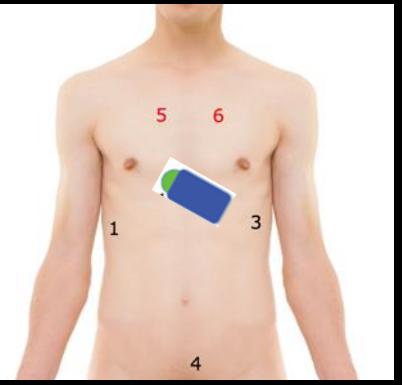
ARDS = acute respiratory distress syndrome.

Daniel Lichtenstein et al,
Anesthesiology. 2004 Jan,
100(1):9-15.



83 j/m
Dyspnoe
präcordialer Druck
reduzierter AZ



LOGIQ
P9

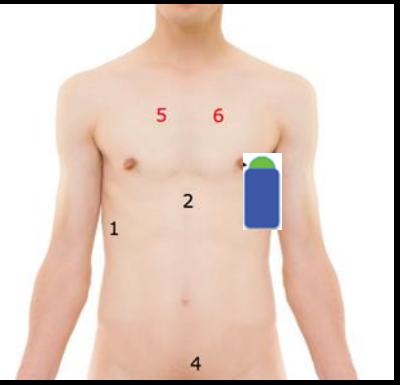
0

5

10

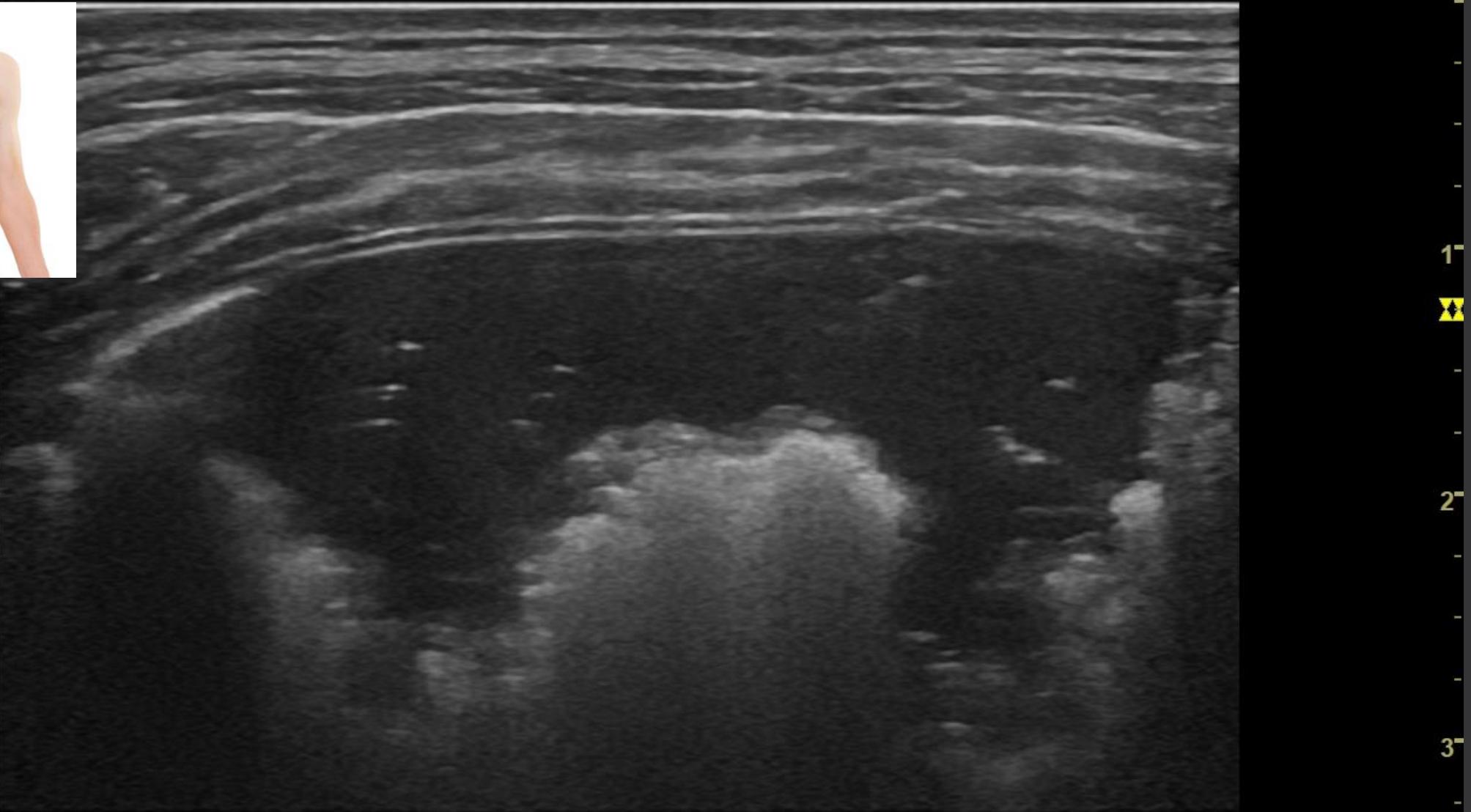
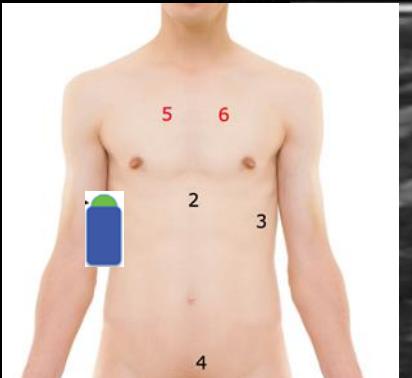
15

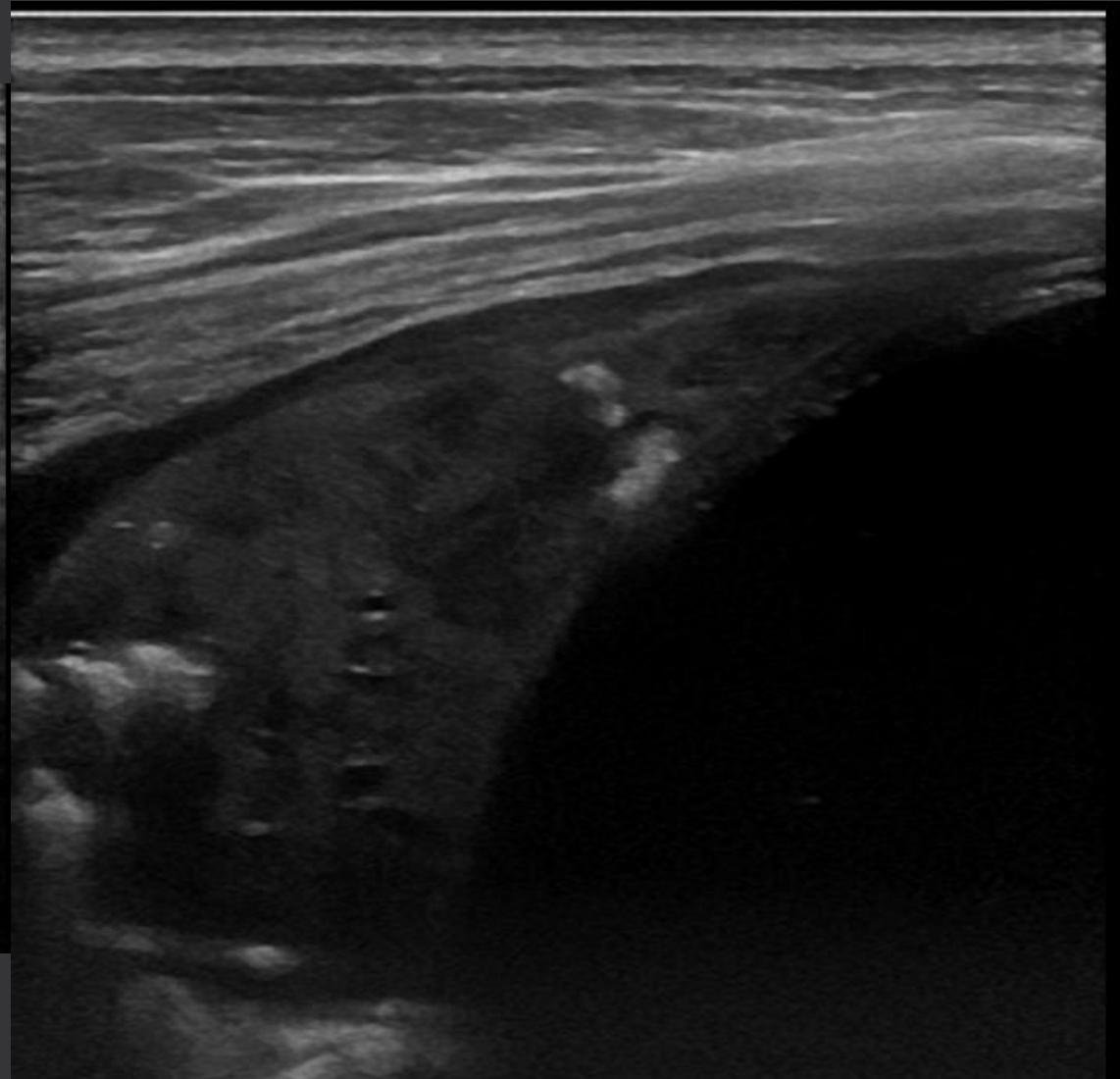
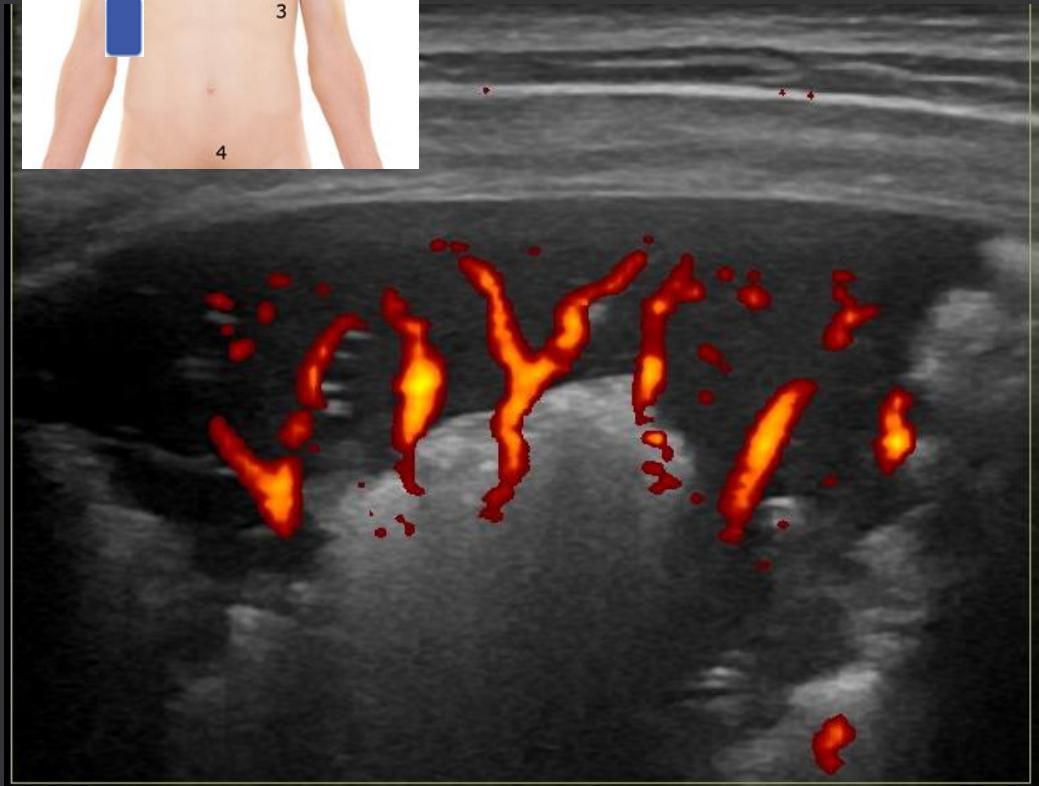
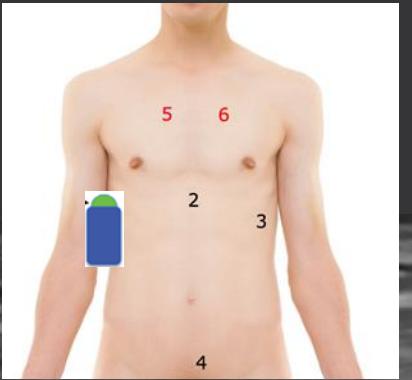


