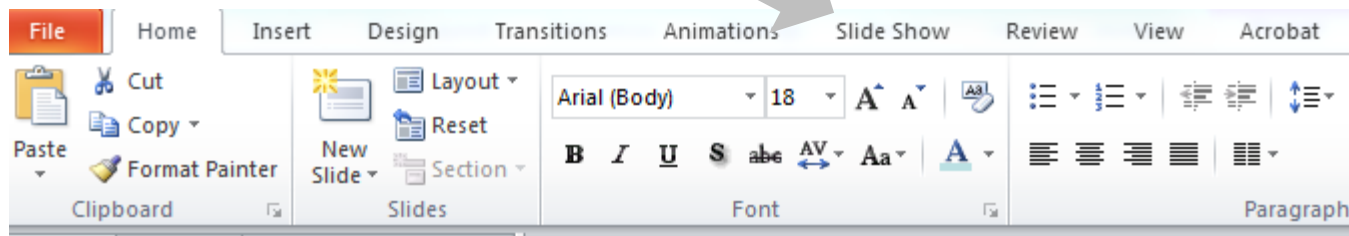

ECG Underwriting Puzzler



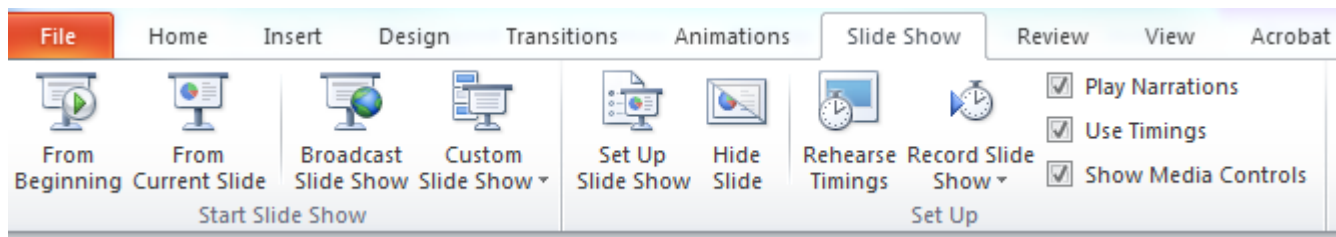
Presented by: Richard Braun, M.D.

Obtaining Best Results from this presentation

- For best results—please do the following:
 - Select “Slide Show” from the menu option on top

