Acute cardiogenic shock with standing-still heart

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Case

- 49 YO Female
- Chief complaint:
  - Febrile sensation with edema (onset: 5DA)

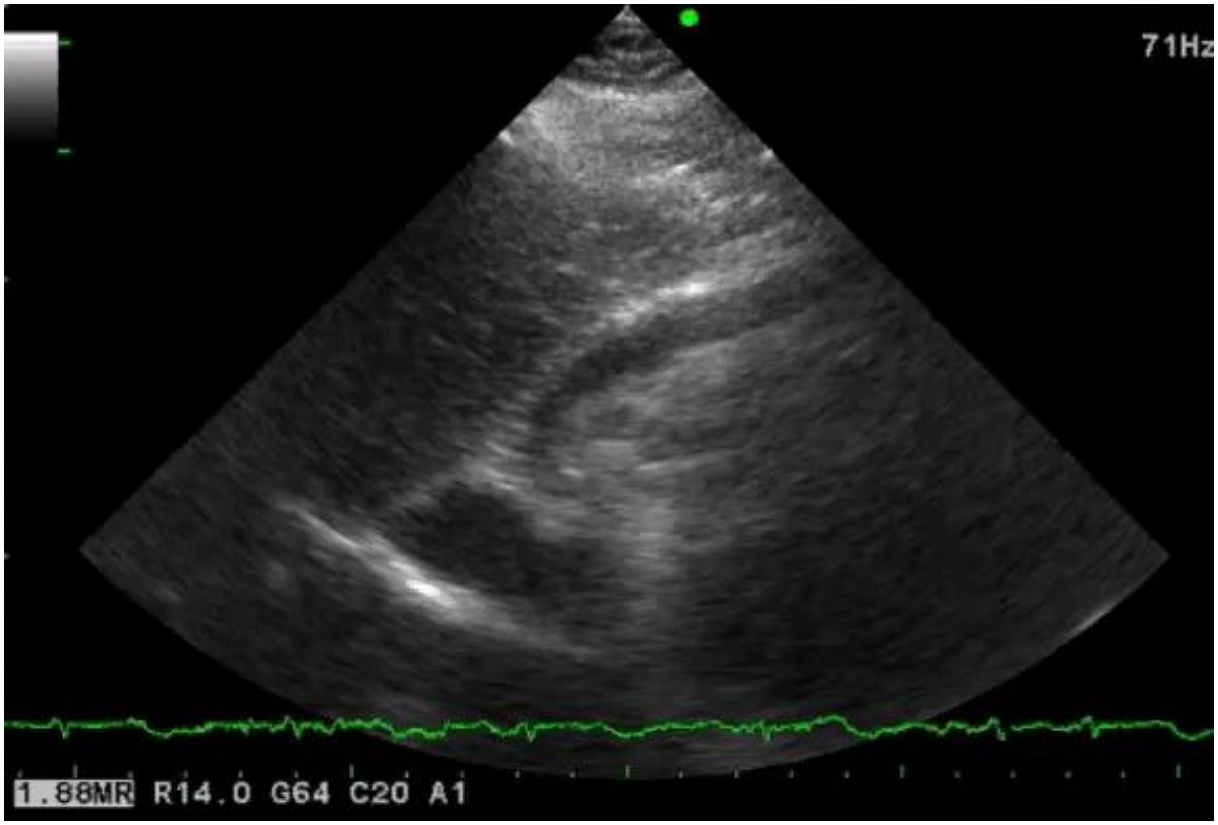
- Present illness (1)

  13YA ulcerative colitis diagnosed, well controlled with mesalazine

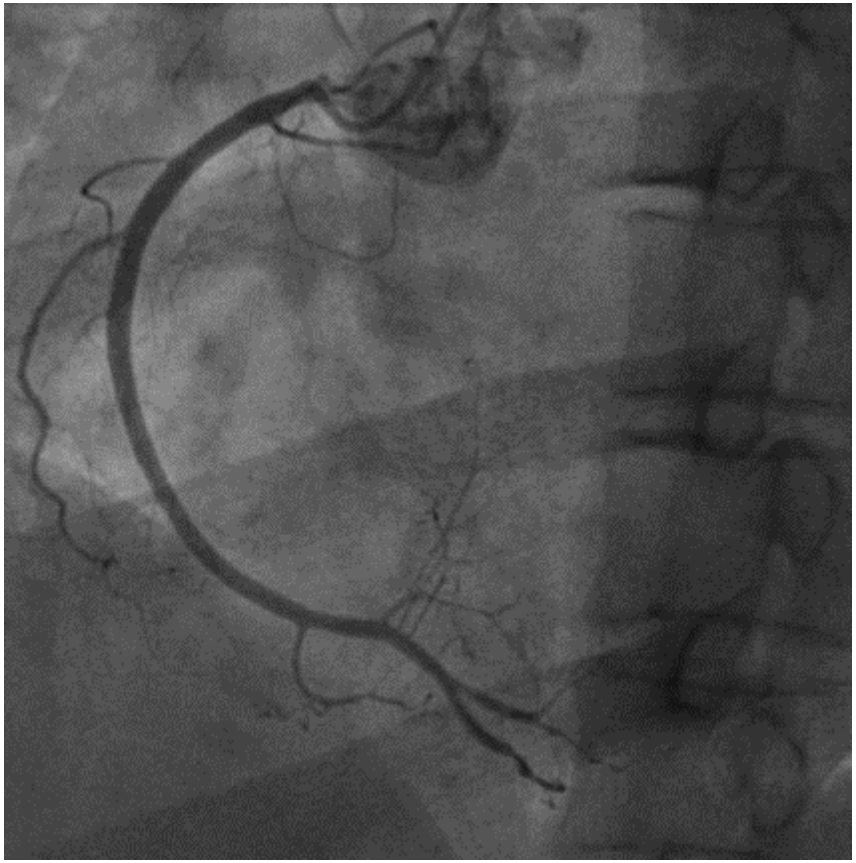
  2WA Exertional chest pain developed
  → emergency department in other hospital