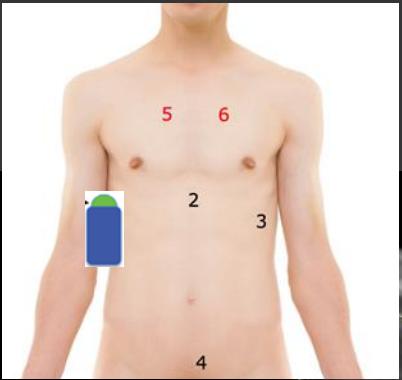
LOGIQ
P90
5
10
15

12 j/w
Dyspnoe
Fieber, Husten
L 5.900
CRP 2,57 mg/dl





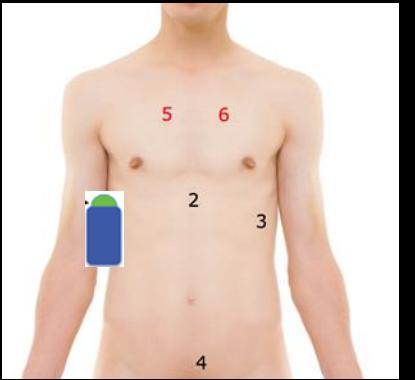




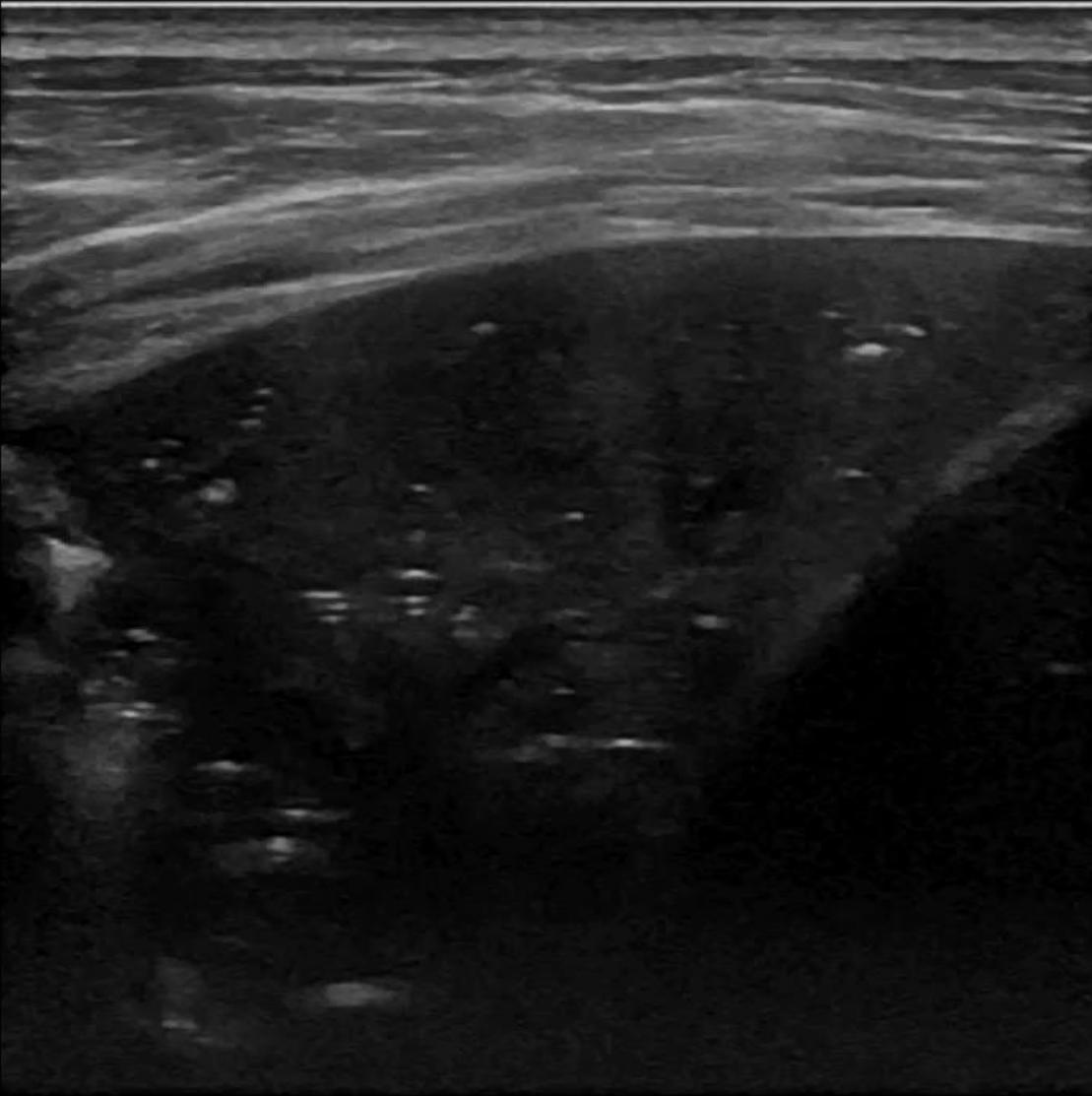
07/11/18 08:35:45 USR

071118-083210

ML6-15 Thorax MI 0.6 Tls 0.0



LOGIQ
P9



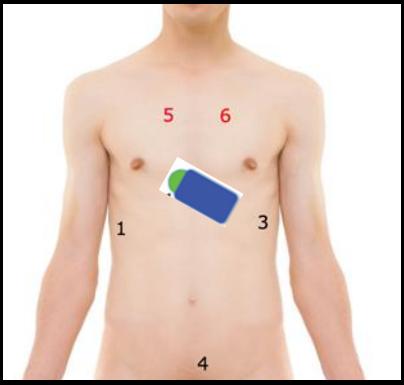
2

4



53 j/w
reduzierter AZ,
St.p.HWI
L 8.200 Lym - 13,9
CRP 7,22 mg/dl

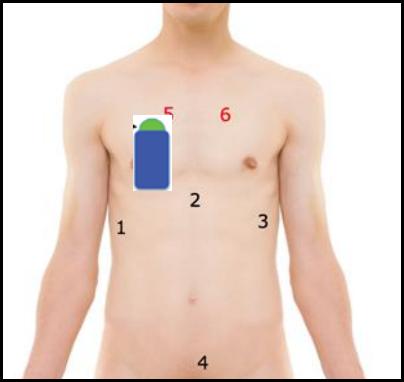




LOGIQ
P9



Right



LOGIQ
P9

0

10

Notarztreresher ÄK 2022, Somavilla

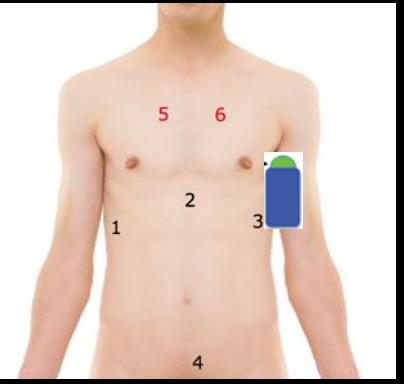


06/04/20 17:22:39 USF

200418-145820

C1-5 Abdomen MI 1.2 Tls 0.1

Left



LOGIQ
P9

0°

X

10°



Notfallsonographie Protokolle:

fast

Focused assessment with sonography
for trauma

Morison, Koller, UB, Pericard

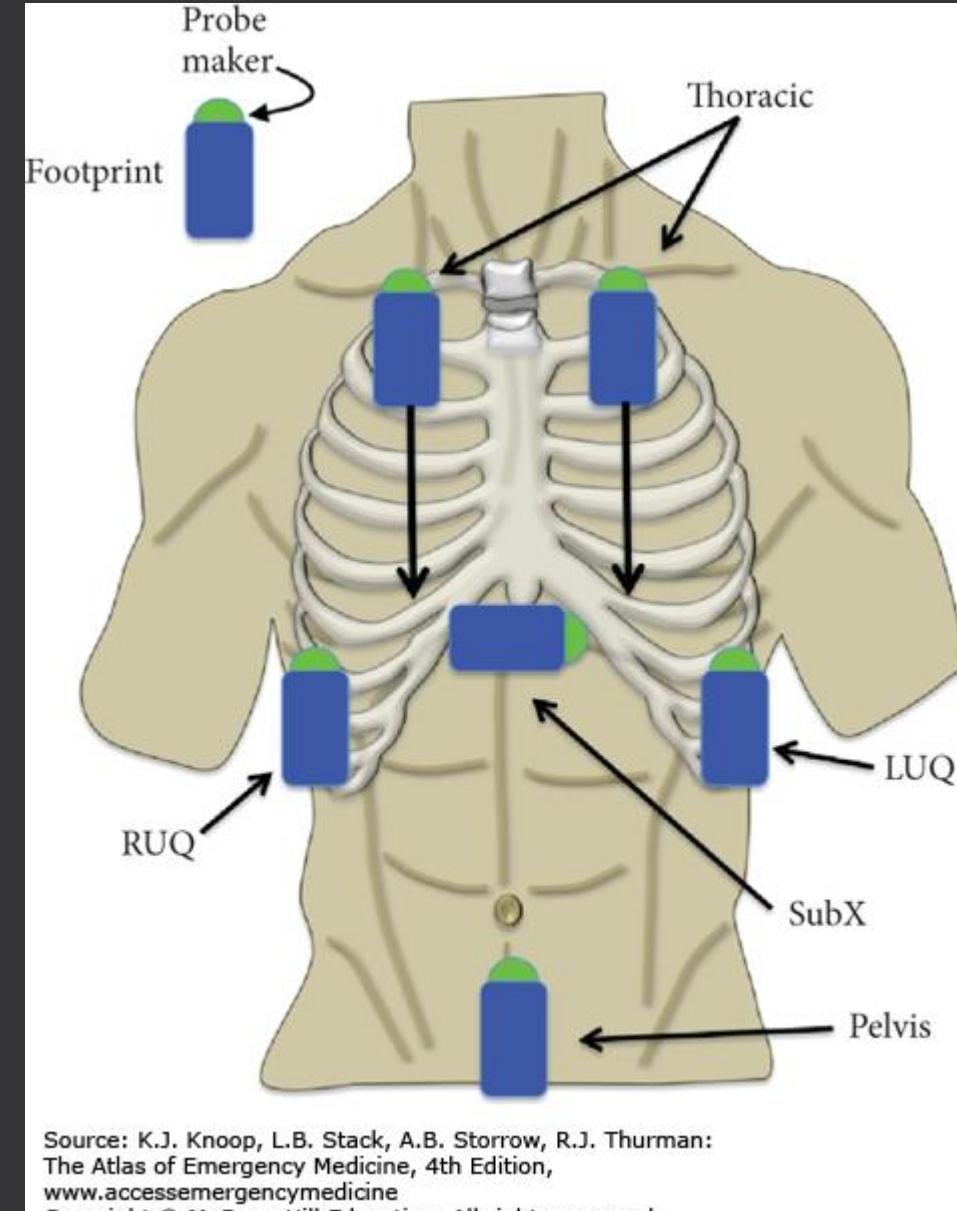
e fast

extended Focused assessment with
sonography for trauma

+ Pneu, Pleuraerguss, Pericard

(feel, rush, cavet, blue, true)

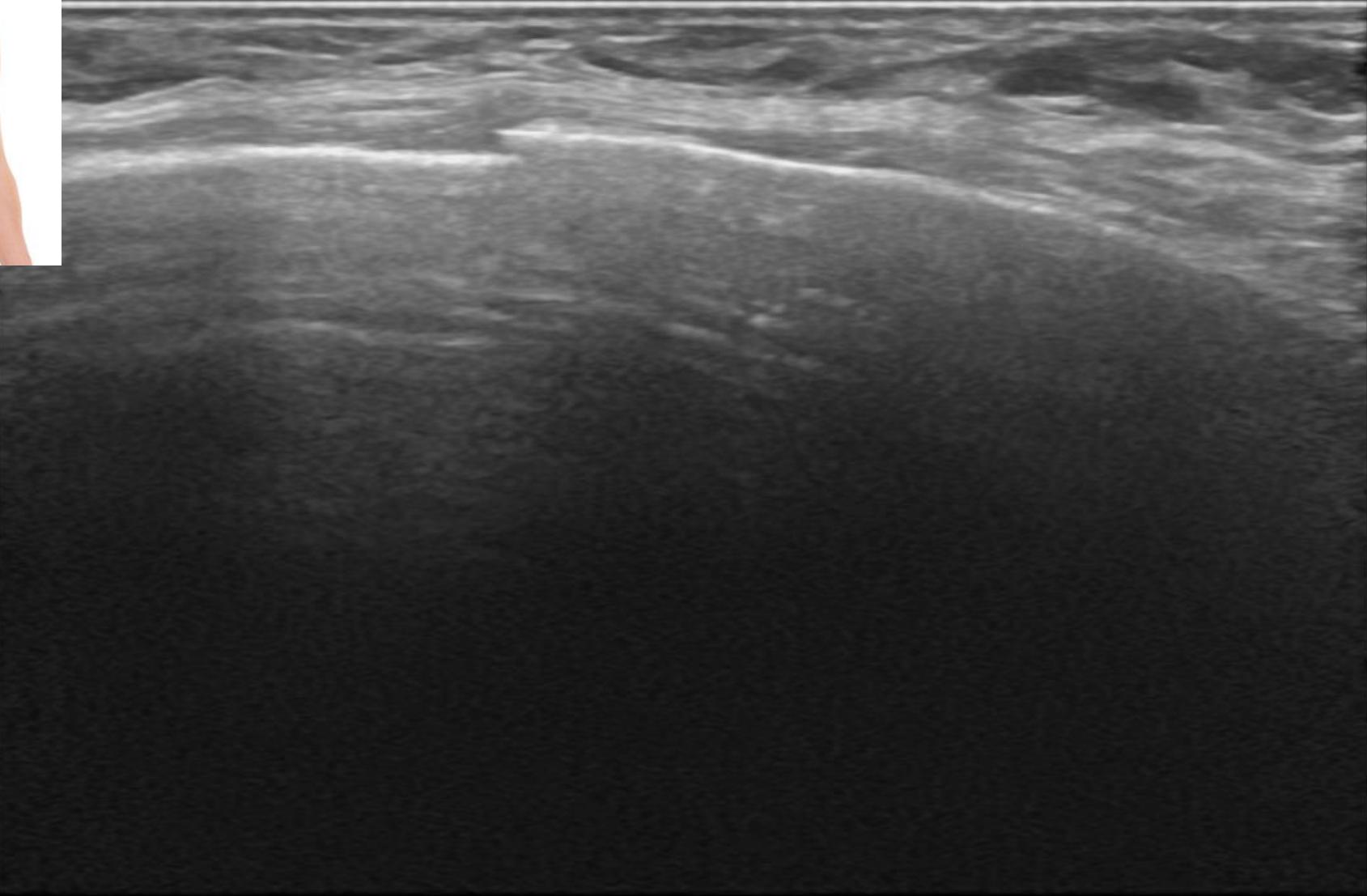
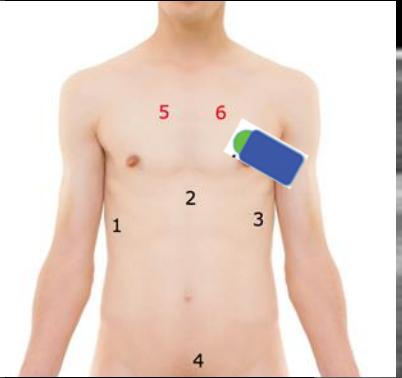
2 Minuten



Source: K.J. Knoop, L.B. Stack, A.B. Storrow, R.J. Thurman:
The Atlas of Emergency Medicine, 4th Edition,
www.accessemergencymedicine.com
Copyright © McGraw-Hill Education. All rights reserved.

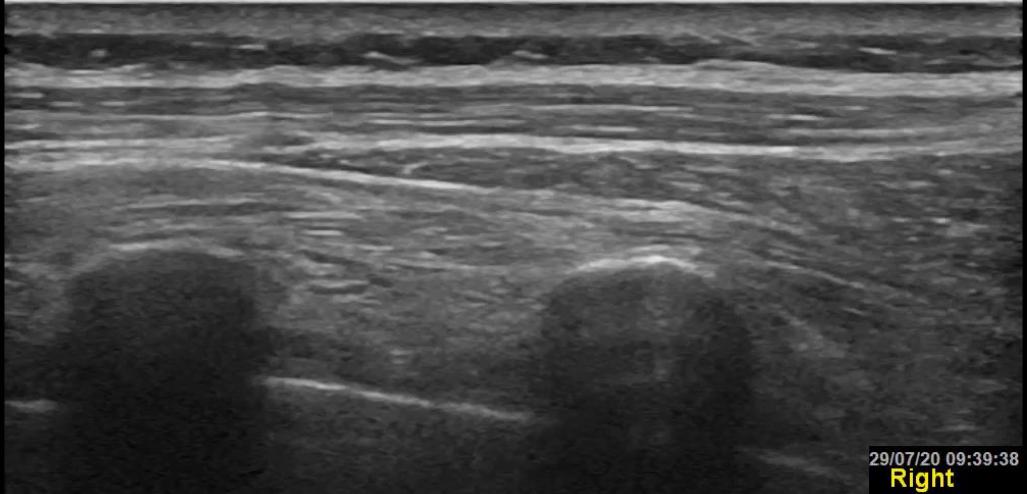
90 j/w
Sturz
Thoraxschmerz
Rippenfrakturen
Dyspnoe nach 2 Tagen





