To evaluate the long-term outcome of patients with vestibular schwannoma (VS) and neurofibromatosis type 2 (NF2) treated with fractionated stereotactic radiotherapy (FSRT) or stereotactic radiosurgery (SRS). Sixteen VS in 14 patients with NF2 were treated with FSRT (n = 14) and SRS (n = 2). Patients with tumor progression and/or progression of clinical symptoms were selected for treatment. For patients treated with FSRT a median total dose of 57.6 Gy was prescribed with a median fractionation of 5 × 1.8 Gy per week. For patients who underwent SRS a median single dose of 17 Gy was prescribed to the 80% isodose. FSRT and SRS were well tolerated. Local control rate was 94% for a median follow-up time of 131 months; 2- and 5-year progression-free survival were 100%. The probability of maintaining the pretreatment hearing level was 44%. Useful hearing preservation was 33%. Cranial nerve toxicity was moderate. Trigeminal nerve function worsened in 2 patients (12%) and facial nerve function in 3 patients (19%). One patient developed a new tinnitus. FSRT and SRS are both safe and effective noninvasive and minimally invasive treatment options for patients with VS in the setting of NF2. The long-term local control rates are excellent. Functional hearing preservation is worse in patients with VS and NF2 than in patients with sporadic VS.