Ultrasound Conference: A Case of Hypoxia

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ULTRASOUND ELECTIVE – NOVEMBER 2016

Clinical Scenario

55M w/ metastatic cholangioCA and h/o PE on rivaroxaban

Initially admitted for dehydration → transferred to SDU for hypoxia.

- On his day of transfer →
  - acutely short of breath
  - Pulse ox O2 sats in 60's → 88-92% with use of NRB
  - tachycardic to 120's
  - Normal BP

Clinical Scenario (Cont'd.)

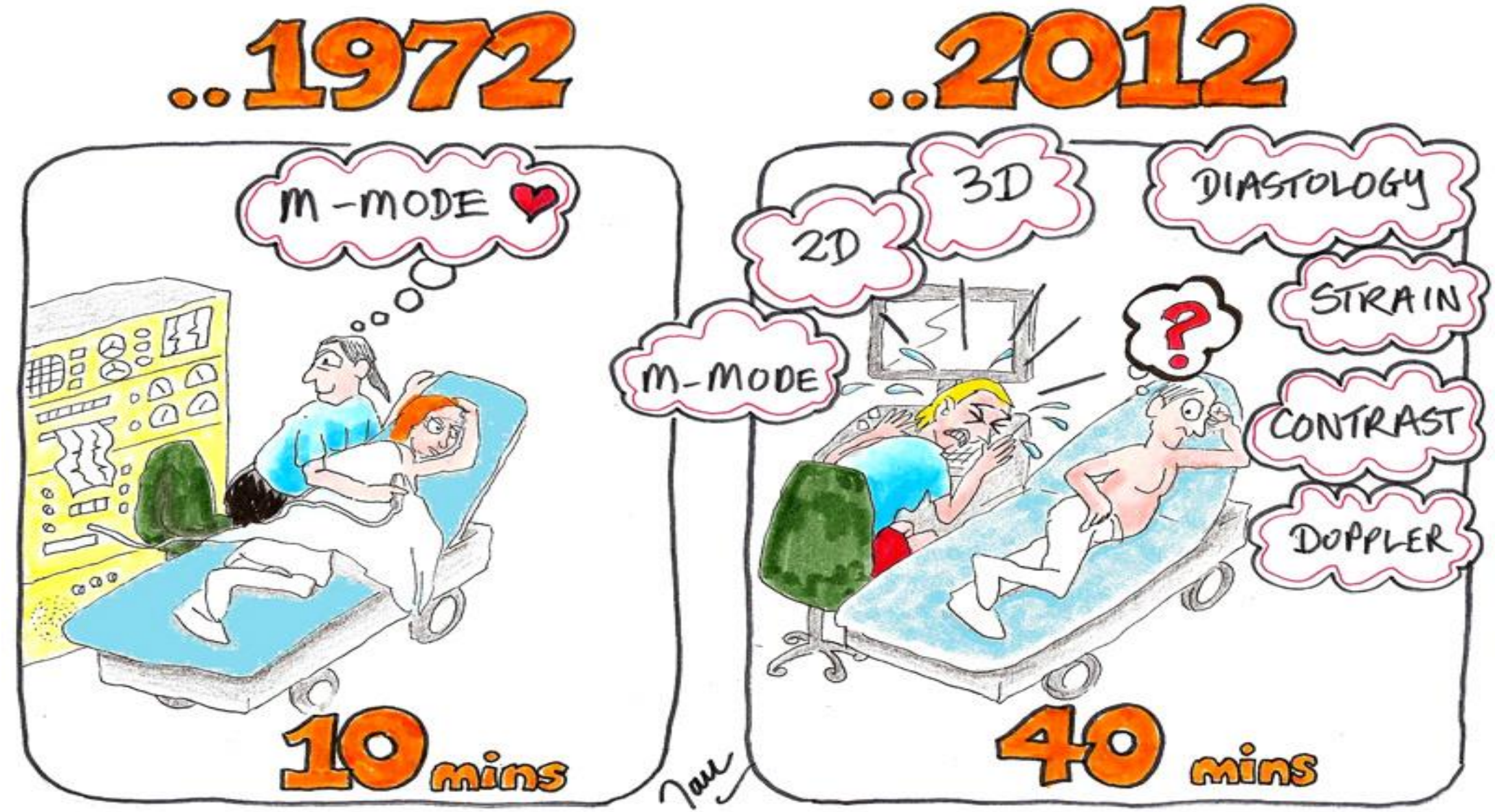
- Bedside TTE during the event:
  - nl EF
  - **large RV**
  - **flattening of IV septum**
  - Had also noted considerable **pleural effusion** as well as **ascites**

- In fact, heparin drip actually started based on very high suspicion for PE

Clinical Questions…

So…why all the hypoxia?