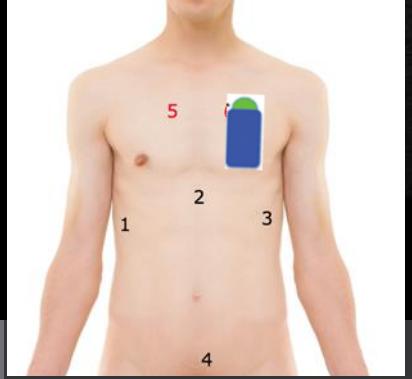
Left

LOGIQ
P9

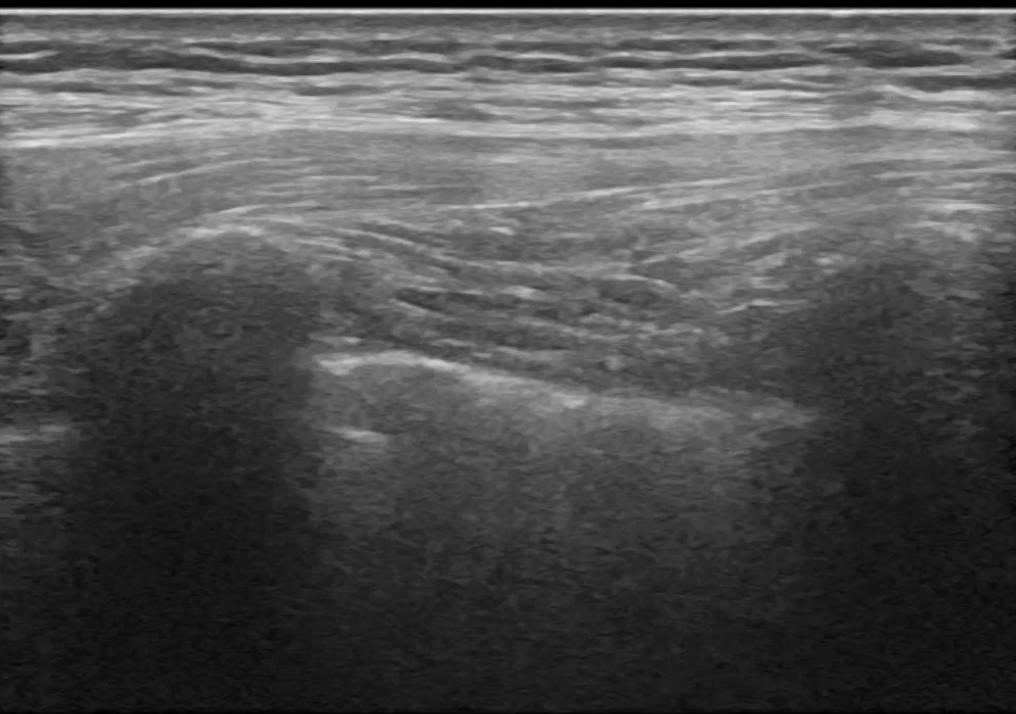


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Right

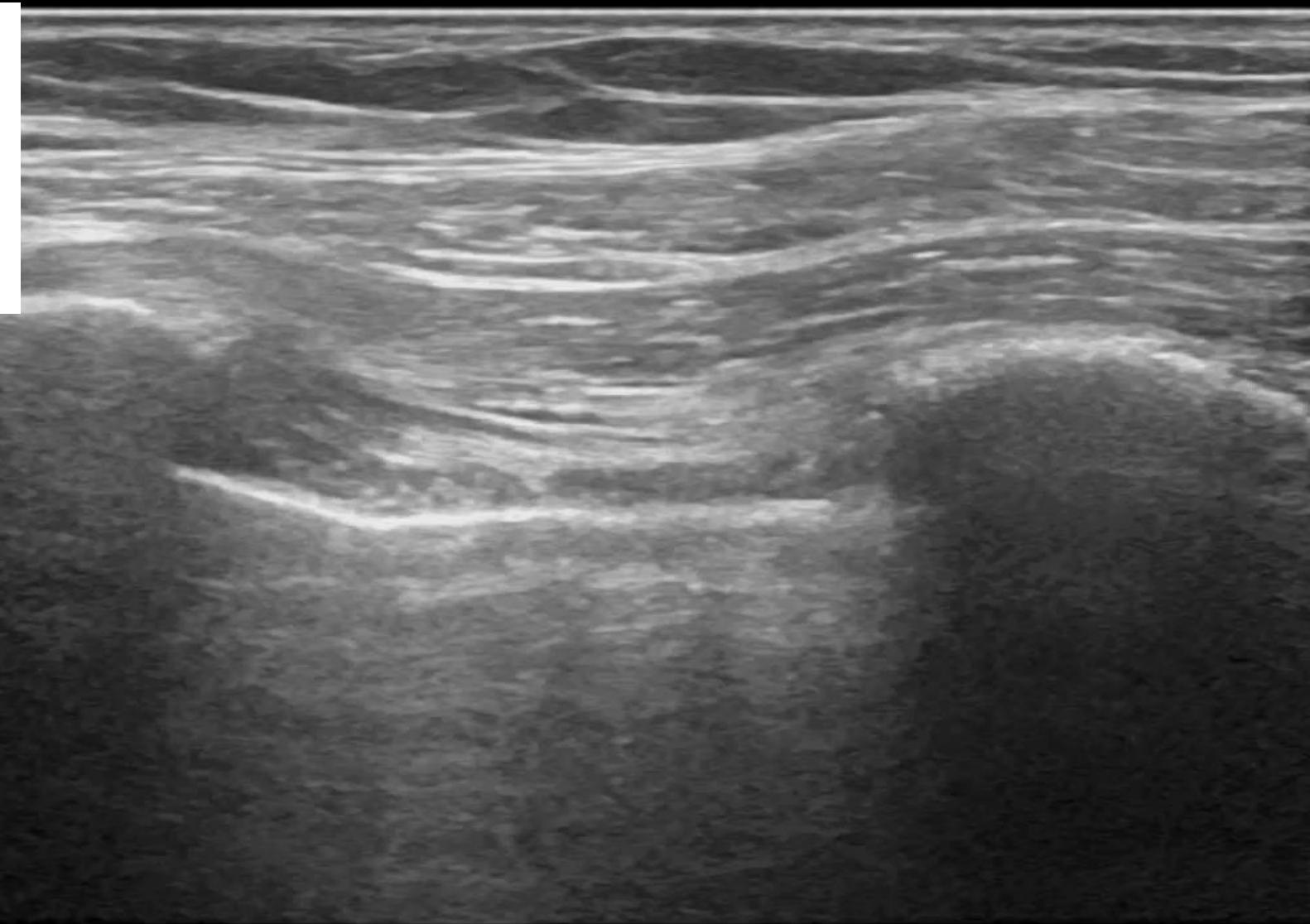
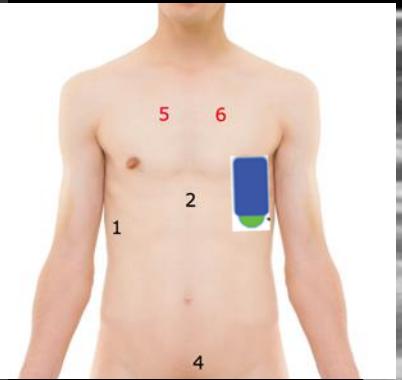
ML6-15 Thorax MI 0.5 Tls 0.0



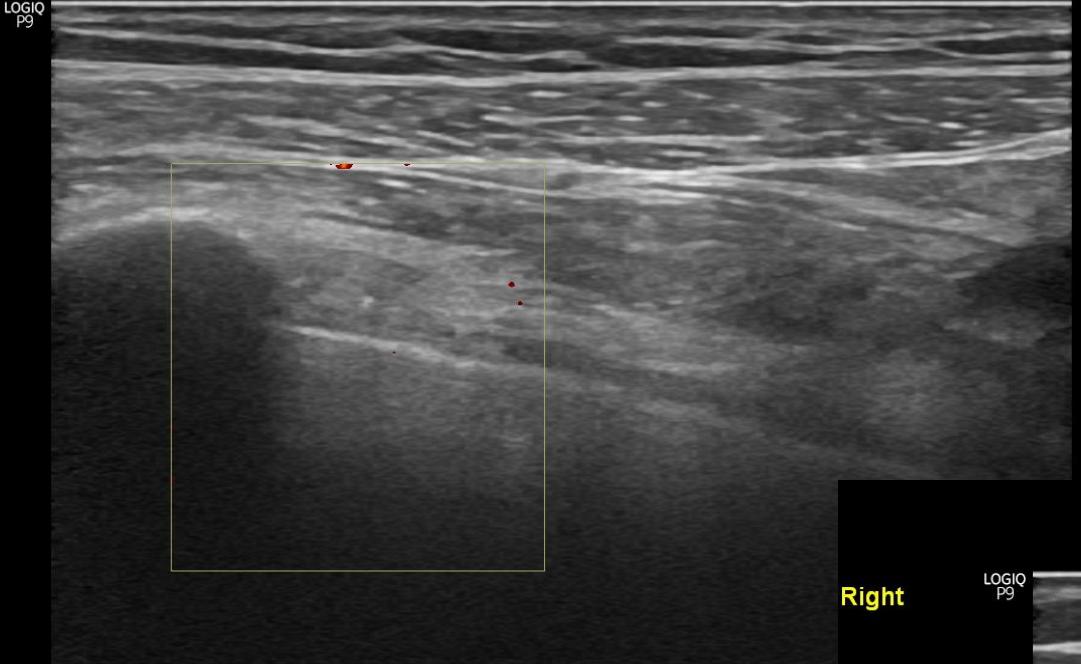
LOGIQ
P9



Left



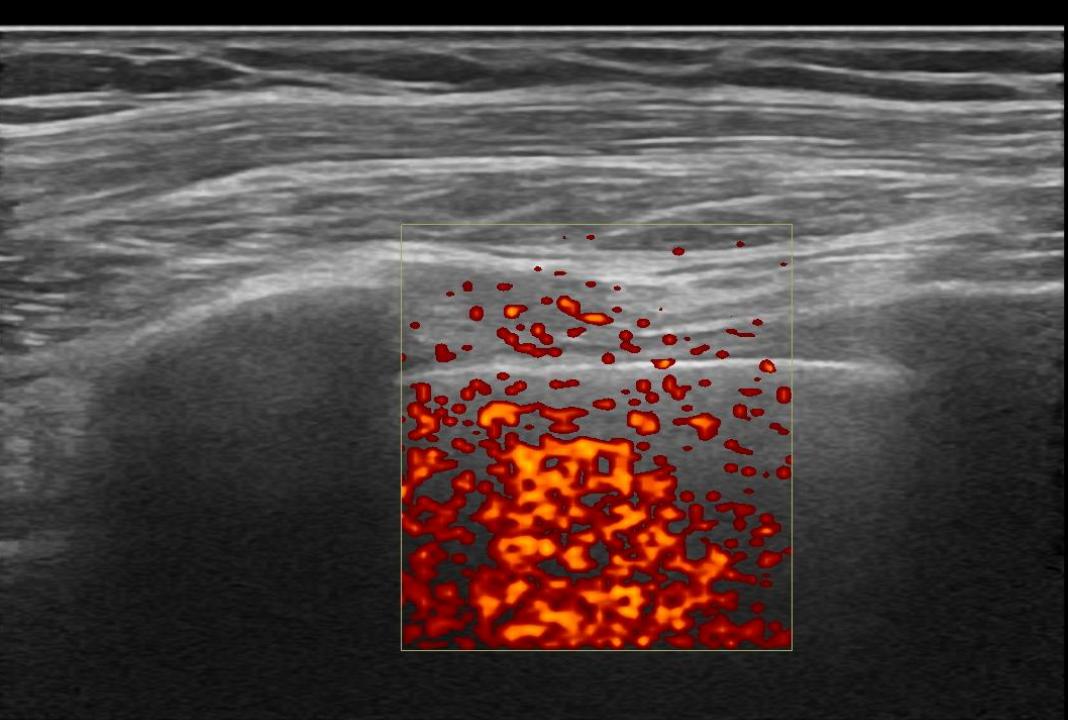
Left



1
2

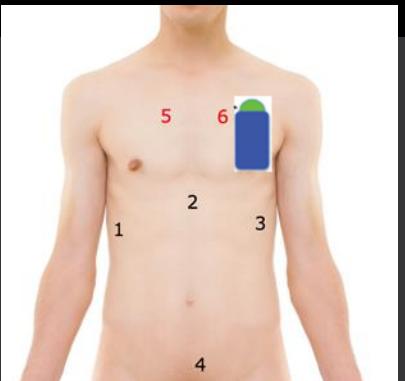
Right

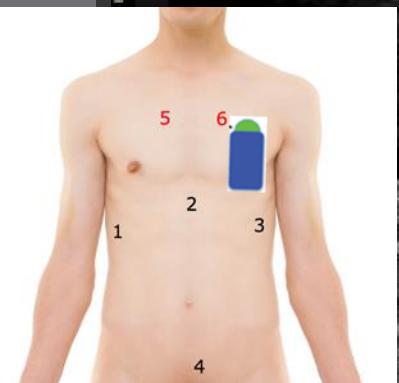
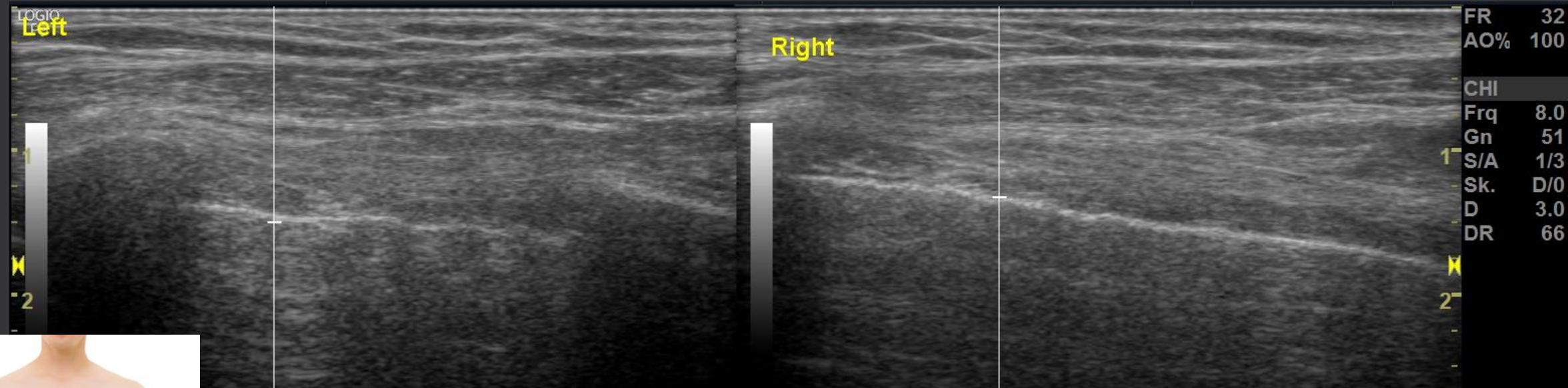
LOGIQ
P9