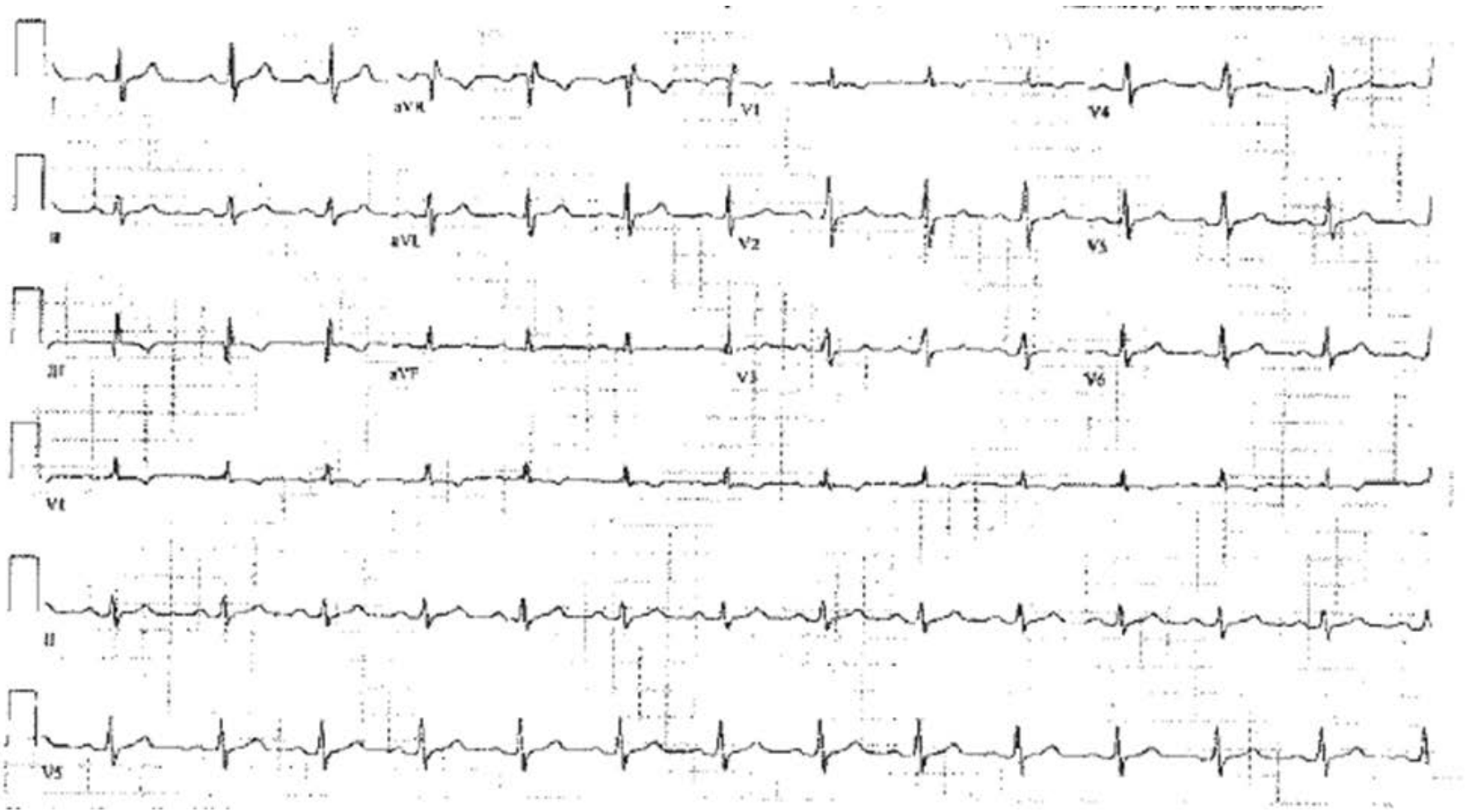


- Select “From the beginning”



- Slowly click through the presentation
- Have fun!---Good luck

Here is an ECG from May of 2006 (currently 41 year-old, male)



