We report a case of a suspected secondary central nervous system (CNS) primitive neuroectodermal tumor (PNET) that developed 25 years after radiation therapy for a medulloblastoma of the cerebellum. At 5 years of age, the patient underwent craniotomy and subsequent radiation therapy of the whole brain (39 Gy), whole spinal cord (9 Gy), and posterior fossa (49 Gy) for the treatment of a medulloblastoma of the cerebellum; the patient did not receive chemotherapy. After radiation therapy, the medulloblastoma completely receded and did not recur. Twenty-five years later, at 30 years of age, the patient visited our institution experiencing right-sided hemiparesis and aphasia that had arisen approximately 1 month prior and had gradually worsened. The patient was subsequently hospitalized after experiencing disturbed consciousness and a generalized convolution seizure. Gadolinium-enhanced magnetic resonance imaging (MRI) revealed a mass accompanied by a large cyst in the left frontal lobe. Complete tumor resection was achieved via macroscopic surgery, and the histopathological findings were indicative of CNS PNET. Considering the tumor occurred in the same site where radiation therapy had been previously administered to treat a medulloblastoma, additional radiotherapy was avoided in favor of combination chemotherapy with ifosfamide, cisplatin, and etoposide. Tumor recurrence was not observed in a follow-up MRI after 6 courses of ICE therapy, and the patient has resumed a normal life. The present case, a CNS PNET, is suspected as a secondary brain tumor induced by radiation therapy previously used to treat a medulloblastoma, and it represents a rare late-onset complication of radiation therapy. For the treatment of PNET, we believe that maximal safe surgical resection of the tumor and post-operative radiation therapy are typically necessary for long-term survival. However, taking into account the risks of repeated exposure to radiation, we did not perform post-operative radiation therapy for this patient. We have not observed recurrence to date; however, the patient will require a strict follow-up schedule hereafter.