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3

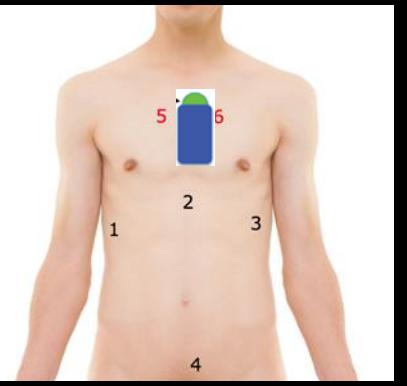




-3 -2 -1 0 3.0 -4 -3 -2 -1 0 3.0

81 j/m
Autounfall
Thoraxschmerz
tachycard
Dyspnoe





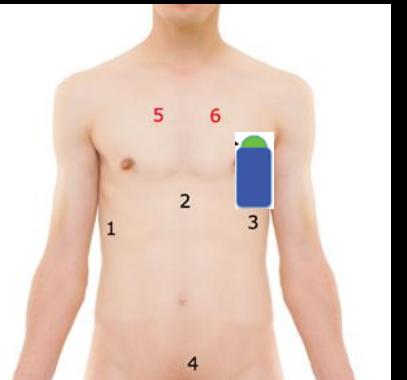
DARM-ABD
L12-3
MI 1,1

F2
55 %
232dB/C5
K/3/3

19 Hz
7 cm

P T R
2,0

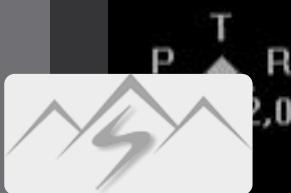




DARM-ABD
L12-3
MI 1,1

F2
55 %
232dB/C5
K/3/3

19 Hz
7 cm



2,0

28 j/m
Skisturz
stabil
Flankenschmerz links





Dr.Somavilla
27/12/16 15:22:56

ADM 271216-151810

Van Beekel, Martijn

MR 1.2

TIS 0.2

CFO

Abdomen

FR 25

AO% 100

CHI

Frq 4.0

0° Gn 74

S/A 2/3

Sk. A/0

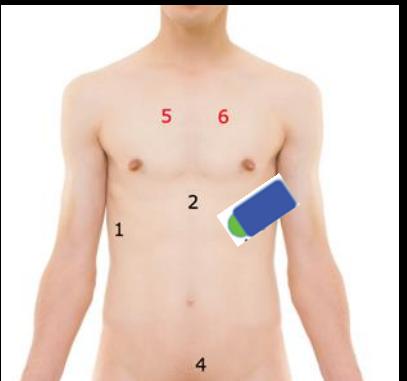
D 17.0

DR 69

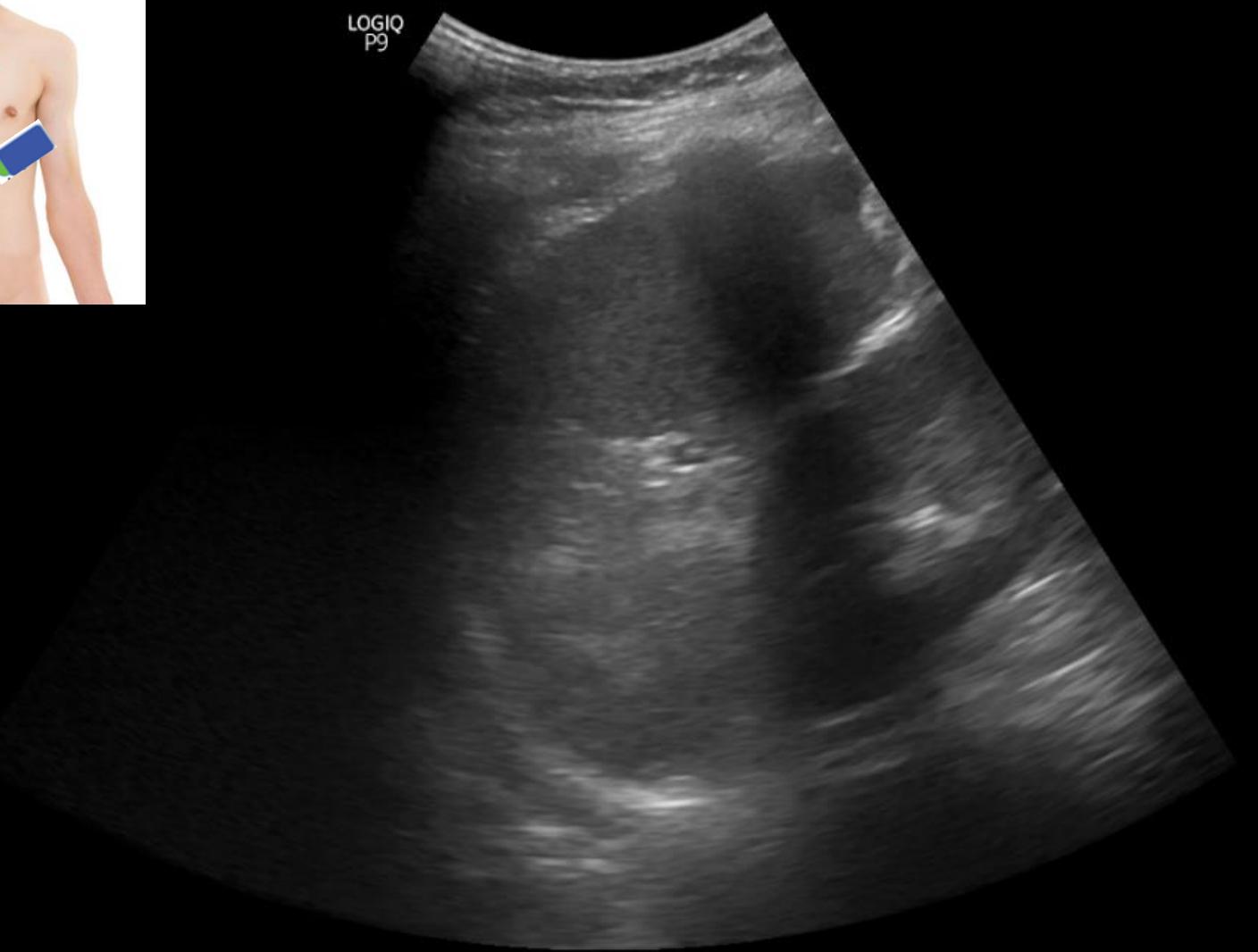
5"

10"

15"



LOGIQ
P9





27/12/16 15:23:50

ADM 271216-151810

Abdomen

FR 25

AO% 100

CHI

Frq 4.0

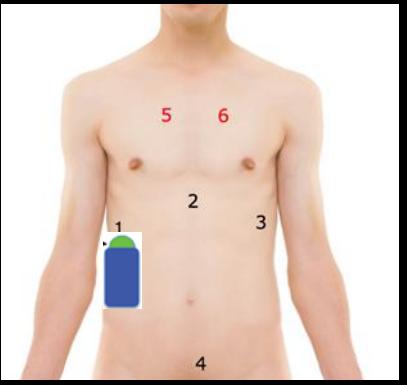
0° Gn 74

S/A 2/3

Sk. A/0

D 17.0

DR 69

LOGIQ
P9

5"

10"

15"





27/12/16 15:27:32

ADM

271216-151810

Abdomen

FR 31

AO% 100

CHI

Frq 4.0

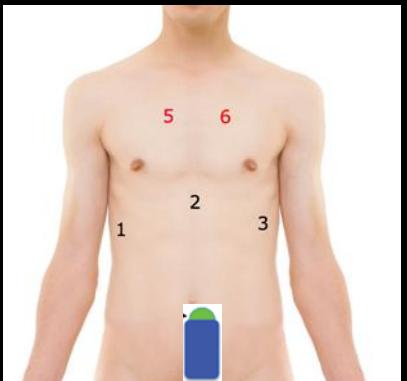
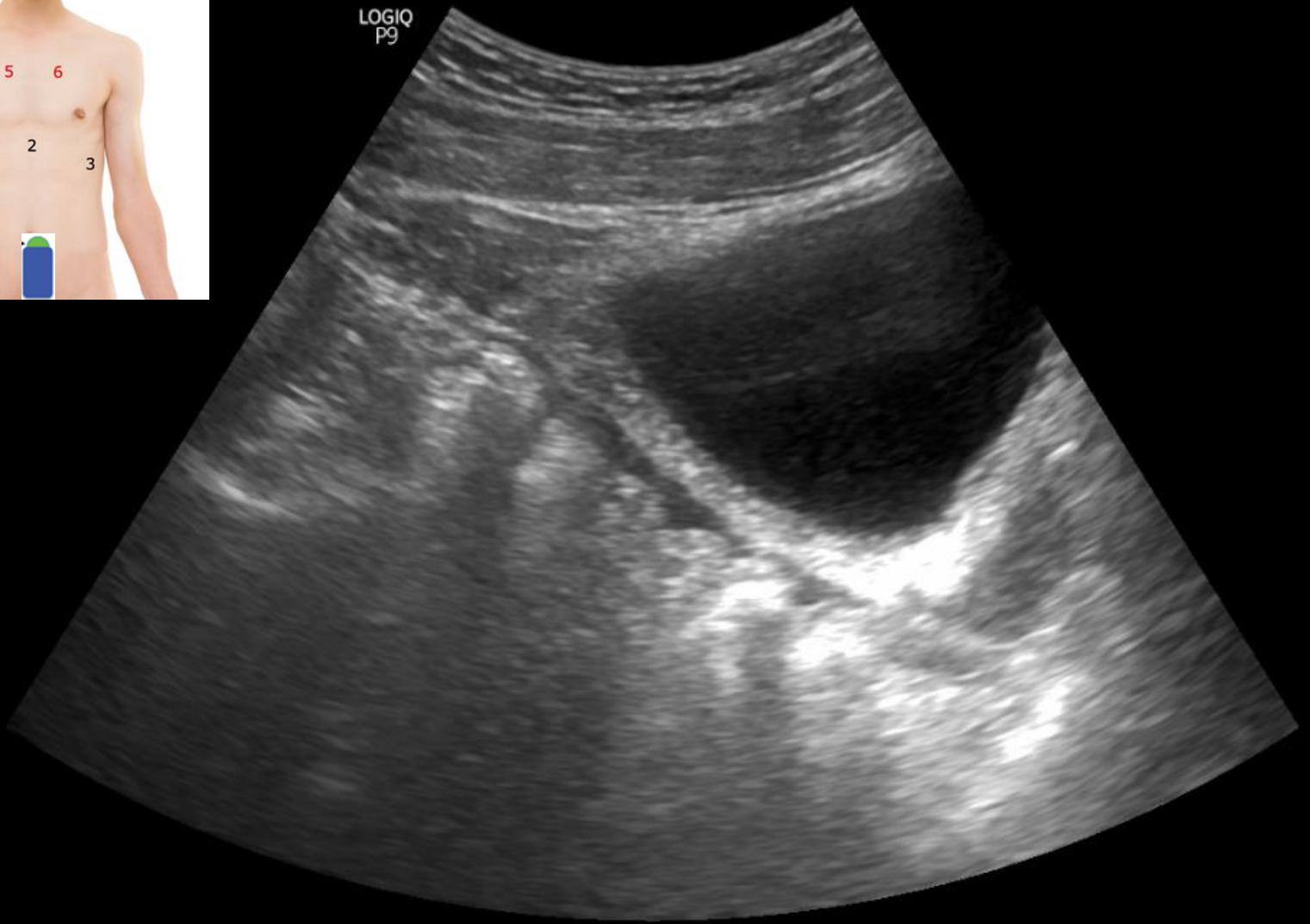
0-Gn 66

S/A 2/3

Sk. A/0

D 13.0

DR 69

LOGIQ
P9



27/12/16 15:24:49

ADM 271216-151810

Abdomen

FR 25

AO% 100

CHI

Frq 4.0

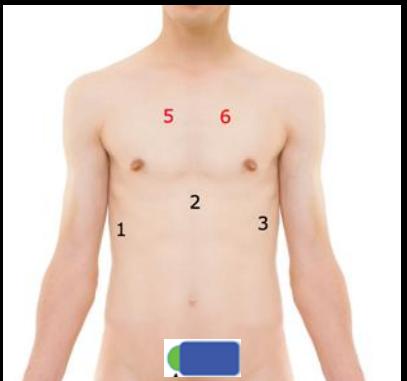
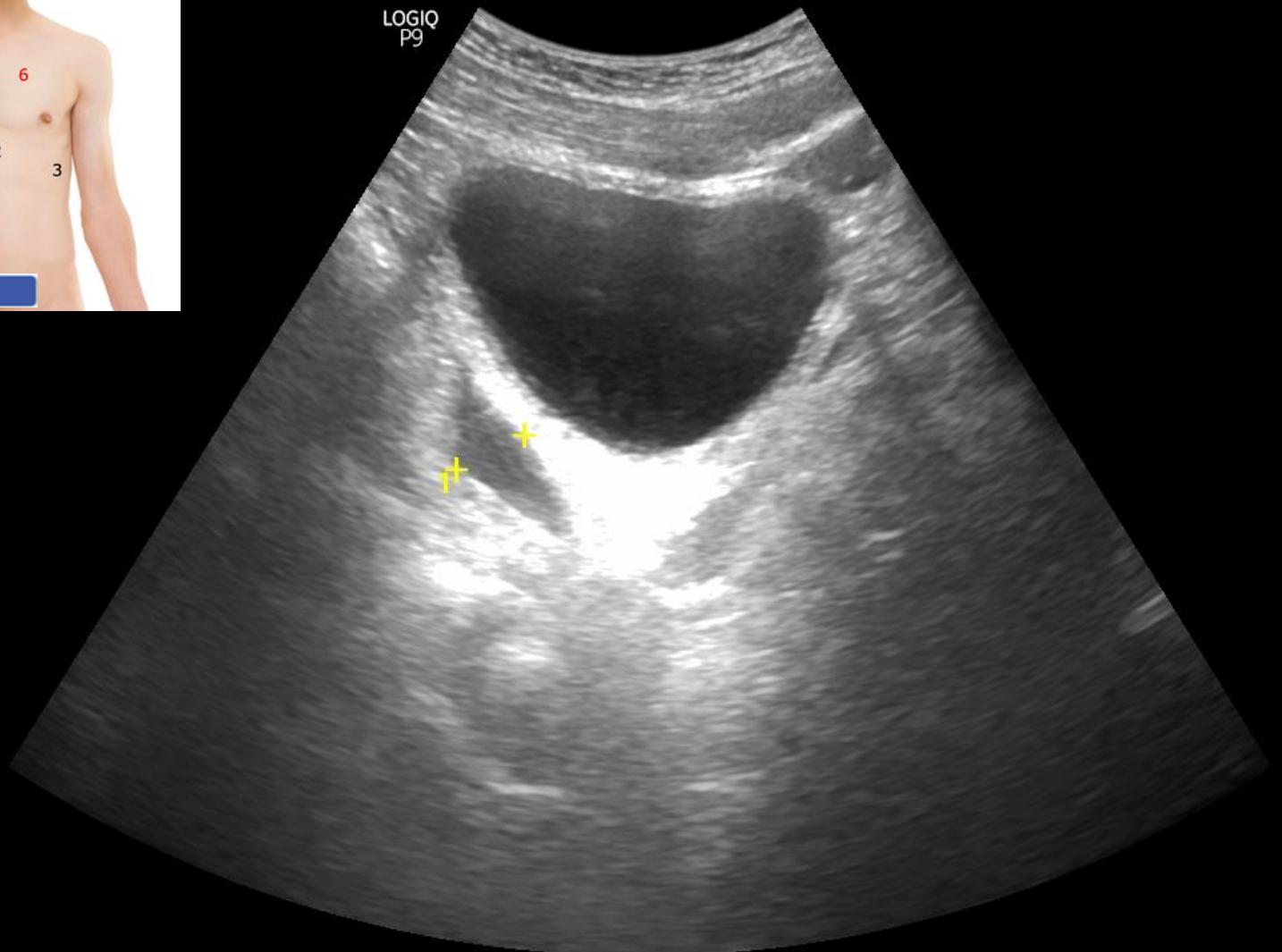
0° Gn 74