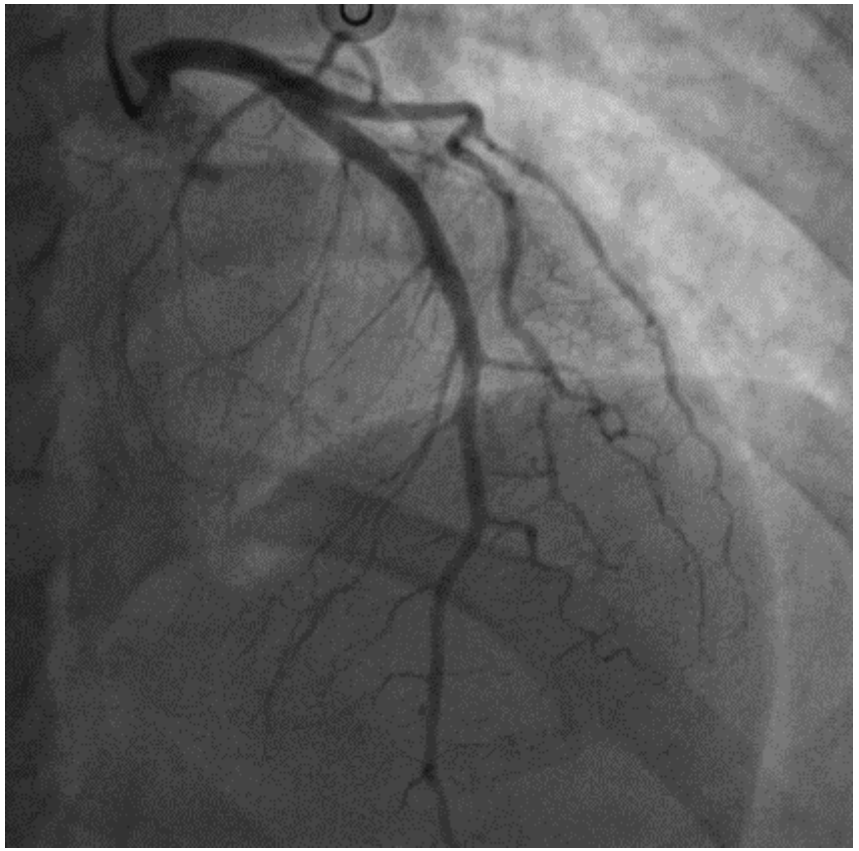
Echocardiography

Echocardiography



Coronary angiography





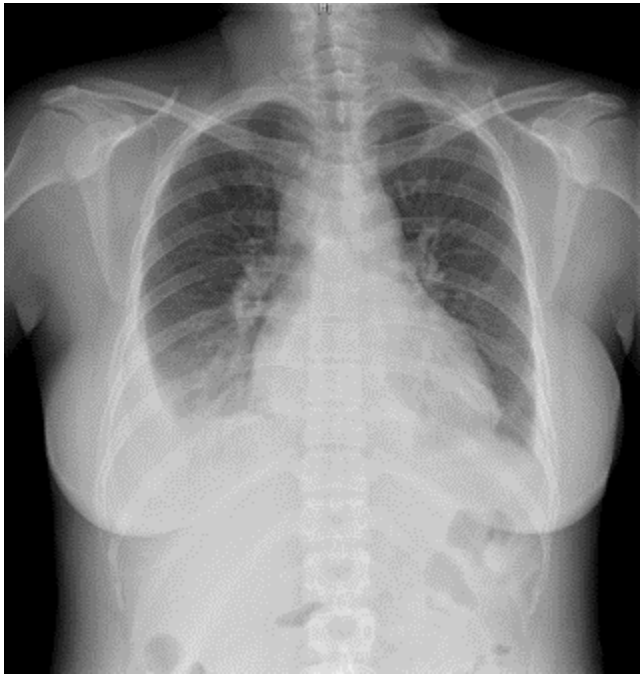
→ Discharged with sustained symptoms

Hospital course

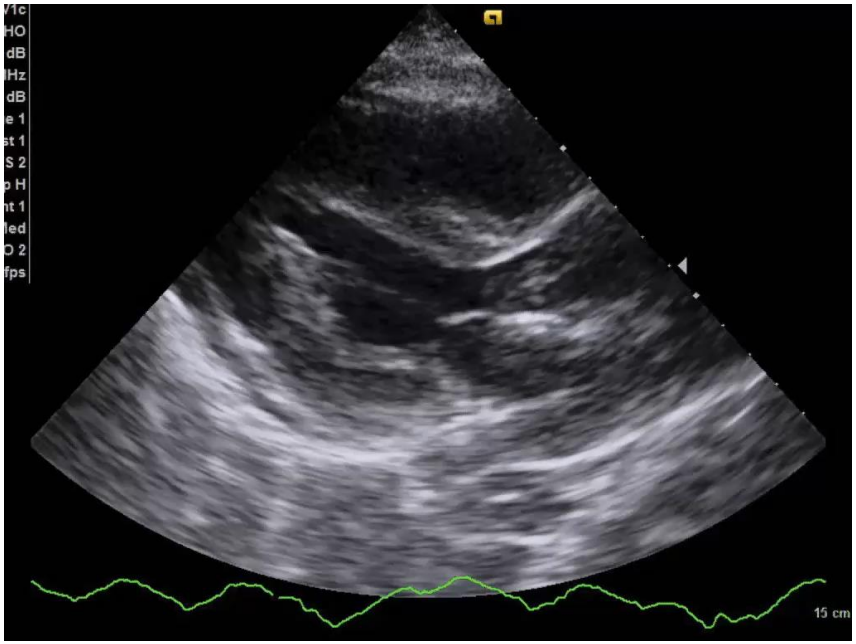
- Present illness (2)

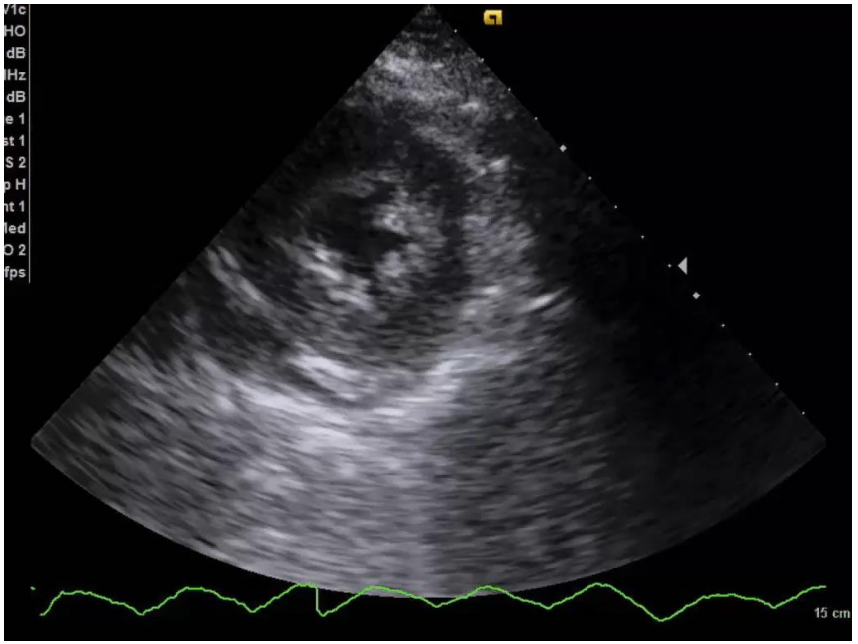
  1WA exertional chest pain sustained
  febrile sensation, general weakness, edema of L/Ex , cough developed

