

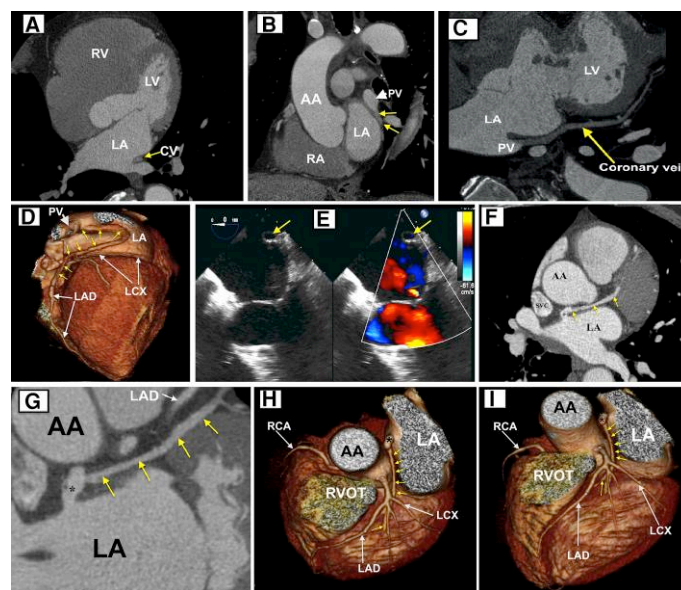
# Anomalous coronary venous drainage into the left atrium

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**Figure 1** Case 1: (A–D) Prospective electrocardiography-triggered computed tomography angiographic images (diastolic cardiac phase of 70%), demonstrating the great coronary vein (CV, arrows) draining into the pulmonary vein (PV, arrowhead) before connecting to the left atrium (LA). (E) Transoesophageal echocardiography image reveals the great coronary vein adjacent to left atrium wall (arrows). Case #2: (G–I) Prospective electrocardiography-triggered computed tomography angiographic images (diastolic phase of 70%) showing the great coronary vein (arrows) running parallel to the left anterior descending (LAD) coronary artery and draining into the left atrium through a left atrium diverticulum (asterisk). AA, ascending aorta; LCXL, left circumflex coronary artery; RA, right atrium; RCA, right coronary artery; RVOT, right ventricular outflow tract.

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Understanding the coronary venous anatomy has gained importance because of procedures such as left ventricular pacing, certain arrhythmia ablation strategies, coronary sinus occlusion for angina control, and local delivery of novel therapeutics. Herein, we report two cases of anomalous coronary venous drainage. The first is that of a 72-year-old male who underwent aortic valve-sparing aortic root replacement in 2012. Computed tomography angiography (CTA) showed an incidental finding of anomalous drainage of the great coronary vein (GCV) to the left upper pulmonary vein which drained into the left atrium (Figure 1A–C). Intraoperative transoesophageal echocardiography also demonstrated the anomalous GCV anatomy (Figure 1D). The second case is that of a 56-year-old male with hypertension who underwent CTA for chest pain. Computed tomography angiography ruled out coronary artery stenosis but incidentally identified anomalous drainage of the GCV to a left atrial diverticulum (Figure 1E and F). Both patients remained asymptomatic at follow-up, with no abnormalities in ventricular size or function, as assessed by echocardiography.

The coronary venous circulation is divided into greater and lesser venous systems, which collectively drain the cardiac venous blood into the coronary sinus and subsequently the right atrium. Coronary venous anomalies are rare, with a reported prevalence of ~0.5%.<sup>1,2</sup> These anomalies include coronary sinus malformations (hyperplasia, absence, or an unroofed coronary sinus) and anomalous drainage of the GCV or other cardiac veins into structures other than the right atrium.<sup>1,2</sup> To our knowledge, GCV drainage to a pulmonary vein has not previously been reported. Of note, the aberrant connections in both cases are not only a cause of right-to-left shunting but could complicate

the insertion of left ventricular pacing leads. As with current findings, most GCV anomalies are asymptomatic and discovered incidentally with cardiac imaging. As such, there may be under-reporting, and the anomalies could be more common than currently considered.<sup>1–3</sup>

The cases reported herein highlight the value of CTA in diagnosing GCV anomalies. Because anomalies such as these are likely to be asymptomatic, routine scrutiny of the cardiac venous anatomy is important. Further studies may clarify whether, once identified, imaging follow-up is warranted.

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## Data availability

No new data were generated or analysed in support of this research.

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