S/A 2/3

Sk. A/0

D 17.0

DR 69

LOGIQ
P9

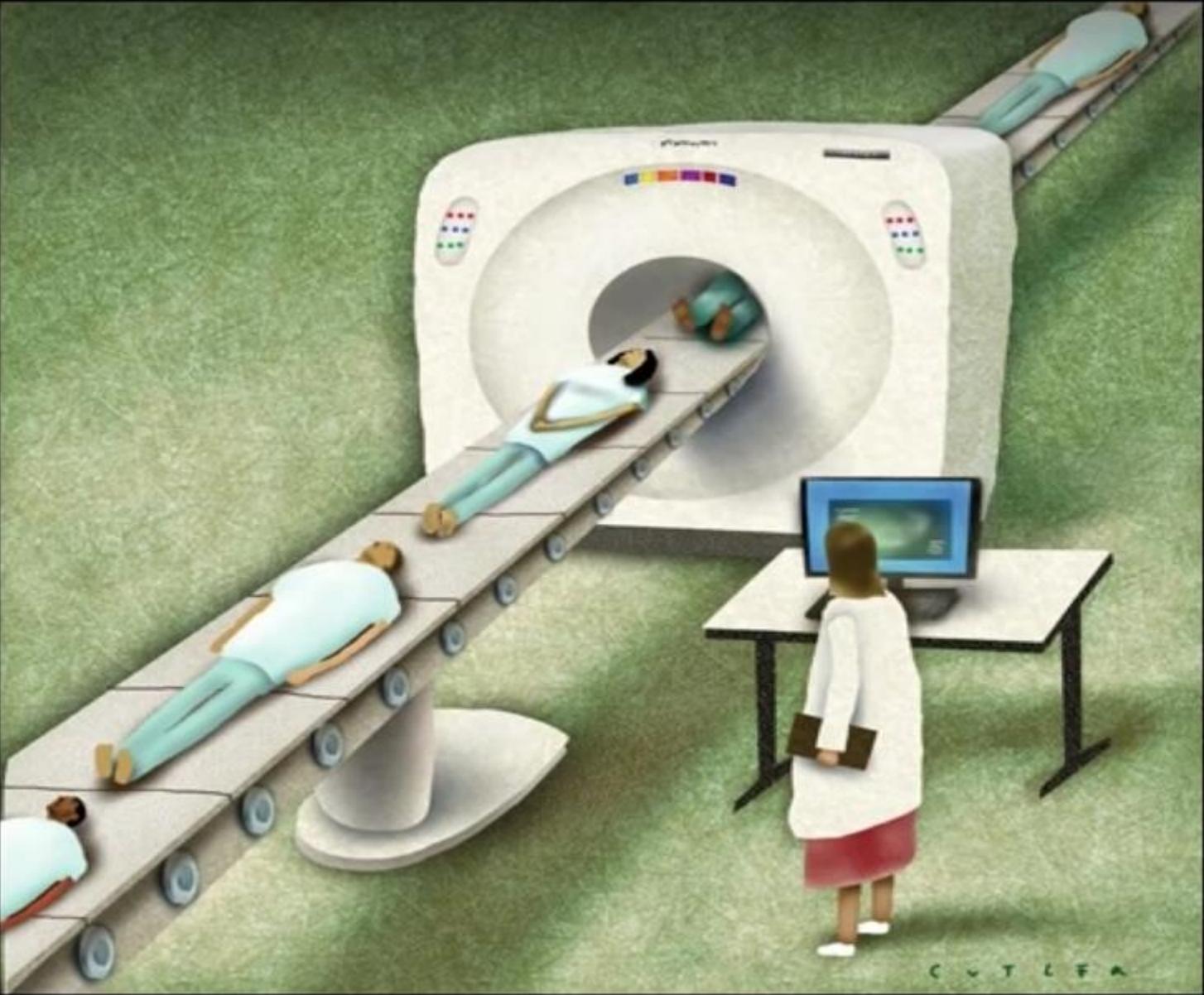
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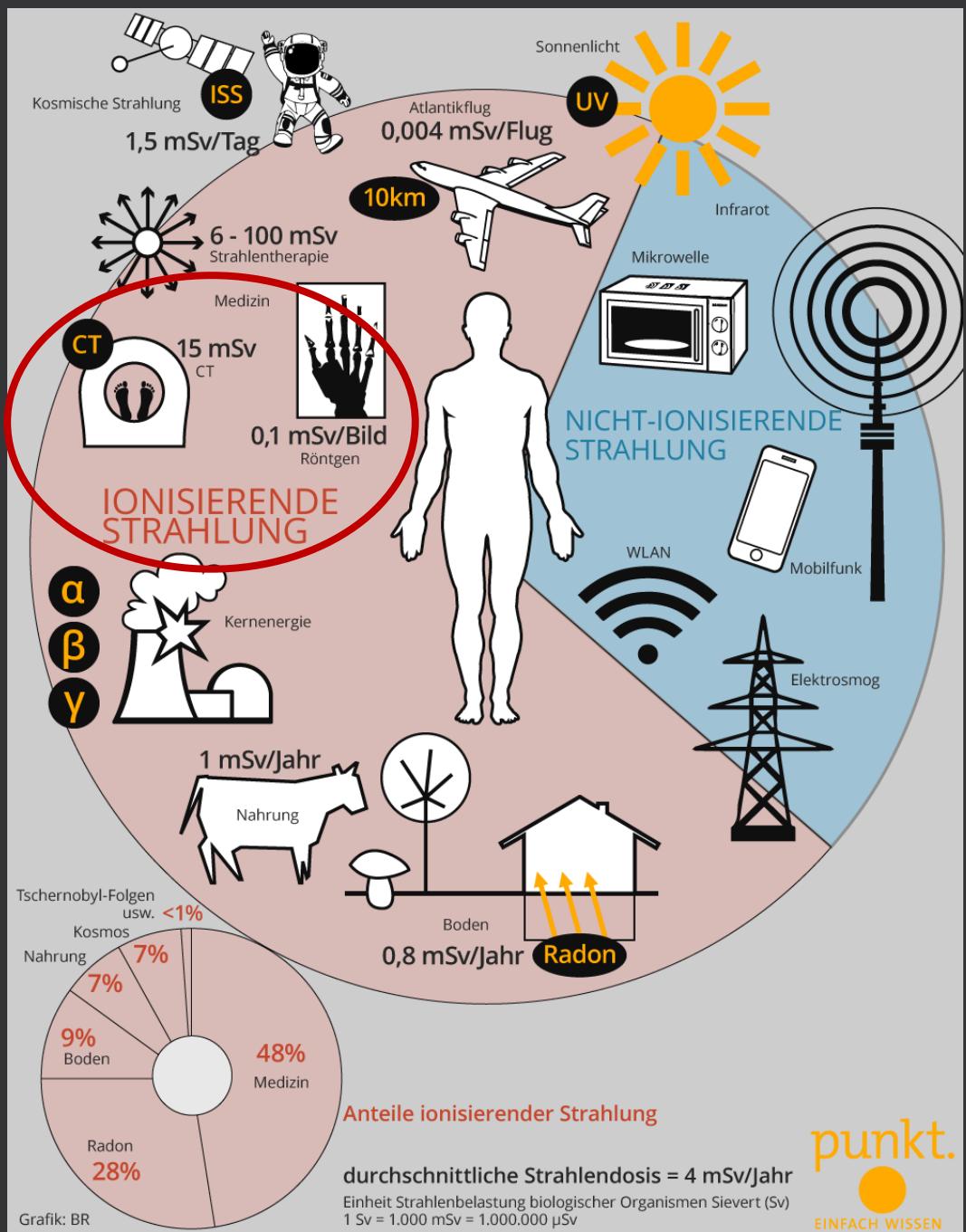
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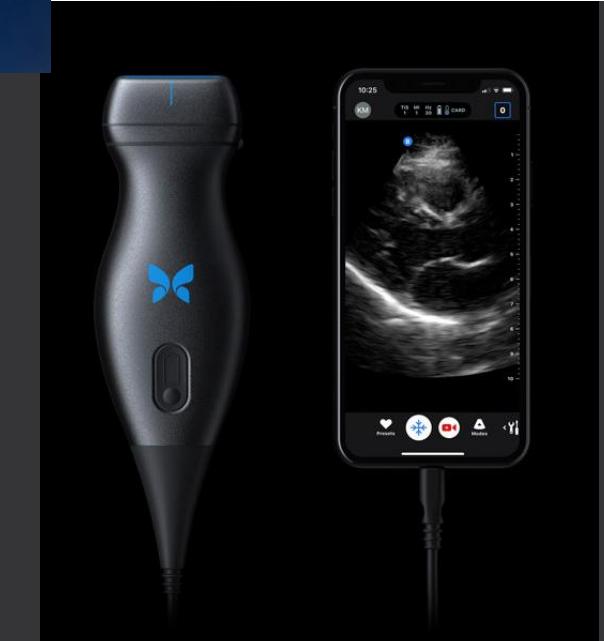
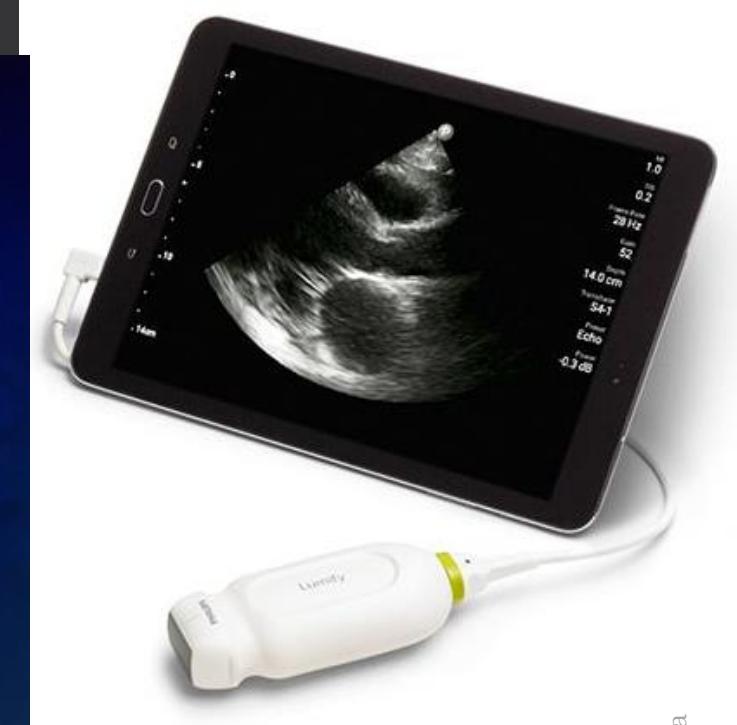
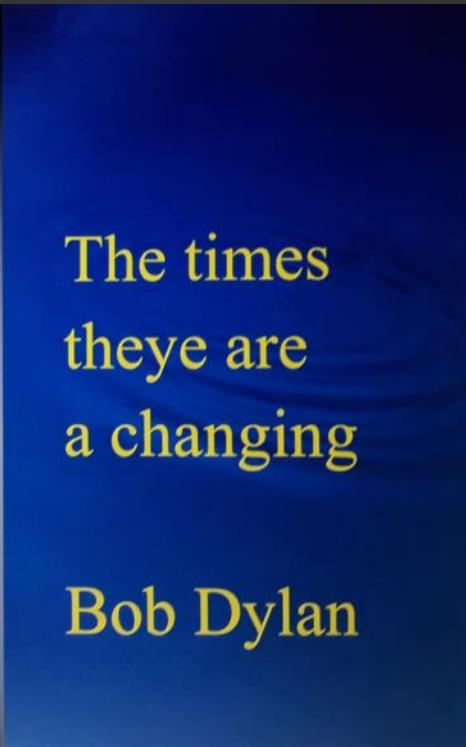
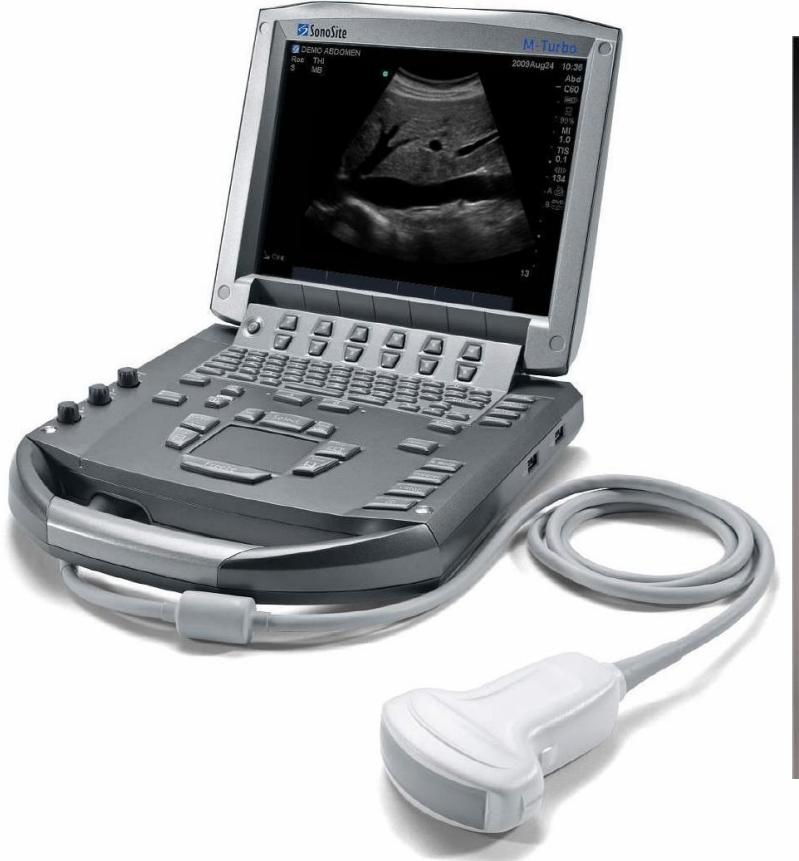
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1 L 1.47 cm







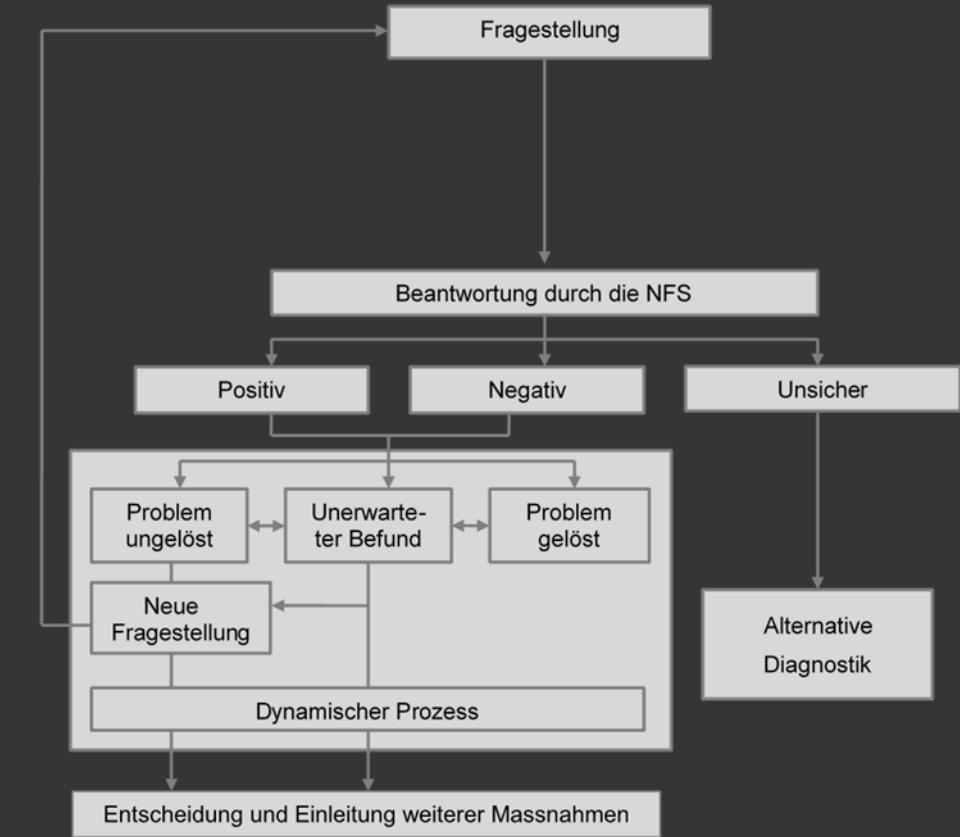


Gerst Alexander
ISS



POCUS

fokussierte Sonographie
klare Fragestellung
ja/nein
vordefinierte Region
organübergreifend
ortsunabhängig
Schlüsse



„Point-of-Care Ultrasound in Medical Education - Stop Listening and Look“
Scott D. Solomon, Fidencio Saldana - New Engl. J. Med 370; 12 2014