  5DA visited ER again



Follow-up echocardiography



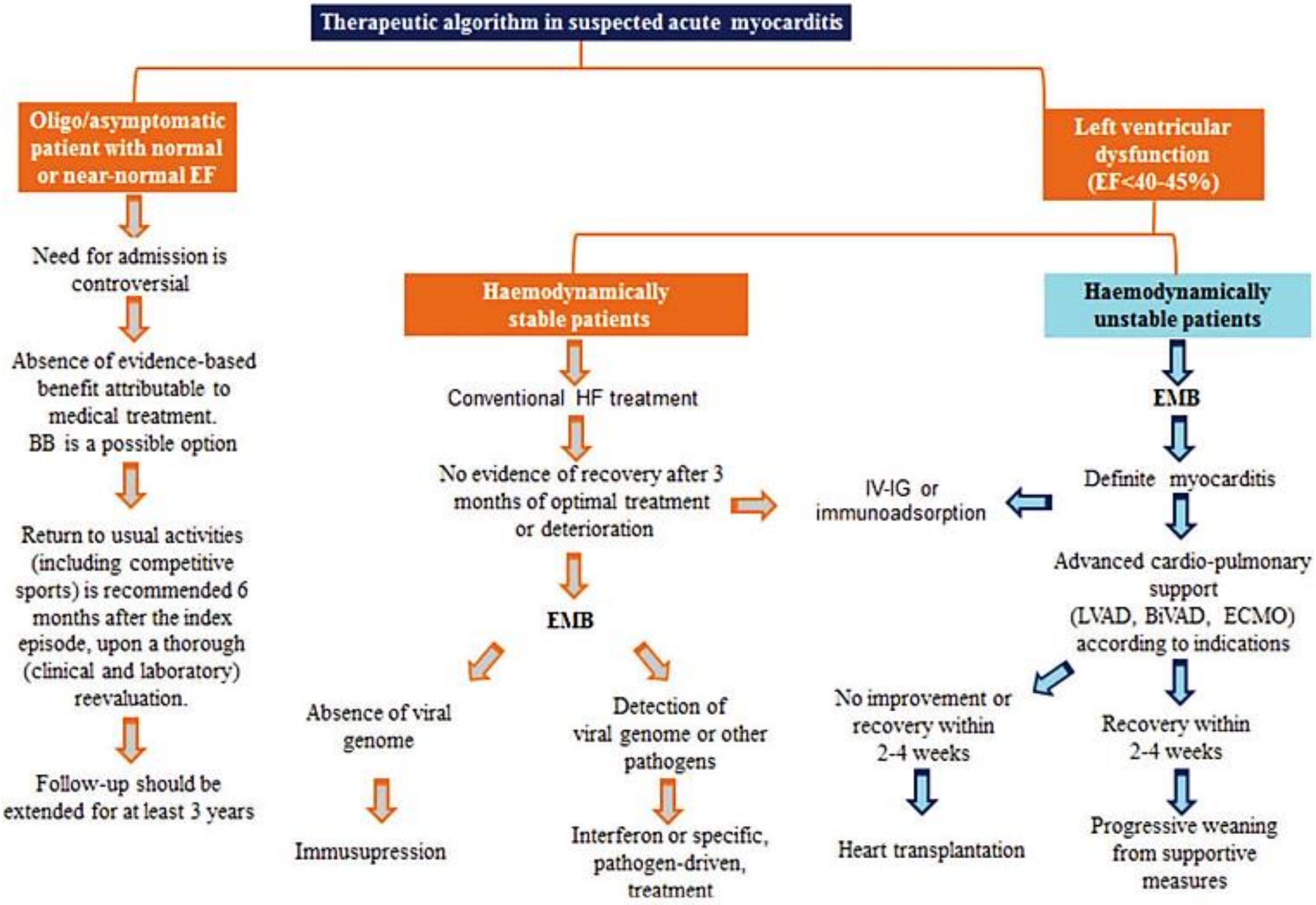


Follow-up echocardiography

Myocarditis

	Criteria
Possible subclinical acute myocarditis	In the clinical context of possible myocardial injury without cardiovascular symptoms but with at least one of the following 1. Biomarkers of cardiac injury↑ 2. ECG findings suggestive of cardiac injury 3. Abnormal cardiac function on Echo or CMR
Probable acute myocarditis	In the clinical context of possible myocardial injury