Here is an ECG from August of 2006

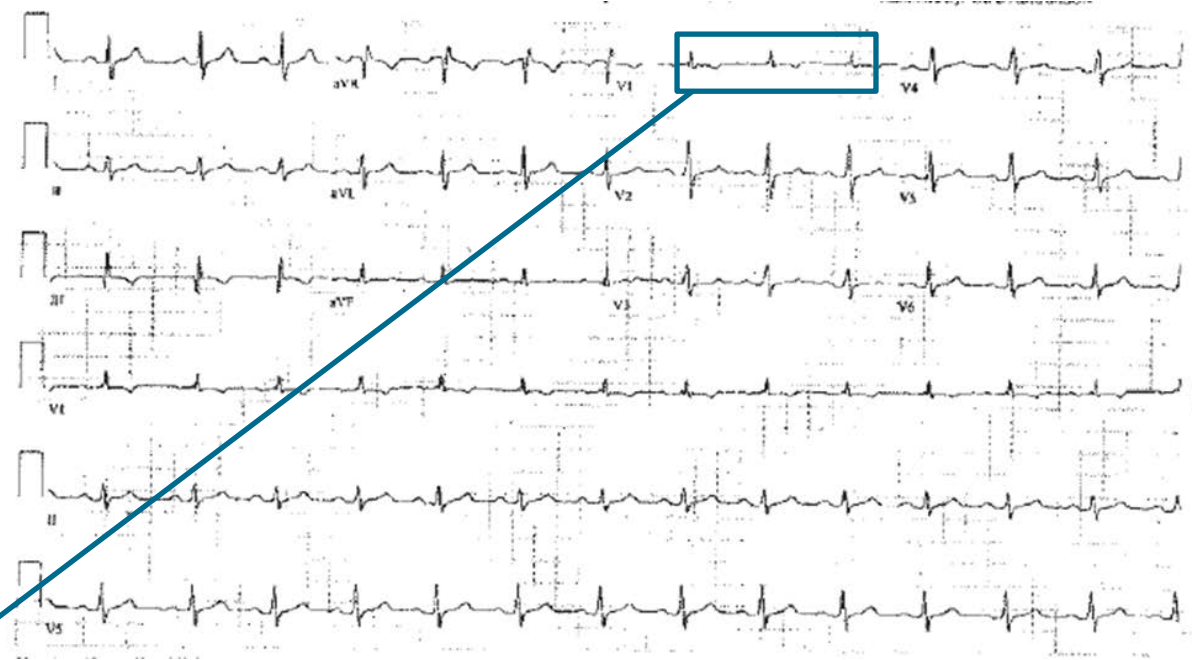


What is the major abnormality on this ECG?

After inspecting for technical issues let's examine the ECG using our usual routine:

Rate; Rhythm; Axis; Intervals; Q waves; Hypertrophy; ST/T waves

Rate	~ 80 BPM
Rhythm	NSR
Axis	Normal
Intervals	Normal
Q waves	Q "equivalent"
Hypertrophy	Maybe
ST/T	Okay



Lead V1 is abnormal, the R wave should not be larger than the S wave. $R > S$ in V1

What causes R>S in lead V1?

Older individuals
With CAD risk factors

Younger individuals
With murmurs or symptoms

Diagnosis	Confirmatory clues*
True posterior myocardial infarct	ST ↓, T ↑ in V1-V2; ±Q waves and ST ↑ V6
Right ventricular hypertrophy	RAD; RAE; secondary ST-Ts;
Ventricular septal hypertrophy	Associated Q waves; LVH
Right bundle branch block	Wide QRS; broad S in V6; R peaks late in V1
Wolff-Parkinson-White syndrome	Short PR; delta wave
Counter clockwise heart rotation	Early transition and tall R in V leads
Normal variant	No other abnormalities
Duchenne Muscular Dystrophy	Muscle weakness

LVH: left ventricular hypertrophy; RAD: right axis deviation; RAE: right atrial enlargement.

The Medical History

The applicant had an Ostium Secundum Atrial Septal Defect (ASD) repaired soon after the first ECG.

Some reported ECG findings associated with right ventricular overload or hypertrophy

R/S ratio in V1 >1

S/R ratio in V5 or V6 >1

Right axis deviation (>+90-+110)

R in V1 >6 mm (or 6 mV)

QR in V1

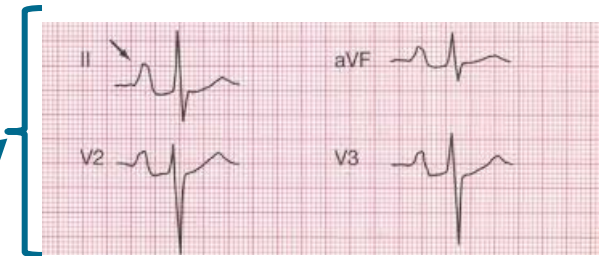
R in V1 + S in V5 or V6 >10.5 mm

Late deflection in V1 (>0.035 sec)