48 j/w

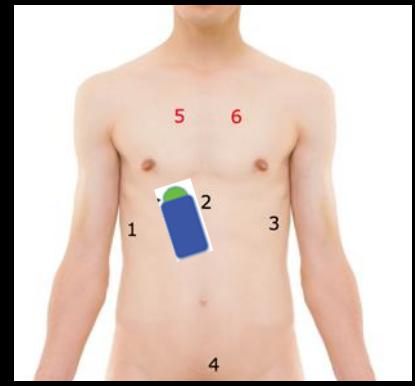
akute OB Schmerzen

gürtelformig

L 10.000

CRP 10,47mg/dl





LOGIQ
P9

0

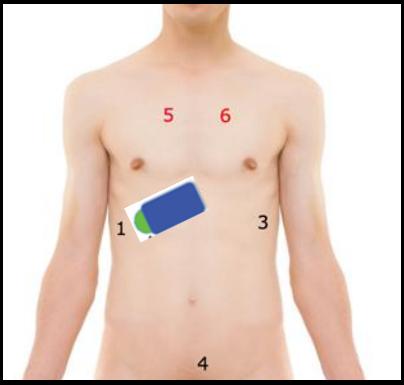
5

10

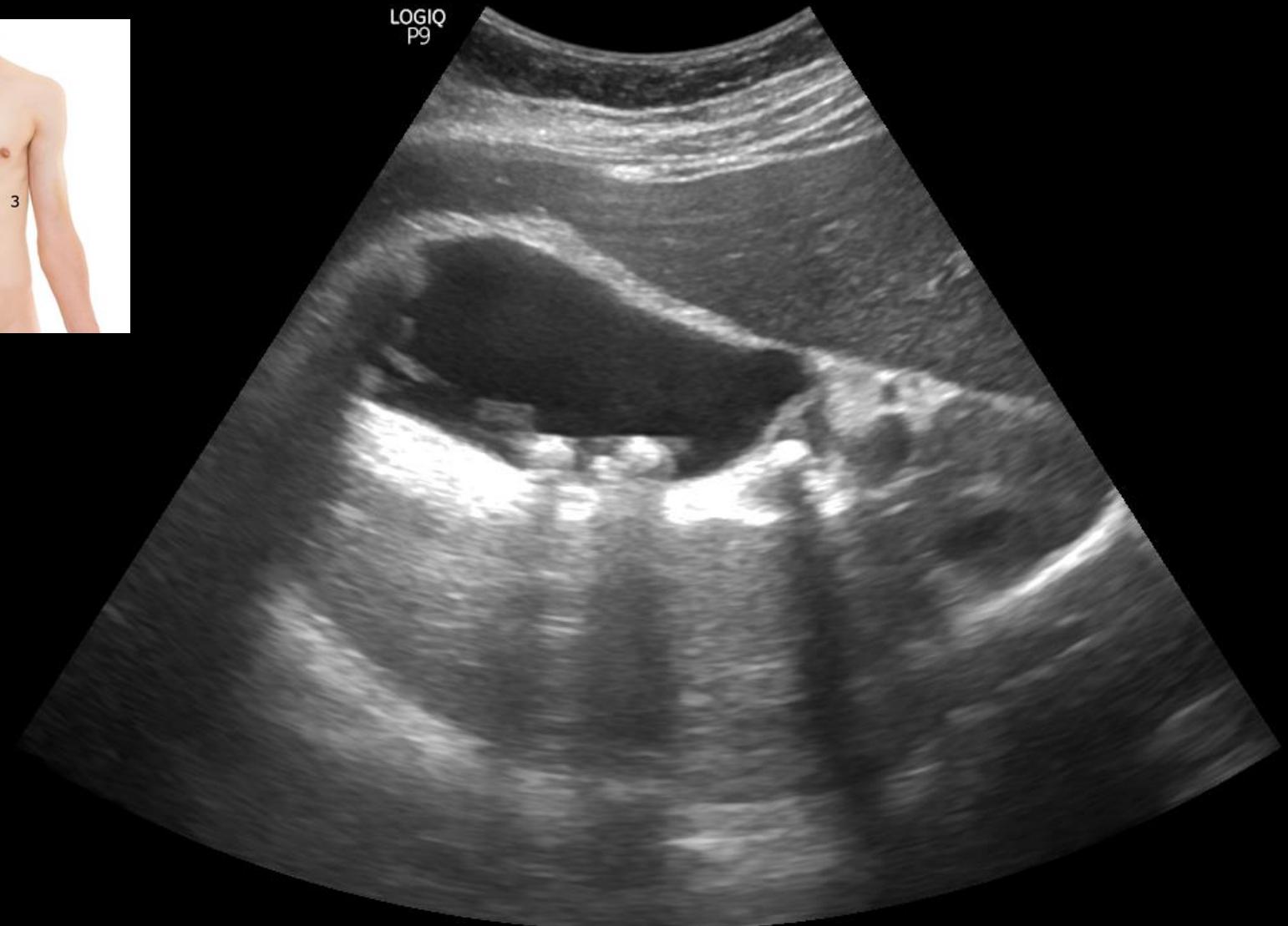
15

Notarztreresher ÄK 2022, Somavilla



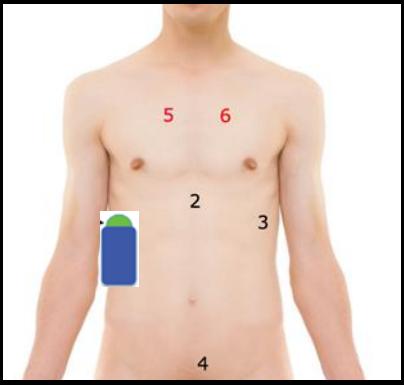


LOGIQ
P9



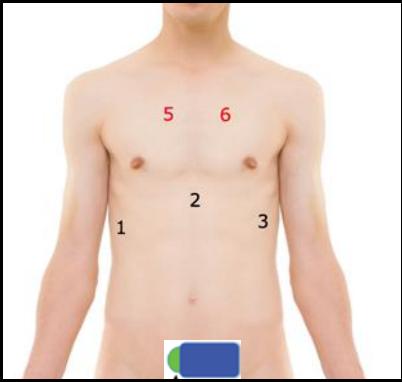
59 j/m
Flankenschmerz re
Ausstrahlung in Leiste