with cardiovascular symptoms and at least one of the following 1. Biomarkers of cardiac injury↑ 2. ECG findings suggestive of cardiac injury 3. Abnormal cardiac function on Echo or CMR
Definite myocarditis	Histological or immunohistological evidence of myocarditis

Leslie T Cooper Jr et al. Lancet 2012; 379: 738–47



Expert Rev Cardiovasc Ther 2017 **15**(1): 25-34.

Hospital course

- Present illness (3)

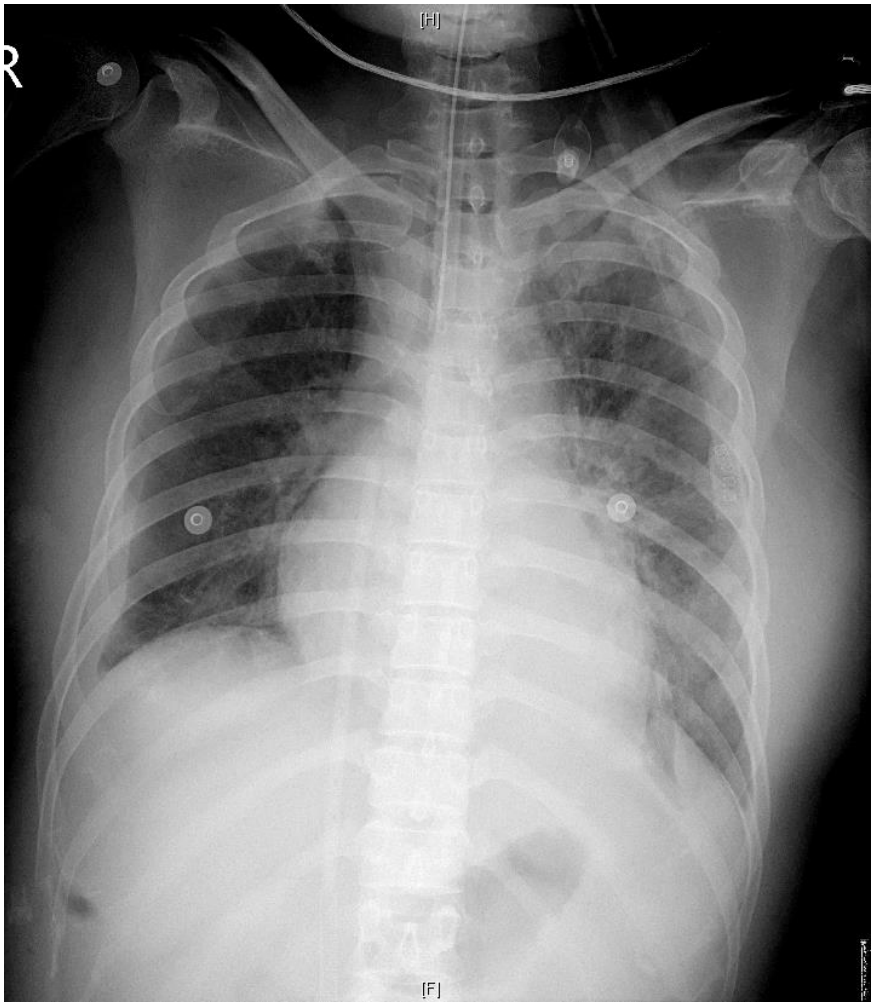
2DA chest tightness aggravated, nausea developed
NPO + TPN started

