Rare is present

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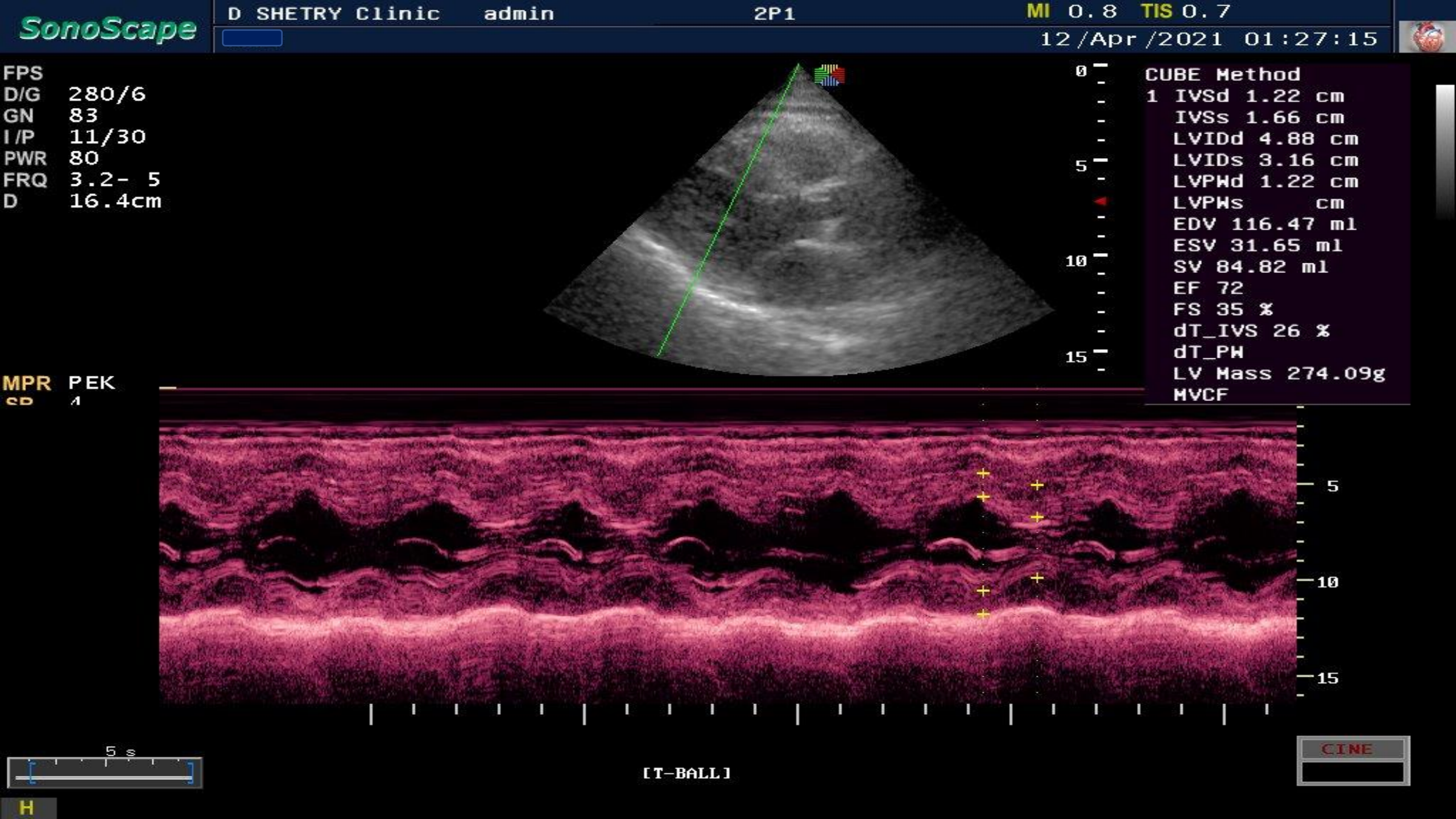
History

- Female patient 51 y old, DM, uncontrolled hypertension, obese without previous history suggesting any cardiac disease.
- No use of oral contraceptives, NSAIDs/ Corticosteroids, liquorice or other herbal supplements. No illicit drug use.