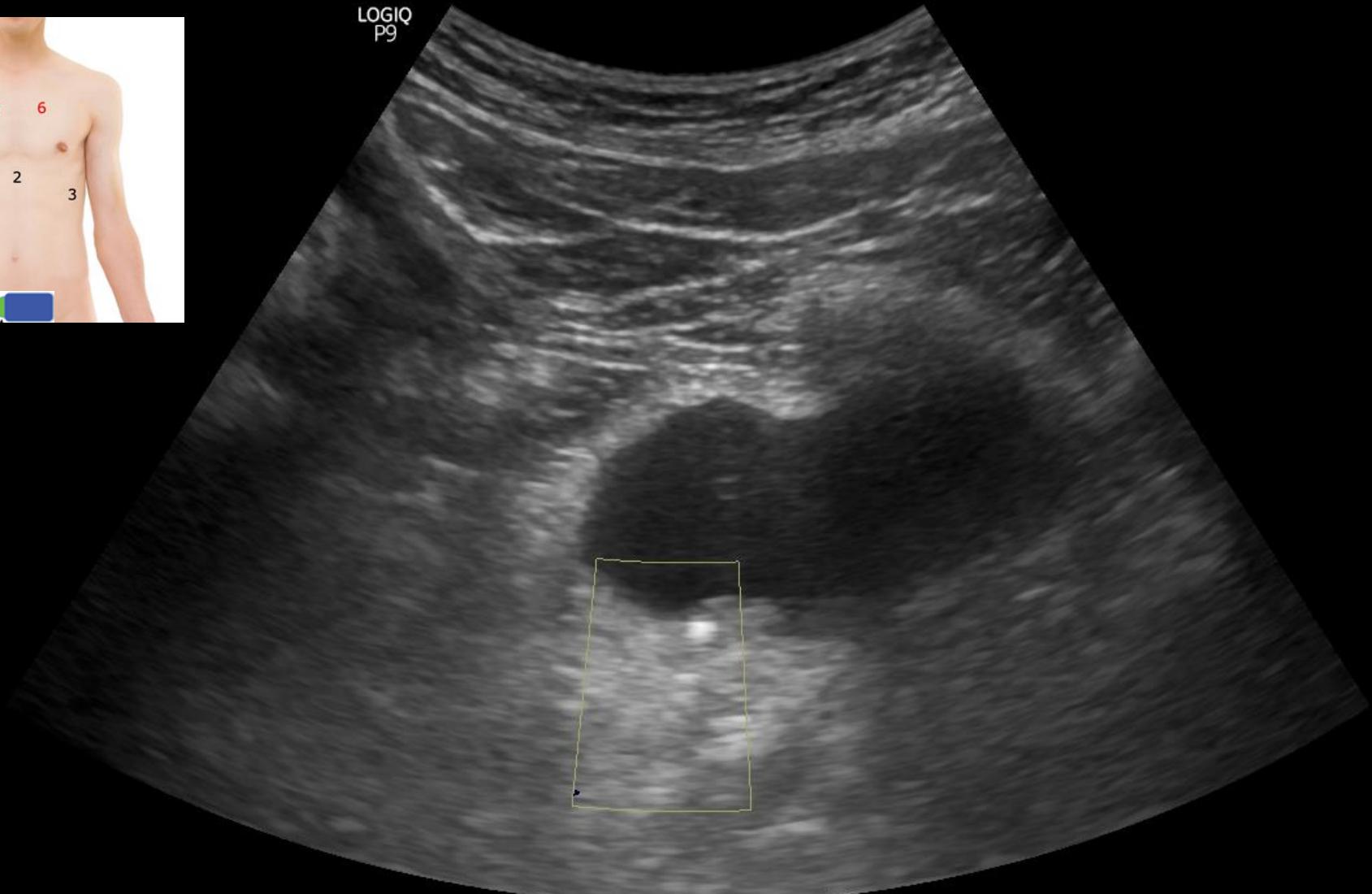


LOGIQ
P9



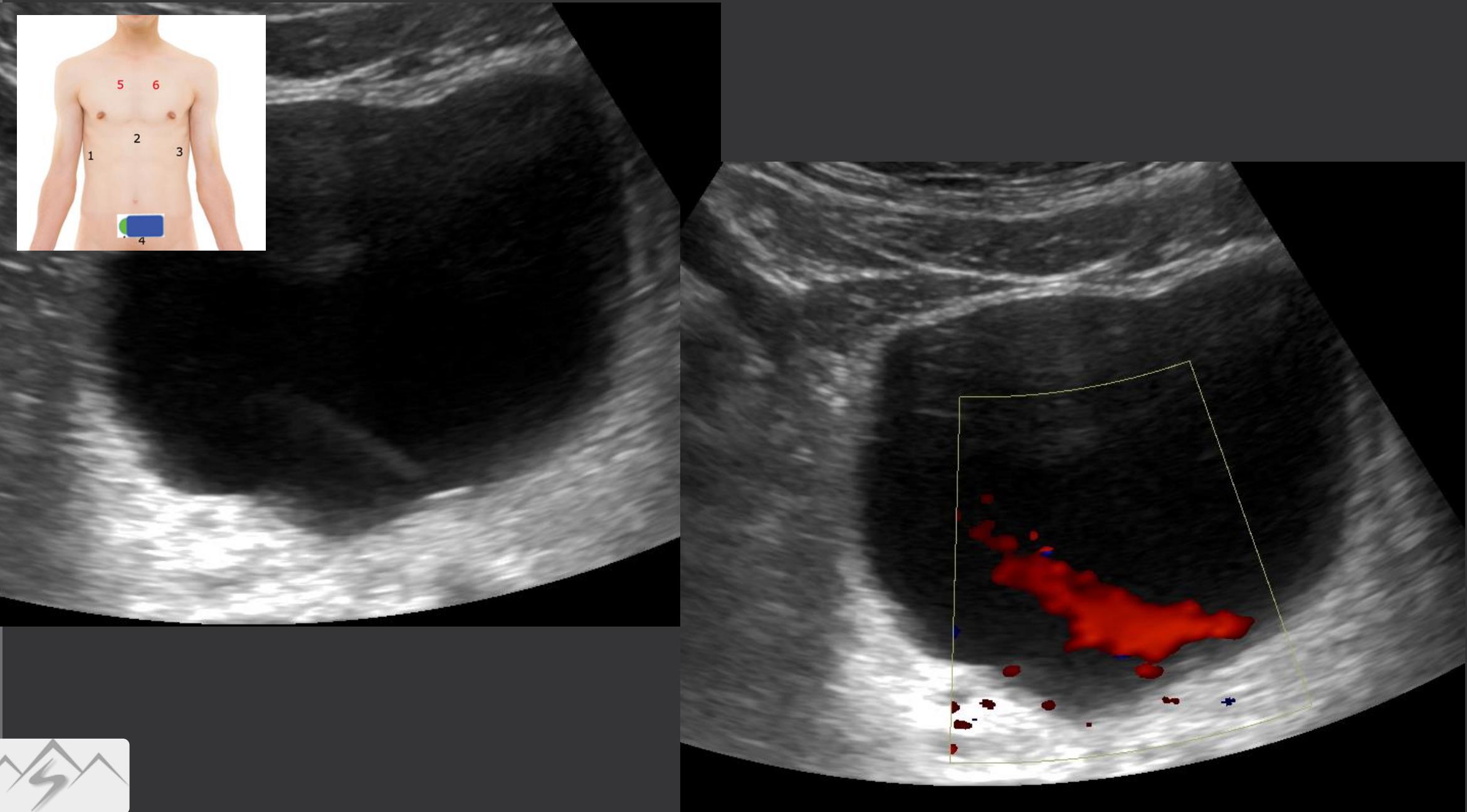


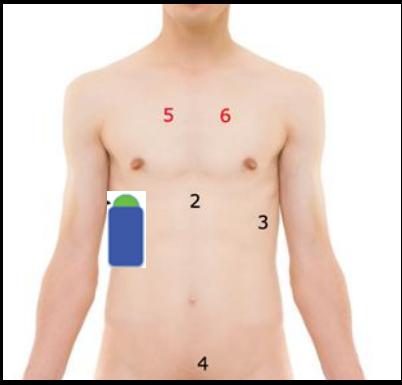
LOGIQ
P9



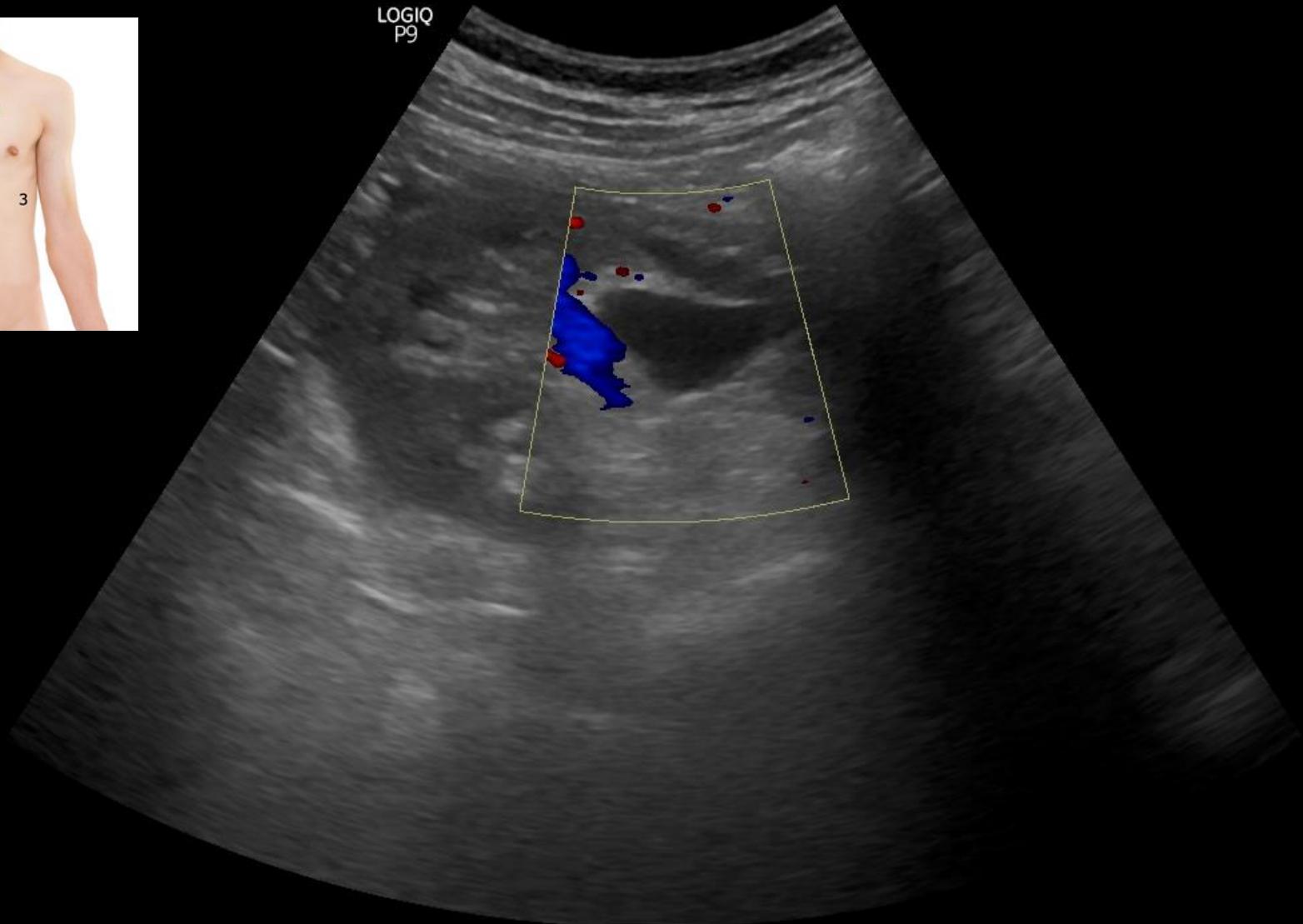
0
5
10
-60 60 cm/s

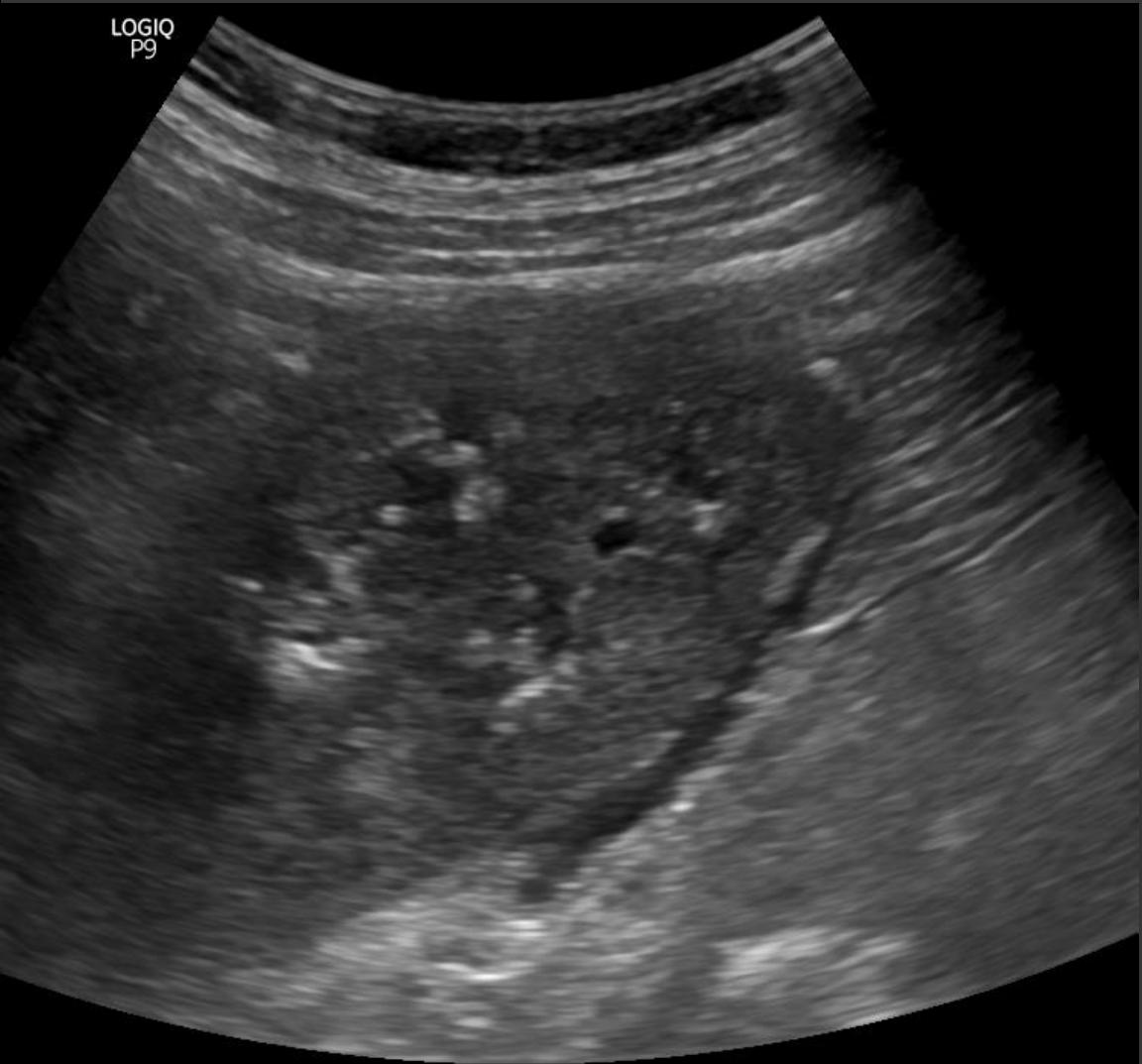
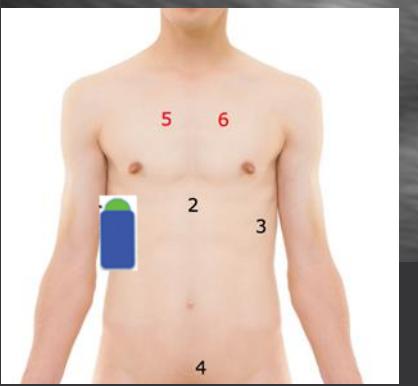






LOGIQ
P9





64 j/w Blitze Sehstörung



25/09/18 08:37:27

ADM 4/94



B
F
V
S
D
P
A
1-
2-
3-



Dreiländerausbildungsrichtlinie – Davos 2008 (ÖGUM, DEGUM, SGUM)

Abdomensonographie Grundkurs

- erweitert durch E-FAST bzw. die Inhalte des Basiskurses

20 Stunden/120
Notfalluntersuchungen

oder

Basiskurs Notfallsonographie

- Korrekte Untersuchungstechnik, Bild- und Befundinterpretation
- Integration der Sonographie in den Untersuchungs- und Behandlungsablauf
- Freie Flüssigkeit/Luft in Abdomen und Thorax (E-FAST)
- Abdominales Aortenaneurysma
- Gallensteine ?
- Nierenauftau und Blasenstatus ?
- Tiefe Beinvenenthrombose (2-Punkt-Kompressionssonographie)
- US-geführten Punktionen

8 Stunden/120 Untersuchungen

Fokussierte Echokardiographie

- relevante kardiale Anatomie
- Standard Ultraschallfenster und Schnittbilder
- hämodynamische Zusammenhänge
- Herzfunktion, Klappenfunktion und Perikardergüsse mit und ohne Tamponade
- linksventrikuläre Funktion qualitativ)
- pulmonale Hypertension/Rechtsherzbelastung
- Zentralvenendruck durch Untersuchung der V. Cava Inferior
- dilatierte Aortenwurzel u/o eine dilatierte thorakale Aorta

8 Stunden/80 Untersuchungen



Final teaching – Zertifikat Notfallsonographie

Dreiländerausbildungsrichtlinie – Davos 2008 (ÖGUM, DEGUM, SGUM)

Abdomensonographie Grundkurs

- erweitert durch E-FAST bzw. die Inhalte des Basiskurses

20 Stunden/120
Notfalluntersuchungen

oder

Basiskurs Notfallsonographie

- Korrekte Untersuchungstechnik, Bild- und Befundinterpretation
- Integration der Sonographie in den Untersuchungs- und Behandlungsablauf
- Freie Flüssigkeit/Luft in Abdomen und Thorax (E-FAST)
- Abdominales Aortenaneurysma
- Gallensteine ?
- Nierenauftau und Blasenstatus ?
- Tiefe Beinvenenthrombose (2-Punkt-Kompressionssonographie)
- US-geführten Punktions

8 Stunden/120 Untersuchungen

Fokussierte Echokardiographie

- relevante kardiale Anatomie
- Standard Ultraschallfenster und Schnittbilder
- hämodynamische Zusammenhänge
- Herzfunktion, Klappenfunktion und Perikardergüsse mit und ohne Tamponade
- linksventrikuläre Funktion qualitativ)
- pulmonale Hypertonie/Rechtsherzbelastung
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- dilatierte Aortenwurzel u/o eine dilatierte thorakale Aorta

8 Stunden/80 Untersuchungen

und

Final teaching – Zertifikat Notfallsonographie



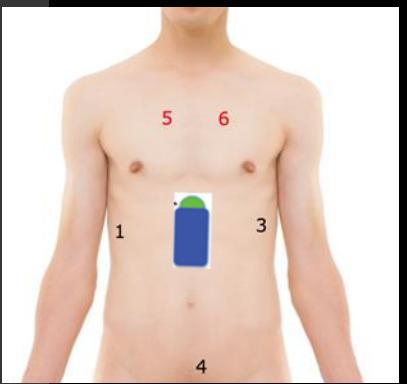
75 j/m
Rückenschmerzen
red.AZ
COPD



11.07.1940

ORD. DR. SOMAVILLA

09:53:02



+Länge = 5,66 cm

Abdomen
C5-2
MI 1,3
H2
60 %
232dB/C4
G/2/3

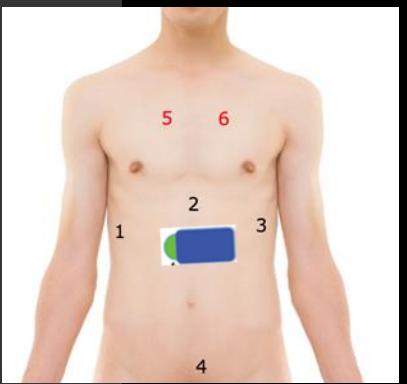
15 Hz
16 cm



11.07.1940

ORD. DR. SOMAVILLA

09:46:52



+Länge = 4,80 cm

Abdomen
C5-2
MI 1,3
H2
60 %
232dB/C4
G/2/3

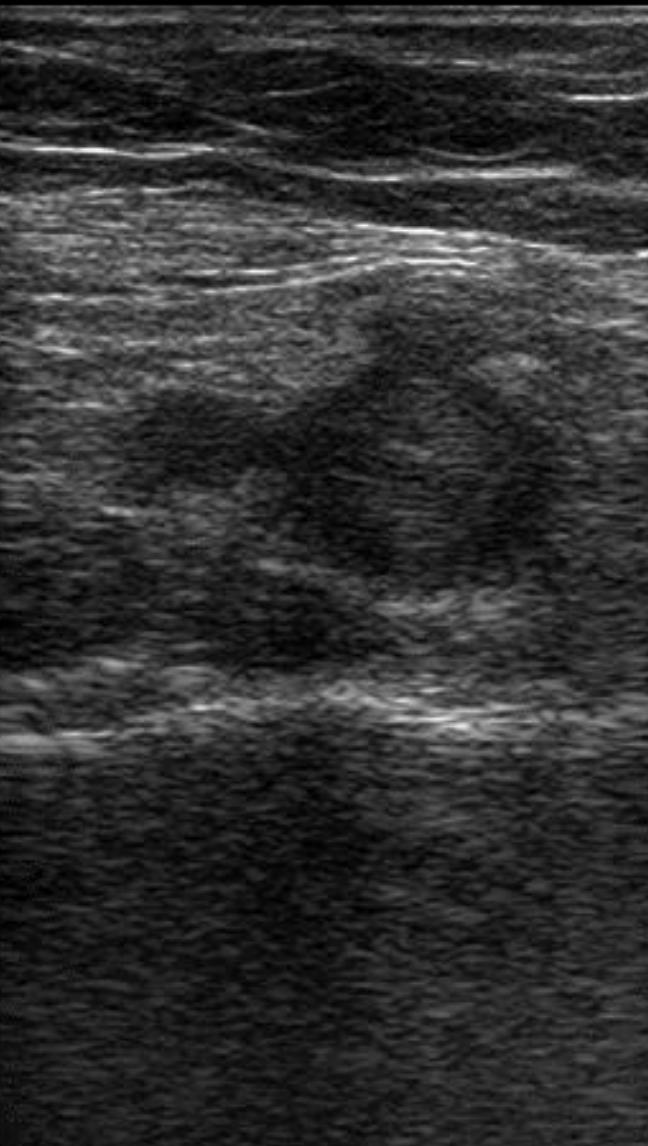
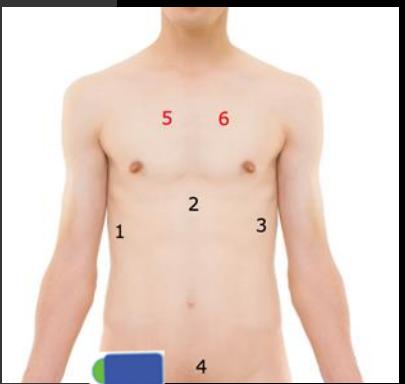
15 Hz
16 cm

P T R
,1 4,2



24 j/w
Schwangerschaft,
Beinschwellung





Bein Venen
L12-3
MI 1,0
F2
40 %
232dB/C4
E/2/4

33 Hz
6 cm



07-10-16-174718

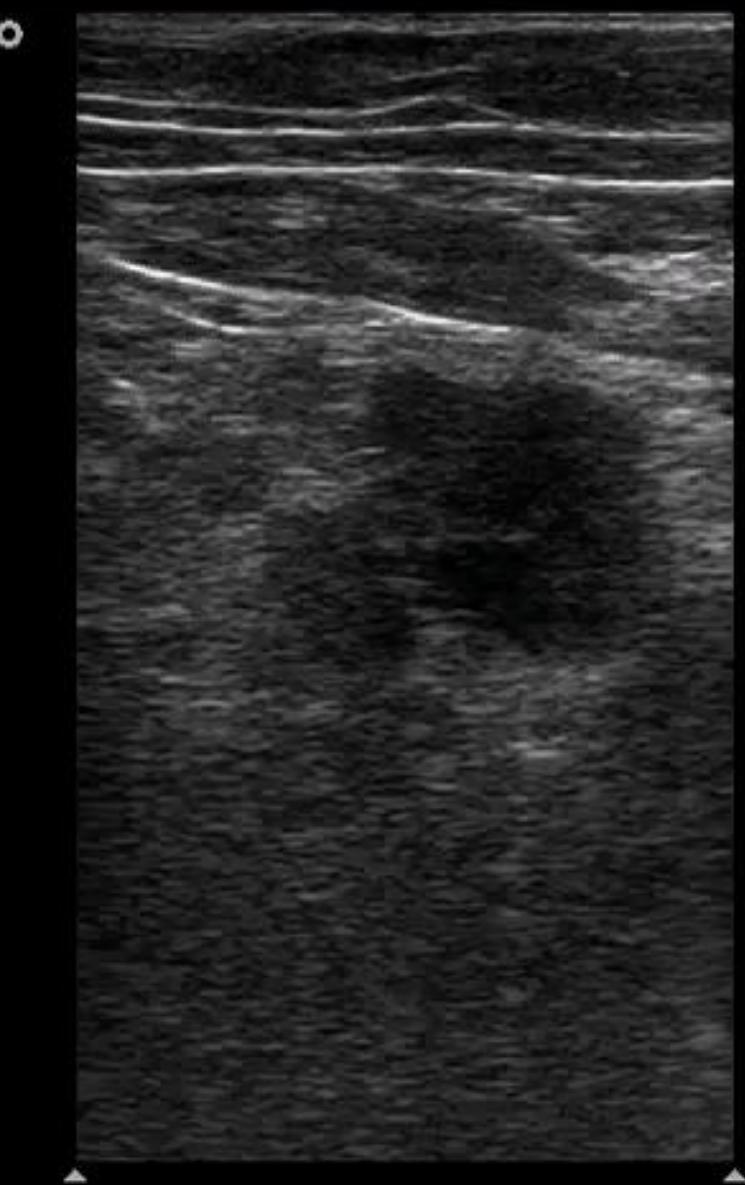
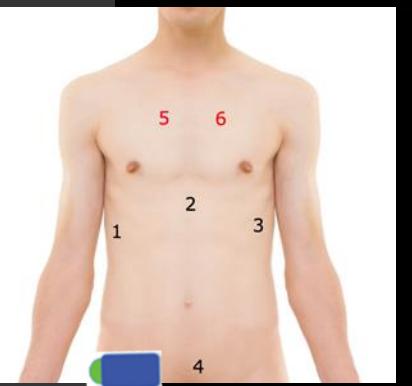
ORD. DR. SOMAVILLA

PHILIPS

16.10.2007

ma

17:48:32



Bein Venen
L12-3
MI 1,0
A
F2
40 %
232dB/C4
E/2/4

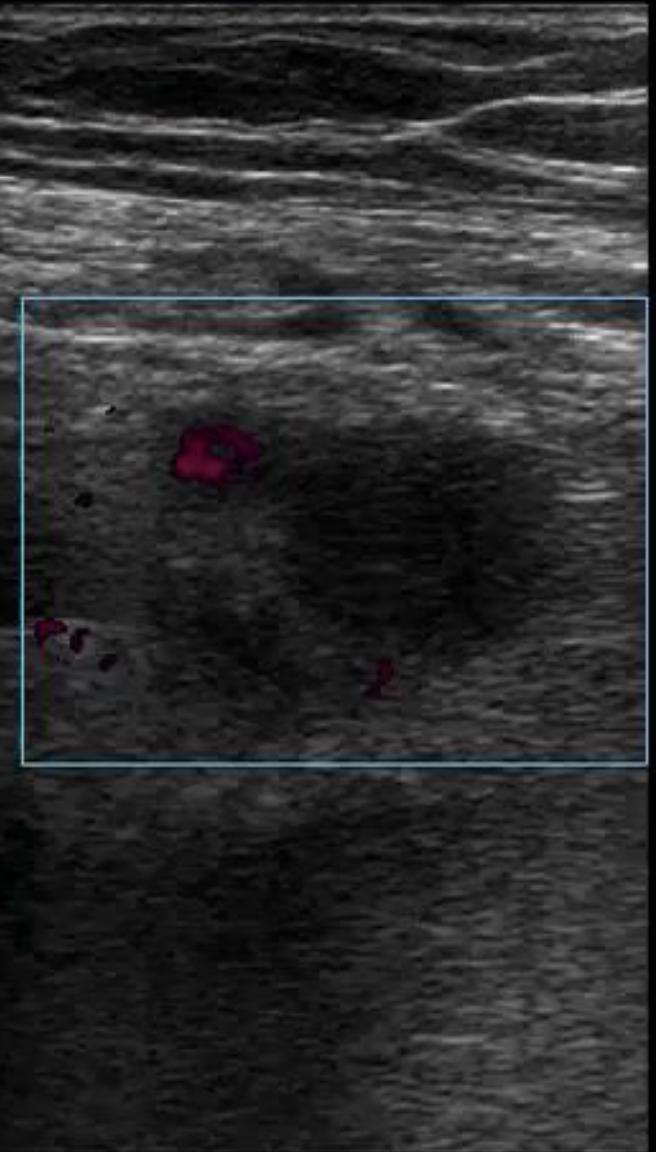
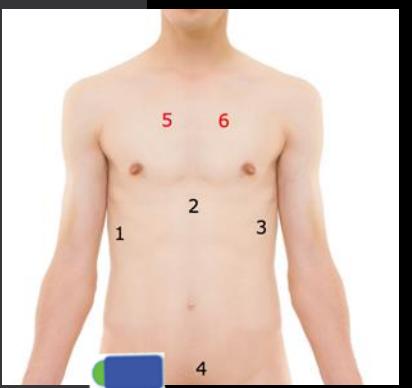
33 Hz
6 cm