Incomplete right bundle branch block

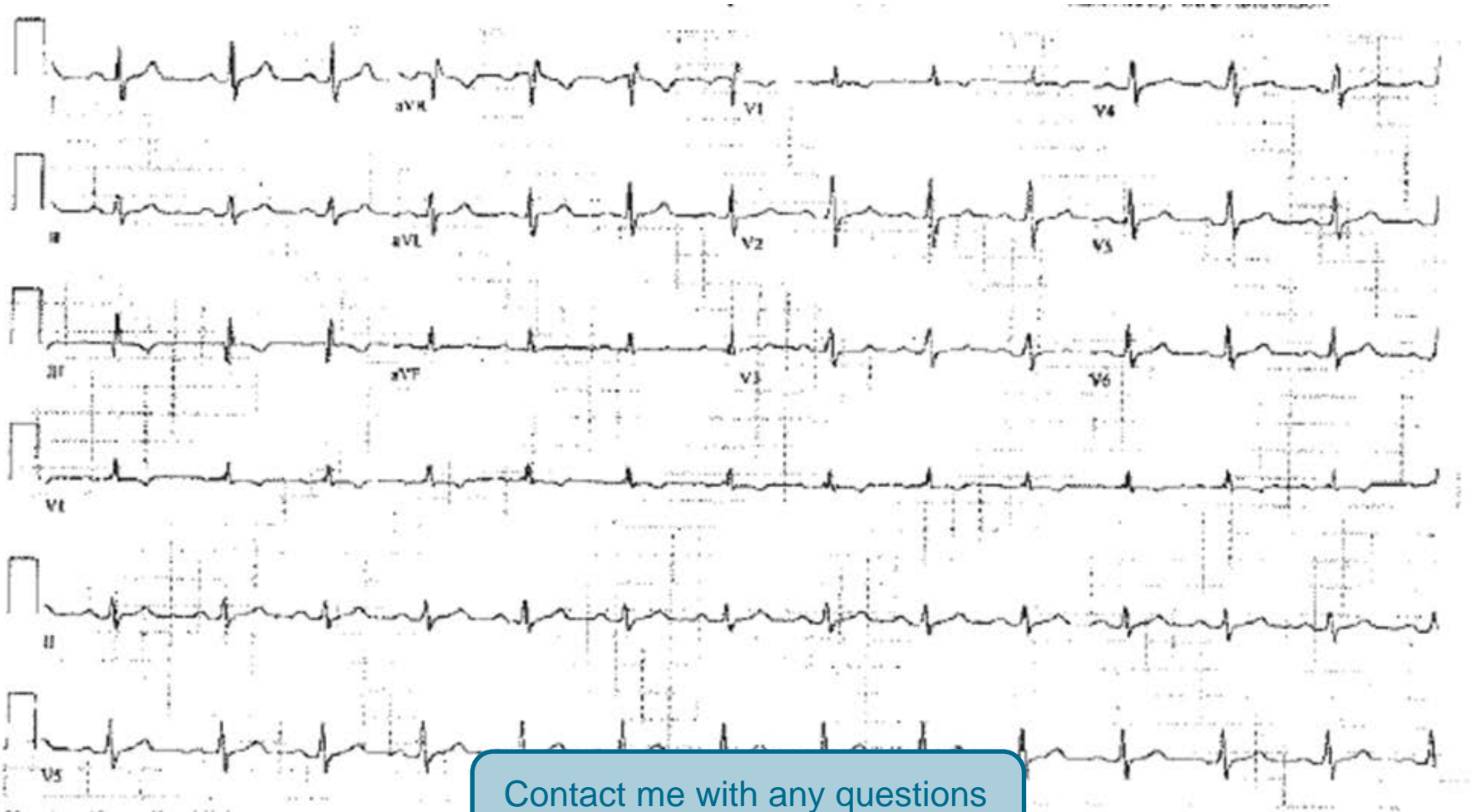
ST-T wave abnormalities ("strain") in inferior leads

Right atrial hypertrophy/overload ("P pulmonale")



We did not have a current ECG, although a recent echocardiogram showed trace leakage through the patch and normal right ventricle size and function.

ECG Puzzler Solved—It is Right Ventricular overload/hypertrophy



Contact me with any questions
rbraun@scor.com