Examination

- **Weight:** 105 kg
- **Height:** 173 cm
- **BMI:** 35.1
- **BP:** 190/110
- **Pulse:** 87 bpm, regular
- **Chest:** Clear
- **Heart:** S1, S2
- **ECG:** LVH
- **ECHO:** Concentric LVH, good systolic function
- **Physical examination** is otherwise normal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1 IVSd 1.22 cm
IVSs 1.66 cm
LVIDd 4.88 cm
LVIDs 3.16 cm
LVPWd 1.22 cm
LVPWs cm
EDV 116.47 ml
ESV 31.65 ml
SV 84.82 ml
EF 72
FS 35 %
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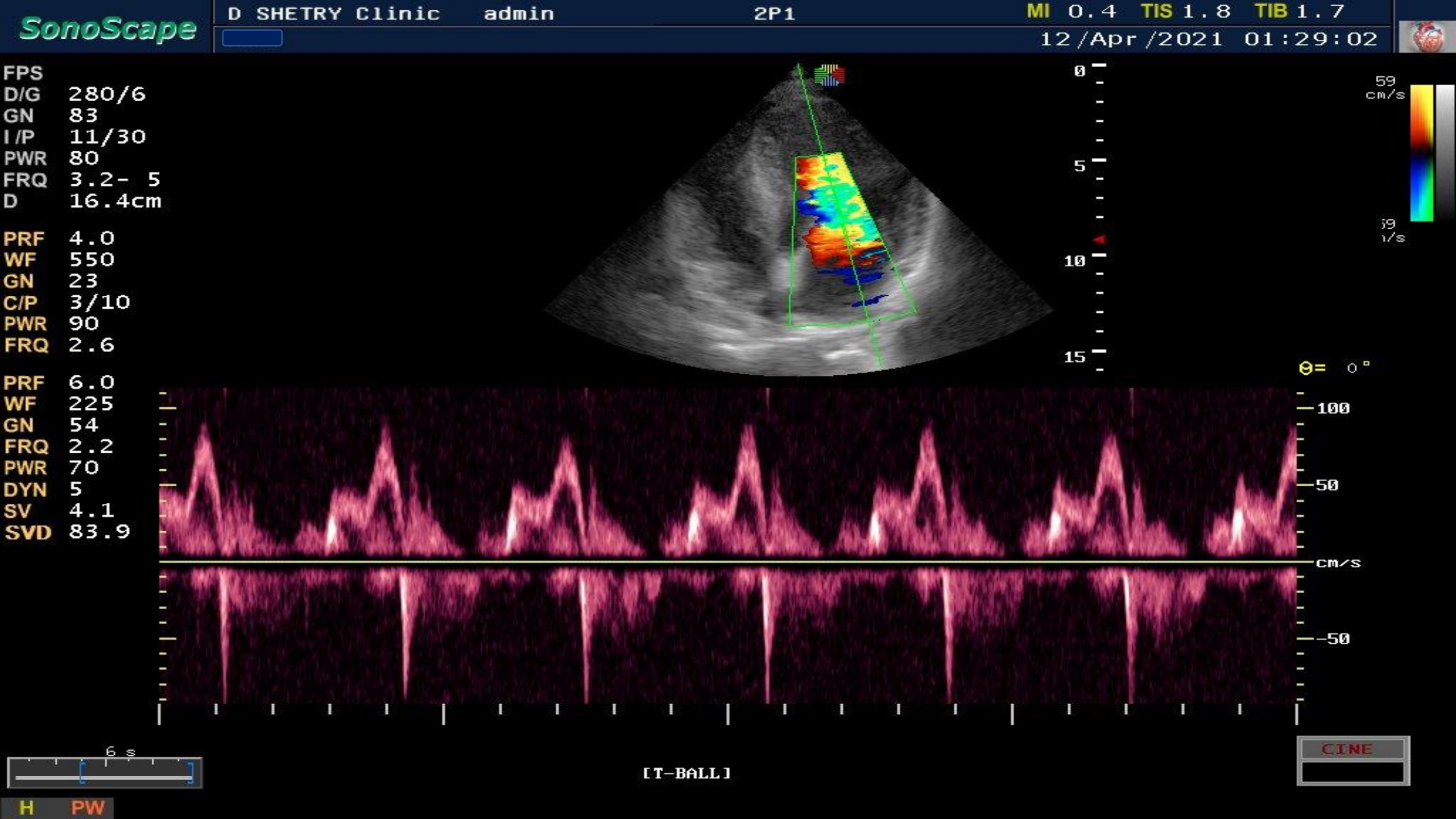
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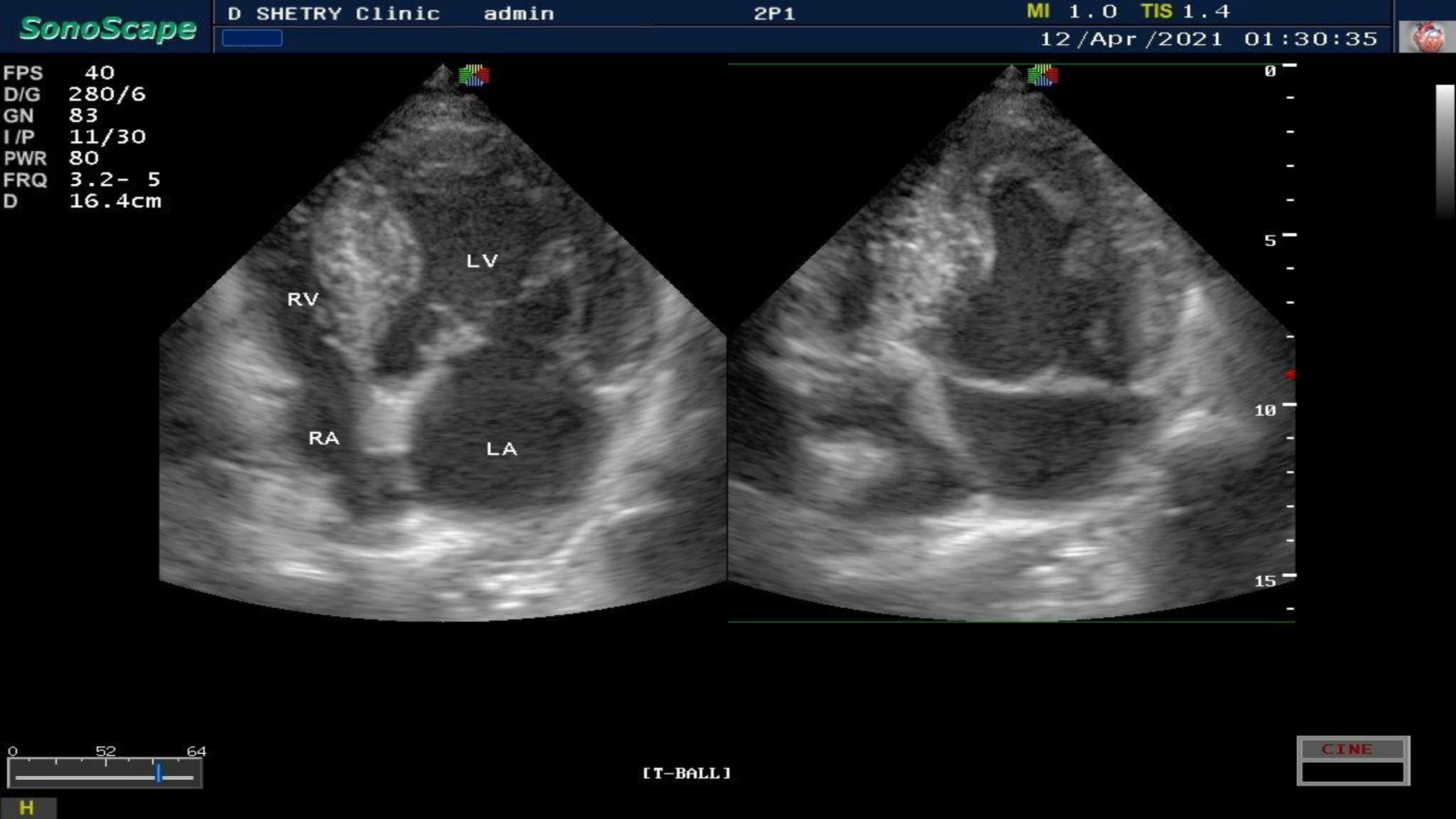