- Does he have a PE?
- What about that pleural effusion?
- But, but…the ascites?!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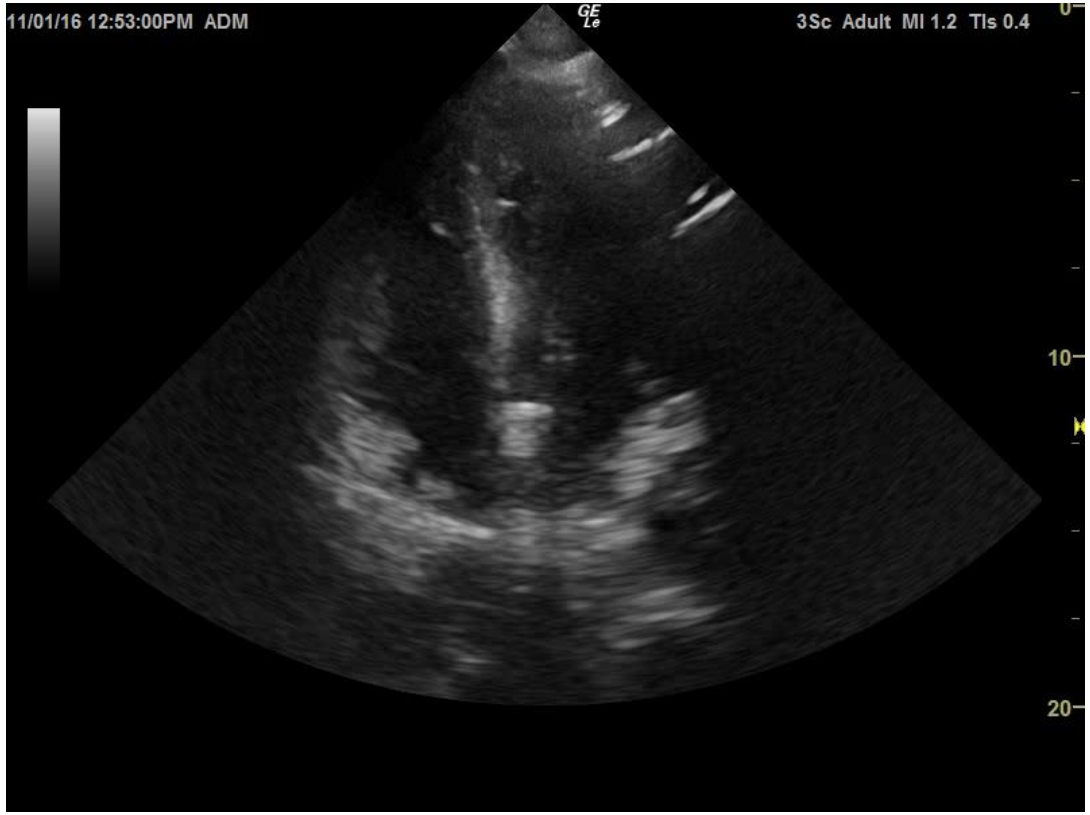
Does He Have a PE?

- View: Parasternal long-axis
- Follows the “rule of 1/3’s”!

Does He Have a PE? (Cont'd.)

- View: Apical 4
- Do we see McConnell's sign?
- What about the RV size?
- Apex = primarily LV



Does He Have a PE? (Cont'd.)

- View: Subcostal, short axis

The Pleural Effusion…

- View: R thorax
- Fairly significant effusion (pre-thoracentesis)
- Loculated in nature

The Ascites


11/01/16 01:09:52PM ADM
3Sc Abdomen MI 1.2 TIs 0.4
5
10
15


11/01/16 01:17:07PM ADM
L axilla
3Sc Abdomen MI 1.2 TIs 0.4
10
20

The Ascites (Cont'd.)

- Prior two images demonstrating fluid under the diaphragm on *both* sides
- More ascites shown on the left
- Patient did receive paracentesis as well, aiming for improvement of dyspnea

Our Conclusions…

- Probably no PE…though his cardiac exam had some interesting findings → "D sign?"
- Another cause of his hypoxia could certainly be the loculated pleural effusion (had fluid on both sides though not shown here)
- Yet another cause of his hypoxia could include his ascites, perhaps by compression or perhaps because it tracked up to his thorax

So, in POCUS, what really helps us when considering a PE?

- Retrospective analysis, CT-confirmed PE's
- McConnell's sign doesn't seem to be too sensitive but with a reported *specificity* of 96%: a qualitative measure that the utility of has been hard to reproduce consistently (Walsh et al.)
- In contrast, RV/LV EDD ratio (> 0.7) has sensitivity of 66% and specificity of 77% → overall, seems have good accuracy

TABLE II

Diagnostic Value of Echocardiographic Findings in Patients with Suspected Pulmonary Embolism Using Helical CT as the Gold Standard

	Sens (%)	Spec (%)	PPV (%)	NPV (%)
EDD ratio > 0.7	66	77	82	59
RVEDD > 27 mm	56	73	77	51
Area ratio > 0.66	59	85	86	56
McConnell sign	16	96	86	44
Septal shift	27	81	67	44
"60/60"	22	69	53	36
TR > 270 cm/s	56	38	59	36
Any echo finding (except TR > 270 alone)	76	50	70	57

Hocus POCUS Cont'd.

	sens	spec	PPV	NPV	**LR(+)**	**LR(-)**
EDD ratio > 0.7	66	77	82	59	2.9	0.4
RVEDD > 27mm	56	73	77	51	2.1	0.6
Area ratio >0.66	59	85	86	56	3.9	0.5
McConnell sign	16	96	86	44	4.0	0.9
Septal shift	27	81	67	44	1.4	0.9
"60/60"	22	69	53	36	0.7	1.1
TR > 270 cm/sec	56	38	59	36	0.9	1.2
Any echo finding (except TR > 270 alone)	76	50	70	57	1.5	0.5

References

1. Lodato JA, Ward RP, Lang RM. Echocardiographic predictors of pulmonary embolism in patients referred for helical CT. Echocardiography. 2008. 25 (6): 584-590.

2. Walsh BM and Moore CL. McConnell's sign is not specific for pulmonary embolism: case report and review of the literature. J. of Emer. Med. 2015. 49 (3): 301-304.