Hyperparathyroidism can be treated surgically with high success rates. While the majority of patients have four glands, the presence of a supernumerary gland may be encountered as a normal anatomic variant in up to 13% of the population. Supernumerary glands are occasionally involved in primary or secondary hyperparathyroidism. The presence of these glands often complicates management and represents a diagnostic dilemma to the surgeon. We report a case of persistent hyperparathyroidism resulting from an adenomatous supernumerary parathyroid gland located in the mediastinum. An extensive literature review was performed and the authors discuss considerations regarding the challenging management of these glands.