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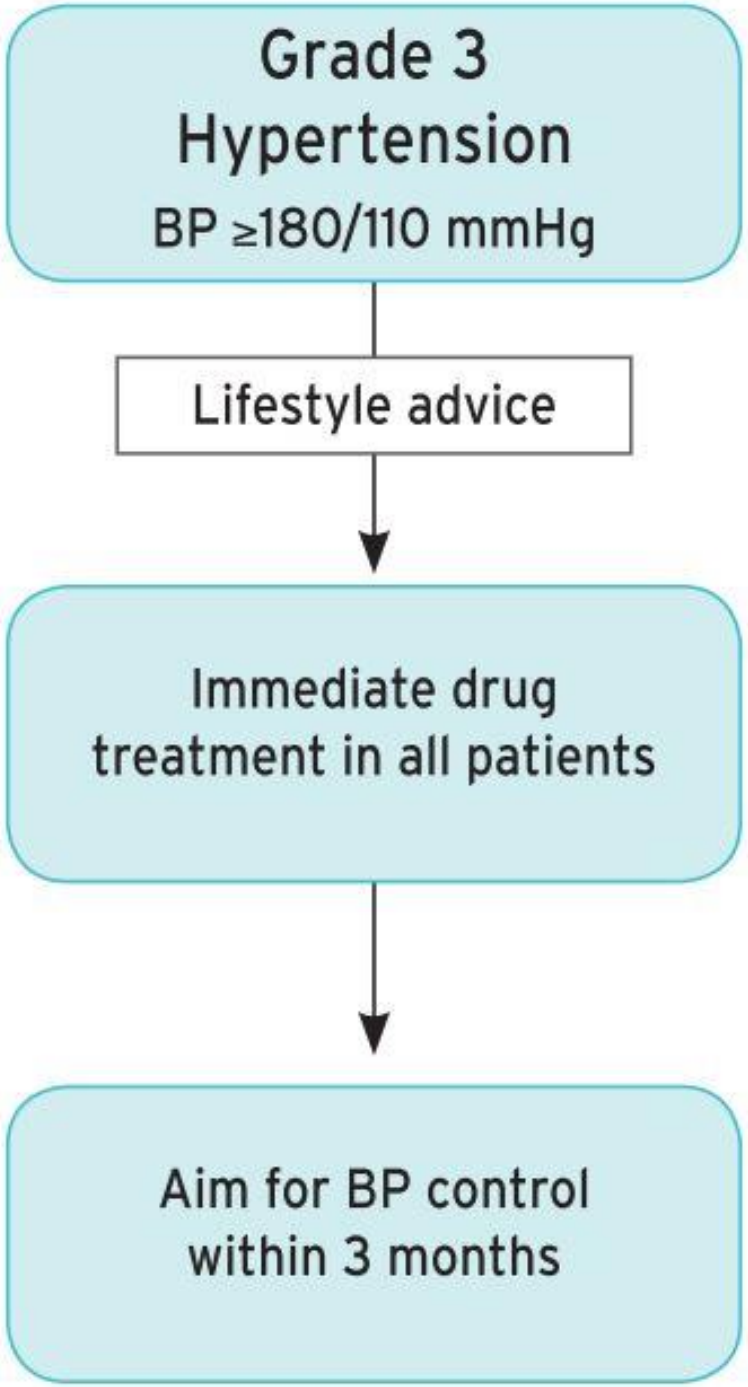
High risk	**People with any of the following:** • **Marked elevation of a single risk factor**, particularly cholesterol >8 mmol/L (>310 mg/dL), e.g. familial hypercholesterolaemia or grade 3 hypertension (BP ≥180/110 mmHg) • **Most other people with diabetes mellitus** (except some young people with type 1 diabetes mellitus and without major risk factors, who may be at moderate-risk)
	Hypertensive LVH
	Moderate CKD eGFR 30-59 mL/min/1.73 m^2)
	A calculated 10 year SCORE of 5-10%