1DA 2am Transient loss of consciousness after defecation

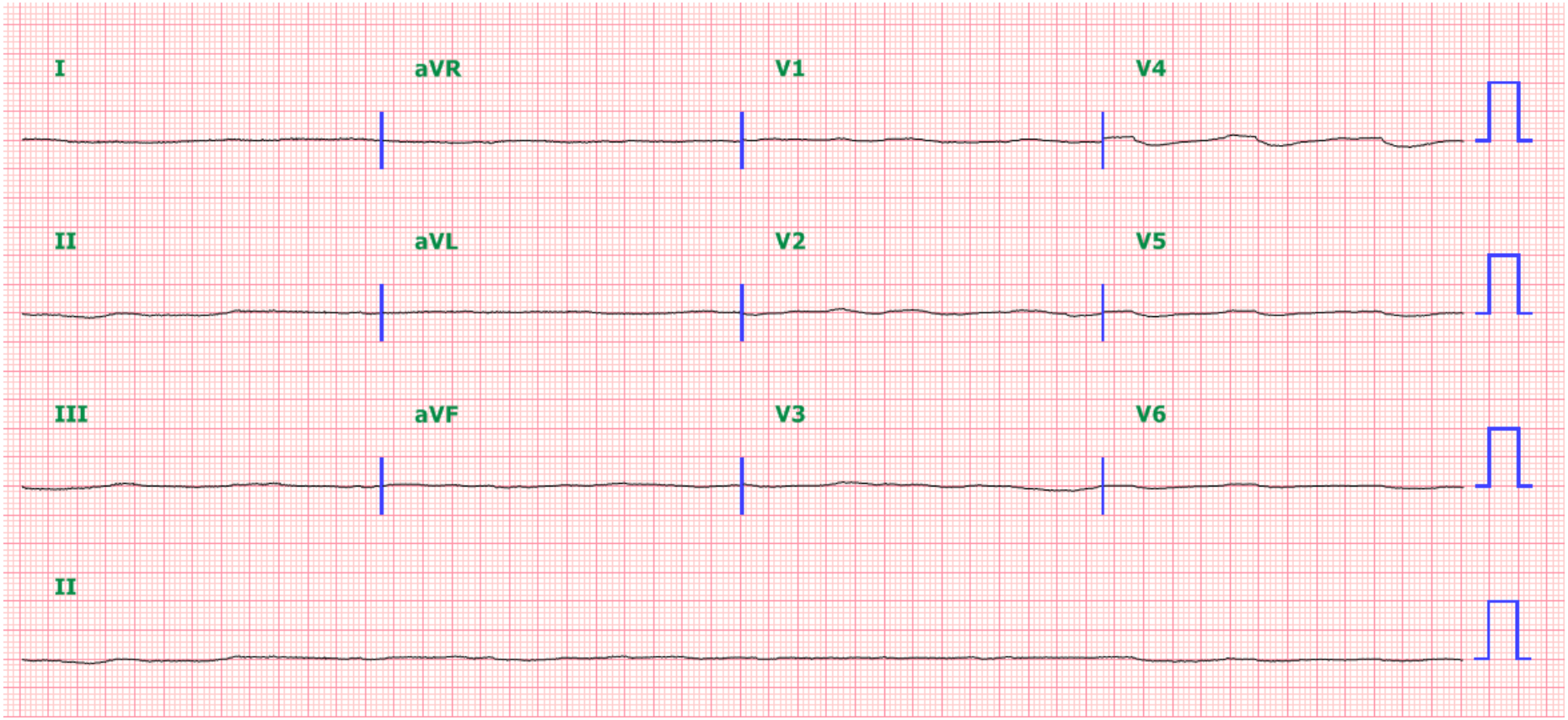
7am found with pulseless electrical activity
CPR during 1 hour → VA ECMO inserted during CPR

