The azygos vein, which has imperfect valves, forms part of the azygos system and varies in origin and level of anastomoses. At or below the level of the renal veins, the azygos vein arises as the union of the right ascending lumbar and subcostal veins or as a direct branch (lumbar azygos). It ascends in the abdomen anterior to the upper lumbar vertebrae and in the posterior mediastinum anterior to the bodies of the twelfth to fourth thoracic vertebrae and their associated anterior longitudinal ligament. It lies anterior to the right posterior intercostal arteries and arches forwards over the right lung root to join the posterior aspect of the superior vena cava. Laterally are the right splanchnic nerve, lung and pleura; medially the thoracic duct and aorta and when it arches forwards the esophagus, trachea and right vagus (X cranial nerve).

The azygos vein receives the fifth to eleventh right posterior intercostal, right superior intercostal, hemiazygos, accessory hemiazygos, esophageal, mediastinal and right bronchial veins. When formed as a lumbar azygos it also receives the common trunk of the right ascending and subcostal veins as its largest tributary.