Laboratory investigations

- **Creatinine:** 1.2 mg/dl
- **Uric acid:** 6.8 mg/dl
- **Serum Na:** 135 mmol/L
- **Serum K:** 2.3 mmol/L
- **Otherwise** normal lab findings


Grade 3
Hypertension
BP ≥180/110 mmHg
Lifestyle advice
Immediate drug
treatment in all patients
Aim for BP control
within 3 months

It is recommended to initiate an antihypertensive treatment with a two-drug combination, preferably in an SPC. Exceptions are frail older patients and those at low risk and with grade 1 hypertension (particularly if SBP is <150 mmHg).[342,346,351]	I	B
It is recommended that if BP is not controlled[c] with a two-drug combination, treatment should be increased to a three-drug combination, usually a RAS blocker with a CCB and a thiazide/thiazide-like diuretic, preferably as an SPC.[349,350]	I	A
It is recommended that if BP is not controlled[c] with a three-drug combination, treatment should be increased by the addition of spironolactone or, if not tolerated, other diuretics such as amiloride or higher doses of other diuretics, a beta-blocker, or an alpha-blocker.[310]	I	B

Treatment

We initiated antihypertensive therapy in accordance with ESC guidelines as follows:

- **Amlodipine 10 mg** + **Valsartan 160 mg** + **Hydrochlorothiazide 25 mg** SPC combination.

