The patient is a 57-year-old woman who had noted a rapidly enlarging mass on the left side of her neck in 2010.
She underwent a total thyroidectomy and central neck dissection, which revealed a 3.8-cm anaplastic thyroid cancer arising in a background of an oncocytic variant of poorly differentiated thyroid cancer (Fig.1A, and Fig.S1 in Supplementary Appendix 1, available with the full text of this article at NEJM.org).
Resection margins were positive, and 3 of 12 lymph nodes were involved.
At 3 weeks after surgery, the serum thyroglobulin level was 17.2 ng per milliliter, with undetectable thyroglobulin antibodies.
The patient received concurrent radiation therapy and weekly carboplatin and paclitaxel chemotherapy.
The serum thyroglobulin level at 4 weeks after the completion of chemotherapy and radiation therapy was 12.0 ng per milliliter.
Restaging scans obtained 3 months later revealed a new, right-sided hilar mass (Fig.1C), and the patient enrolled in a phase 2 clinical trial of everolimus, which was administered at a dose of 10 mg daily.
Within 6 months, follow-up scans showed that the lesion had greatly diminished in size (from 3.0 by 2.6 cm to 1.1 by 0.8 cm) (Fig.1D).
After 18 months of a sustained response to everolimus, scans revealed progressive disease (Fig.1E).
The patient underwent a mediastinoscopy with removal of an enlarged lymph node, which contained metastatic anaplastic thyroid cancer (Fig.1B, and Fig.S1 in Supplementary Appendix 1).
Whole-exome sequencing was performed on biopsy samples of the pretreatment and resistant tumors as well as on a blood sample.