07.10.10 17:49:50

ORD. DR. SOMAVILLA

ma

17:49:52
0,4

Bein Venen
L12-3
TIS 1,0
A
F2
40 %
Angio
3,8 MHz
55 %
A/6/5
Filter 3
Nulllinie 2

7 Hz
6 cm

P T R
3,0 12,0



07-10-10-174710

ORD. DR. SOMAVILLA

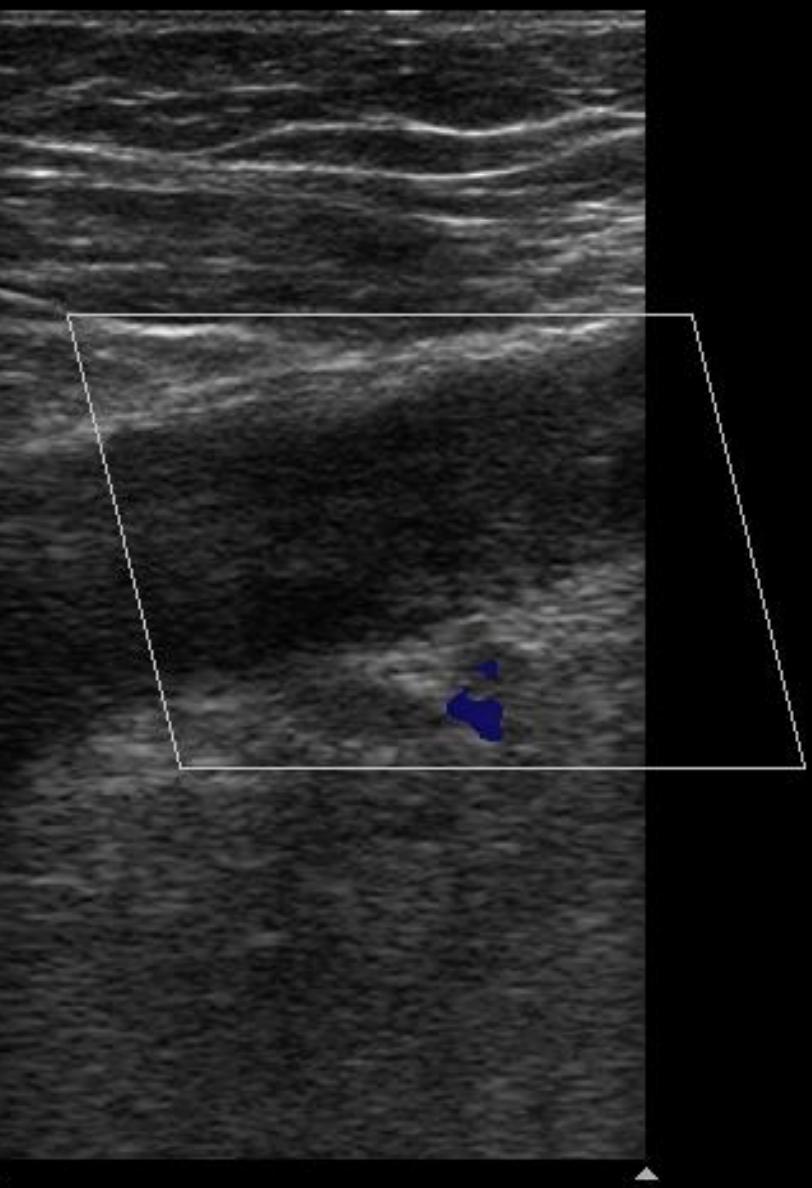
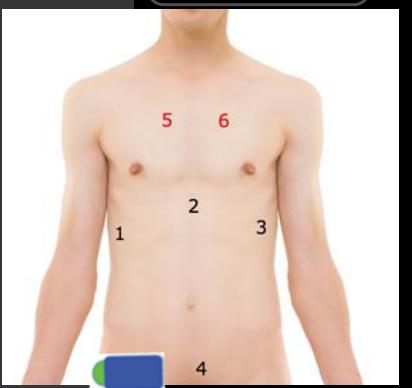
PHILIPS

10.10.2007

ma

17:48:18

+2,5



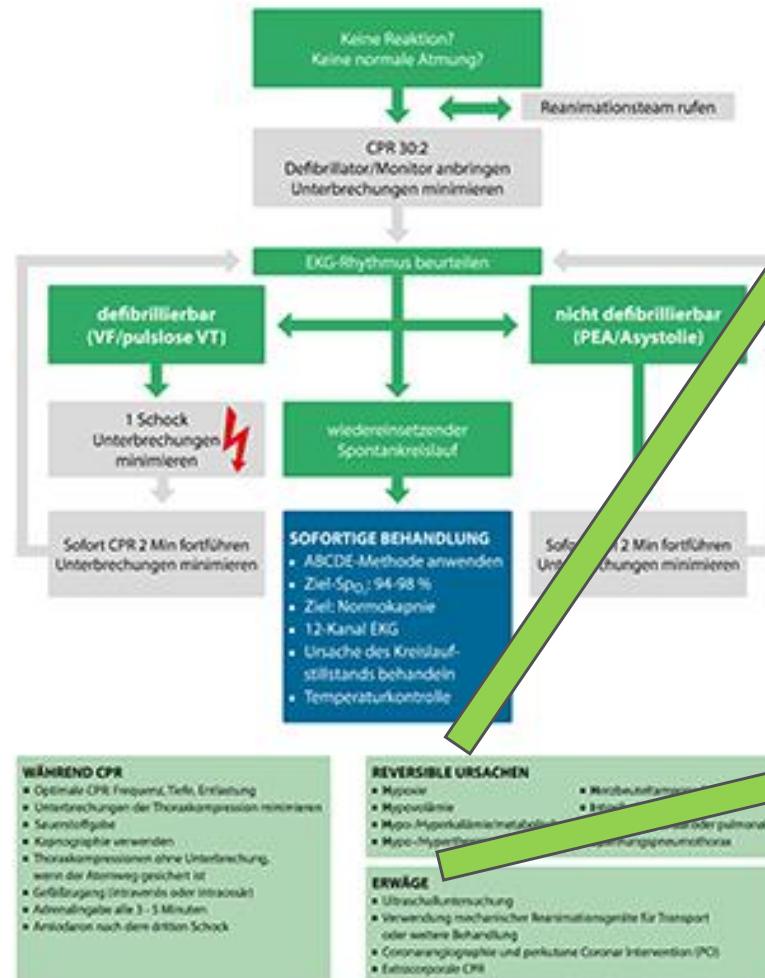
Bein Venen
L12-3
TIS 0,7
F2
40 %
Farb-Dopp
3,8 MHz
34 %
G/6/5
Filter 3

5 Hz
6 cm

T
P R
3,0 12,0



Erweiterte Reanimationsmaßnahmen



Reversible Ursachen

- Herzbeuteltamponade
- Hypovolämie
- Thrombose (kardial oder pulmonal)
- Spannungspneumothorax

Erwäge

- Ultraschalluntersuchung

2016 ERC, ARC



10.06.2013 14:23 | DEGUM Aktuell, Notfallsonographie / News

Im Notfall entscheidet Ultraschall über Leben und Tod

Experten fordern die flächendeckende Einführung d. fokussierten Notfallsonografie

Point of Care-Ultraschall gibt schnelle Antworten in der Notfallrettung

Der Point of Care-Ultraschall wird zunehmend zu einem wichtigen Verfahren, das vom Personal der Rettungsdienste auf der ganzen Welt genutzt wird, so auch in Deutschland, wo jetzt mehr und mehr Rettungswagen und Notarzteinsatzfahrzeuge mit Point of Care-Geräten ausgestattet werden. 01.07.2017 SonoSite iViz™

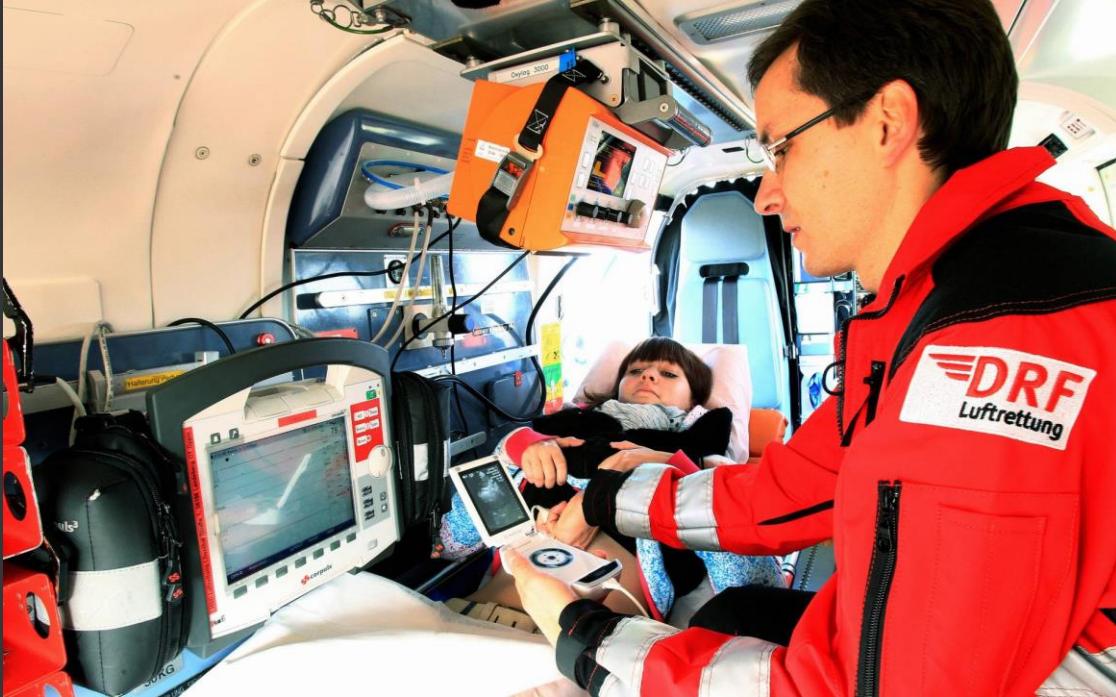
Emergency, Point-of-Care, and Clinical Ultrasound Guidelines in Medicine (ACEP) Revised June 2016 with current title, October 2008

Section 9 – Conclusion ACEP endorses the following statements on the use of emergency, clinical, point -of -care US:

1. Emergency, clinical point-of-care ultrasound performed, interpreted, and integrated into clinical care by emergency physicians **is a fundamental skill in the practice of emergency medicine**.
4. Emergency US training in emergency medicine residency programs **should be fully integrated into the curriculum and patient care experience**.
8. Emergency US is an independent procedure that **should be reimbursed and valued**, independent of the ED history, physical examination, and medical decision-making.



Präklinik Nef Hubschrauber PVZ Allgemeinpraxis Visite Notaufnahme





Ultraschallgestützte körperliche Untersuchung

=

Standart

optimiert Diagnostik



Untersucherabhängig?



Untersucherabhängig? steile Lernkurve



kostengünstig



rasch durchführbar



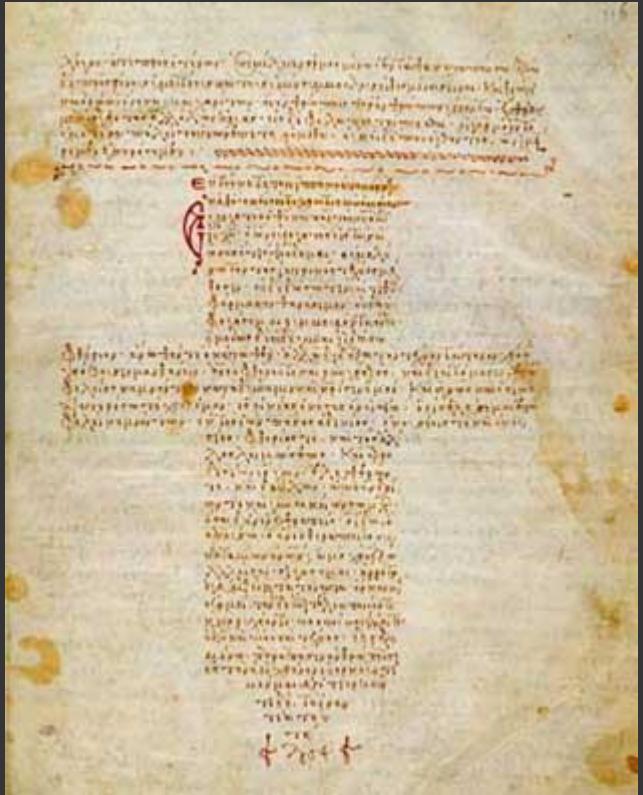
ortsunabhängig

verlängertes Stethoskop (bedside)

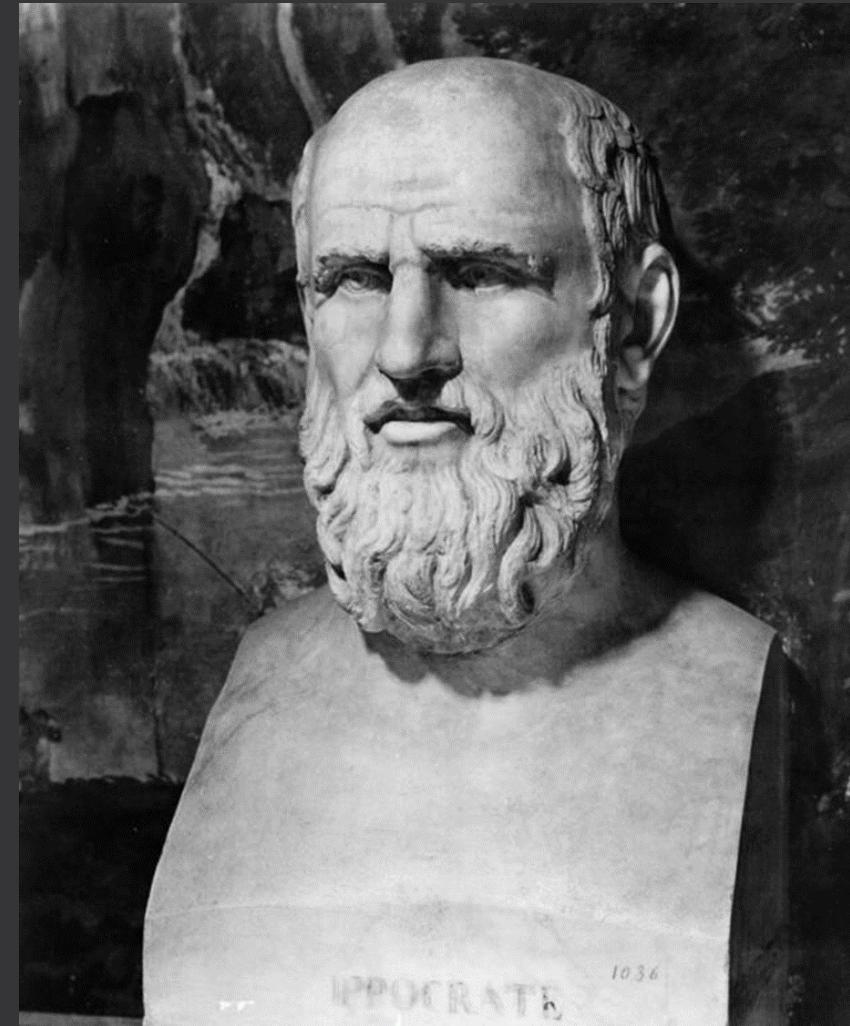


unschädlich





Der Eid des Hippokrates
12. Jhd., Byzantinische Handschrift



"primum non nocere, secundum cavere,
tertium sanare"