In follow up visits, BP remained uncontrolled (above 170/100 mmHg) despite patient compliance to treatment and adherence to lifestyle recommendations.

We added

- **Carvedilol 25 mg** tab twice daily in addition to the previous combination

However, BP remained uncontrolled again.

Thus, we started to investigate this case as a case of Resistant hypertension.

- ✓ ***On reviewing the lab again we noticed HYPOKALEMIA and that was the first clue.***

We decided to investigate for causes of secondary hypertension especially those associated with hypokalemia.

- **We stopped all anti-hypertensives and shifted to Verapamil 240 mg SR tab twice daily for 2 weeks.**
- **Then, we investigated plasma aldosterone/renin ratio that came to be 37**
- **For confirmation of our diagnosis, we performed acute saline infusion test.**

Saline infusion test:

- ❑ **2000 ml 0.9% saline i.v. over 4 hours (while recumbent).**
- ❑ **Plasma aldosterone after saline infusion was found to be 12 ng/dl.**
- ❑ **The patient shifted to Spironolactone 50 mg/d and follow up visits revealed dramatic response with controlled BP readings (<130/80).**

Primary aldosteronism:

Indications for screening:

- ❑ **Patients with hypokalaemic hypertension not explainable by medications.**
- ❑ **Resistant hypertension (patients requiring ≥3 antihypertensive medications including a diuretic and blood pressure >140/90 mmHg).**
- ❑ **Presence of an incidentally detected adrenal mass.**
- ❑ **Family history of hypertension.**

Primary aldosteronism:

Screening methods:

- **Aldosterone/renin ratio (ARR) is the best screening test at present owing to its superiority over single measurements of aldosterone and renin activity being independent of circadian, dietary, postural or medication-induced changes.**

- **It is recommended to change medications to drugs that do not affect the RAAS axis. In particular, beta-blockers and aldosterone antagonists are known to strongly influence the ratio and need to be ceased approximately 2 weeks and 4 weeks, respectively, prior to screening.**

Primary aldosteronism:

Screening methods:

- **An aldosterone-to-renin ratio of greater than 30 is considered a positive screening test for primary aldosteronism.**

Primary aldosteronism:

Confirmatory tests:

- **Acute saline infusion test:**
  - ✓ **Patients can undergo this test on an out-patient basis.**
  - ✓ **Infusion of 2000 ml of isotonic saline over 4 hours with patients remaining recumbent.**
  - ✓ **An incompletely suppressed aldosterone level after saline infusion confirms the diagnosis of primary aldosteronism. A threshold value of 5 ng/dl aldosterone after saline infusion was found to provide a sensitivity of 100% and specificity of 97%.**

Primary aldosteronism:

Confirmatory tests:

- **Fludrocortisone suppression test:**
  - ✓ **This the gold standard for diagnosis.**
  - ✓ **Requires a 4 day administration of synthetic mineralocorticoid fludrocortisone (0.1 mg every 6 hours) and a high-sodium diet (1.75 g).**
  - ✓ **Incompletely suppressed aldosterone levels > 6 ng/dl confirm the diagnosis. However, this test carries the risk of severe hypokalemia and hypertension and requires a 5-day hospital stay.**

Primary aldosteronism:

Confirmatory tests:

- **Oral sodium loading test:**
  - ✓ **Consists of oral salt loading over 3 days (urinary sodium excretion >200 mEq).**
  - ✓ **On the third day, patients are required to collect a 24 hours urine sample. A urinary aldosterone concentration of >12 mg/24 hours confirms the diagnosis with specificity 91% and sensitivity 72%.**

Take Home messages

- ✓ **Primary aldosteronism is considered the most common form of endocrine hypertension, accounting for up to 20% of cases of resistant hypertension.**
- ✓ **It should be suspected in cases of resistant hypertension especially those associated with hypokalemia.**
- ✓ **CaCBs and Alpha blockers should be used instead of RAAS blockers and βBs for 2 weeks before testing for primary aldosteronism.**


Thank you