The vertebral veins are formed in the suboccipital triangle by small tributaries from the internal vertebral venous plexus. The plexus leaves the vertebral foramen (canal) above the posterior arch of C1 (atlas), and together with small veins from adjacent muscles enters the foramen transversarium of C1 to form a plexus around the vertebral artery. It descends through the foramina transversaria of C2 to C6 where it emerges to pass anterior, then antero-lateral to the vertebral artery, behind the internal jugular vein. It continues to descend anterior to the first part of the subclavian artery to drain into the supero-posterior aspect of the brachiocephalic vein.

The vertebral veins receive the anterior vertebral and deep cervical veins and tributaries from the occipital vein, prevertebral muscles and internal and external vertebral venous plexuses. The main vein has a valve at the opening into the brachiocephalic vein.

A small accessory vertebral vein continues from the plexus passing through the foramen transversarium of C7, turning anteriorly between the subclavian artery and cervical pleura to join the brachiocephalic vein.