HD1 transferred to SMC
mental alert, V/S: BT 34.7, SpO2 92%

Chest X-ray



Electrocardiogram



Laboratory finding

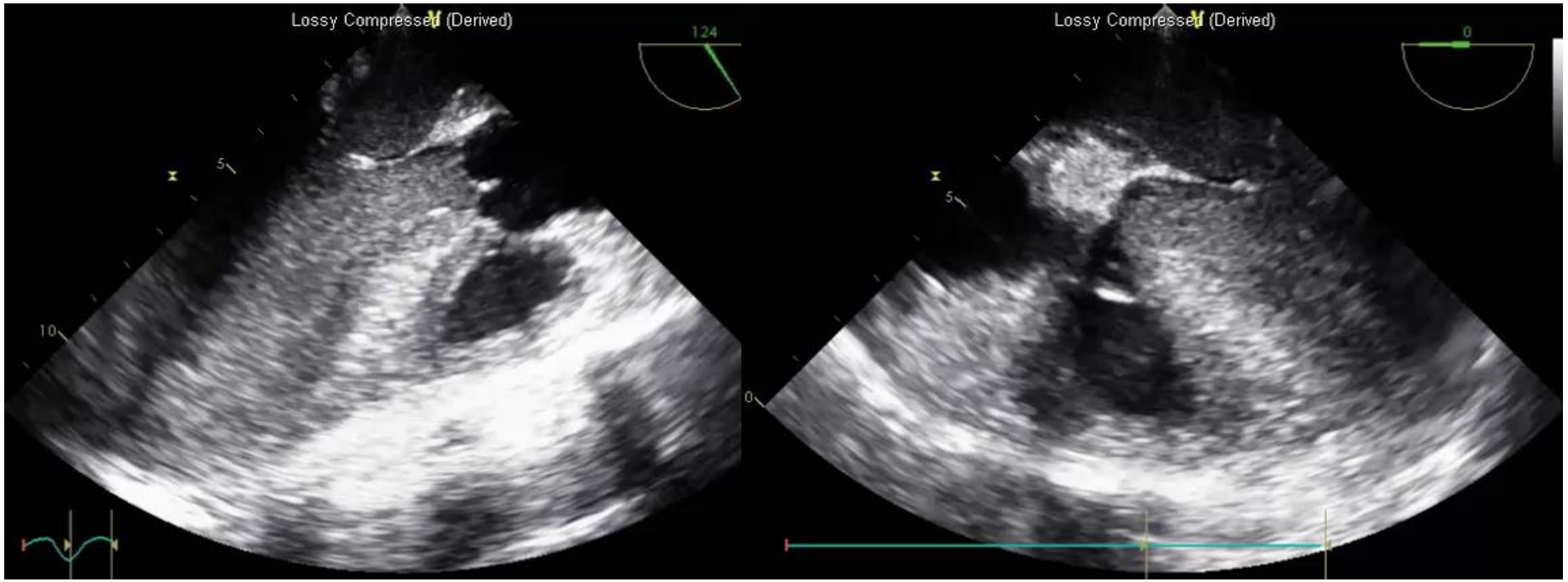
- CBC 16060-9.9-142K
- PT INR 1.27
- T-B 2.1U/L, AST/ALT 1076/799U/L
- Lactic acid 3.53 mmol/L
- BUN/Cr 37.8mg/dL/1.76mg/dL, e- 138-4.2-104mmol/L
- CK-MB 96.67ng/mL, cTnI 7.834ng/mL

LV venting and Heart biopsy was planned

Histologic classification:

Eosinophilic vs. lymphocytic vs. granulomatous vs. giant cell

TEE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124
5
10
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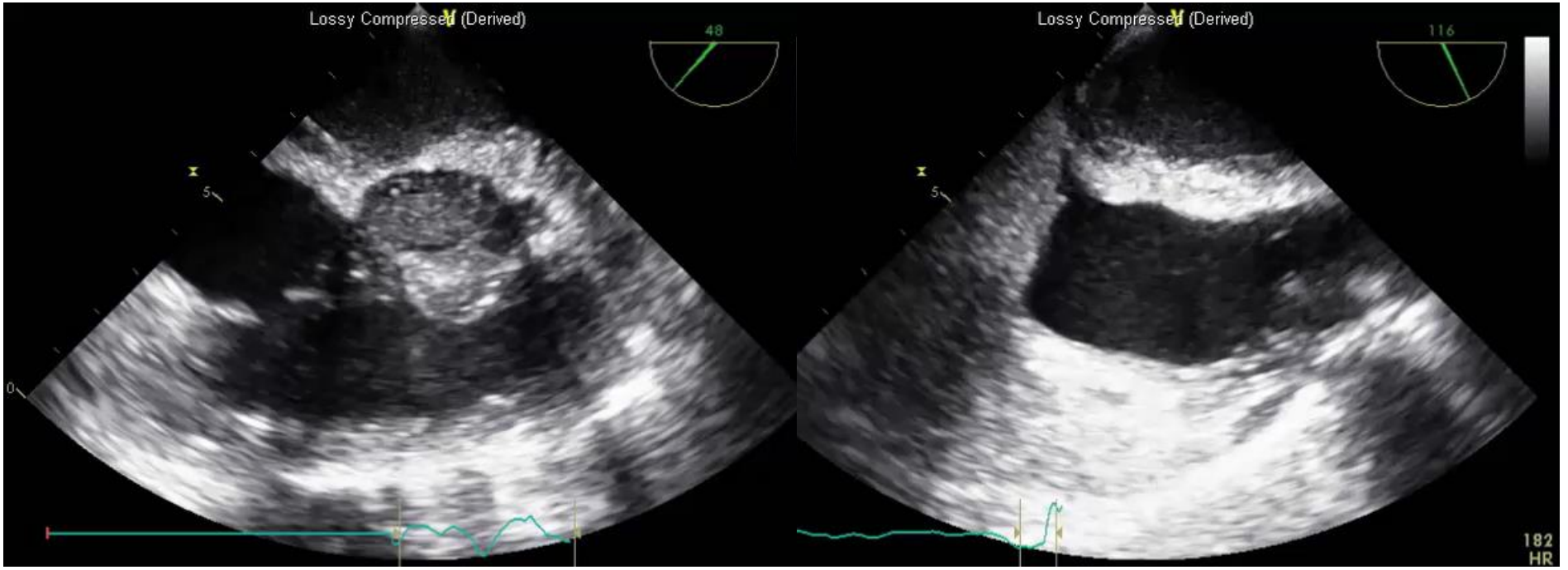
TEE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48
5
0
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116
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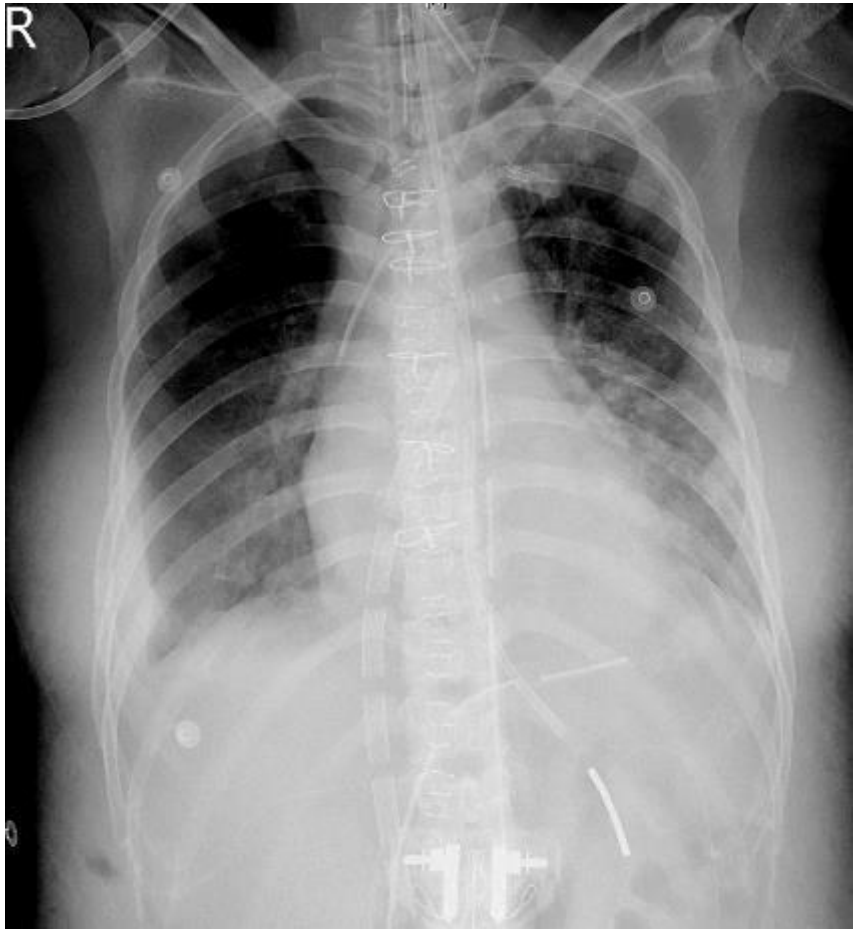
182
HR

Hospital course

HD1 op. was proceeded.

no LV thrombus was found

atrial septectomy & biopsy of RV myocardium



Hospital course

HD3 T-B 1.3, AST/ALT 154/218, lactic acid 1.64

BUN/Cr 24.9/1.7

Biopsy: (septum, RA wall):

> . Diffuse chronic and acute inflammatory infiltration
> with frequent multinucleated giant cells and myocardial damage,
> consistent with giant cell myocarditis

→ Steroid pulse therapy (mPd 1g)

HD6 T-B 1.2, AST/ALT 28/91, lactic acid 1.53

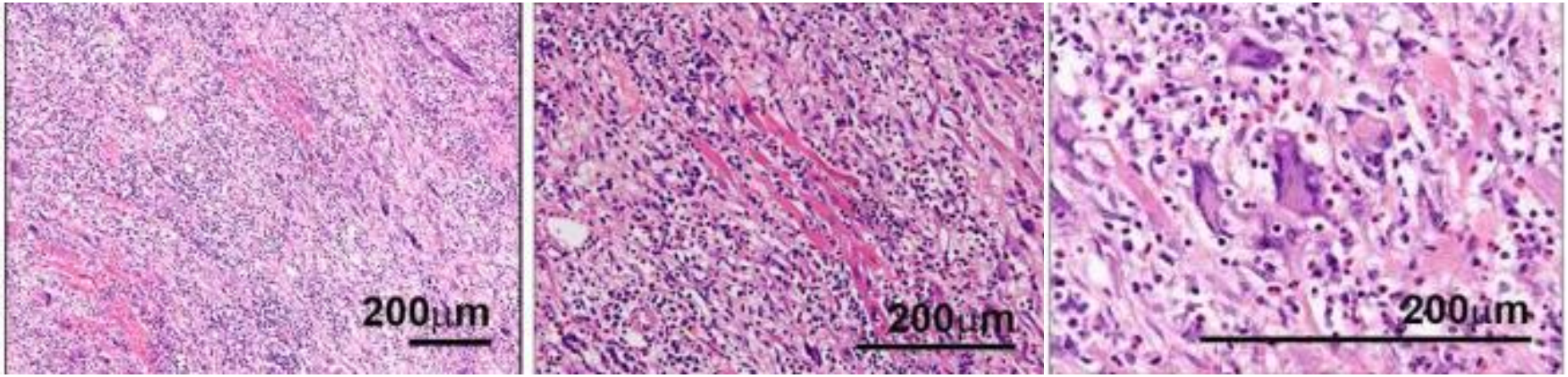
BUN/Cr 21.7/1.51

Heart transplant was done

HD82 Discharged without complication

Giant cell myocarditis

- Can deteriorate rapidly over hours to days
  → Initial ICU care is recommended



Leslie T Cooper et al. Heart Fail Rev (2013) 18:733–746

Giant cell myocarditis

Multicenter Giant Cell Myocarditis Study Group

- 63 giant cell myocarditis
- Median TPL-free survival without immunosuppression : 12 weeks
- 89% of death or HTPL (34 HTPL, 22 death): majority < 1Yr
  - 20-25% of recurrence in graft after HTPL
    But only 15% died within 3 years after HTPL
  - Modulating Immunosuppressives usually resolves giant cell myocarditis

Leslie T Cooper et al. Heart Fail Rev (2013) 18:733–746
Ekstrom, K., et al. Eur J Heart Fail **18**(12): 1452-1458

Giant Cell myocarditis

- From 1991 through May 2015
- Helsinki University Central Hospital.
- a total of 46 patients with histologically-confirmed GCM
- TPL-free survival: 42% at 5 years from symptom onset in all patients

Therapy

Immunosuppressive therapy[a]	37/38 (97)
Prednisone	37/37 (100)
Azathioprine	31/37 (84)
Cyclosporine	28/37 (76)
Other[b]	7/37 (19)
Triple combination therapy[c]	26/37 (70)
Beta-adrenergic blockers	39 (85)
ACE inhibitors	33 (72)
Amiodarone	28 (61)
ICD implanted (total)	26 (57)
Primary prevention	21 (46)
Secondary prevention	5 (11)
Permanent pacemaker	8 (17)
Left ventricular assist device	2 (4)
Extracorporeal membrane oxygenation	2 (4)

Eur J Heart Fail 2016, 18(12): 1452-1458.

Giant Cell myocarditis

Predictor	e/n	HR	P value
LVEF by echocardiography, per +5%	25/45	0.87 (0.75-0.99)	0.047
NT-proBNP, per +1000ng/L	16/36	1.06 (1.03-1.10)	<0.001
Troponin-T >85ng/L (median)	19/38	4.57 (1.63-11.28)	0.003
Grade 2-3 myocyte necrosis	17/37	4.29 (1.63-11.28)	0.003
Grade 2-3 myocardial fibrosis	17/37	2.37 (0.83-6.82)	0.109
Grade 2-3 necrosis or fibrosis	17/37	7.17 (2.29-22.40)	<0.001
Triple drug immunosuppression*	17/37	0.39 (0.15-1.01)	0.051

Triple drug immunosuppression: steroid, azathioprine, cyclosporine

Eur J Heart Fail 2016, 18(12): 1452-1458.

Summury

- Hemodynamically-unstable myocarditis requires endomyocardial biopsy to conclude
  - the prognosis
  - Need of immunosuppression
- Giant cell myocarditis presents poor prognosis
  - Immunosuppression!
  - Consider mechanical circulatory support as bridge-to-transplant to save the life

Thank you for your attention