





**FIGURE 1.** A 65-year-old man was followed since September 2015 in our institution for panhypopituitarism associated with a pituitary mass syndrome suspect of granulomatosis. Biopsy of the pituitary gland concluded to a possible suppurated abscess without sign of acid-alcohol-resistant bacilli. Probabilistic antibiotherapy was administered for 6 weeks. In February 2016, a bitemporal hemianopsia occurred, which was treated by surgical decompression and corticosteroid therapy. Presurgical examination found a plasmacytic infiltrate without malignant cell. Antituberculosis therapy was initiated after another episode of acute bitemporal hemianopsia. As no therapeutic efficacy was noted on brain MRI, further histologic analyses of previous samples were conducted that revealed a tissue infiltration by IgG4-positive plasma cells, with a ratio of IgG4+/IgG+ plasma cells of 40% ( $N < 40\%$ ). Serum IgG4 was up to 2.21 g/L ( $N < 1.35$  g/L). Accordingly, the diagnosis of IgG4-related disease (IgG4-RD) was established based on the comprehensive diagnostic criteria established in 2012.<sup>1</sup> Baseline MRI and <sup>18</sup>F-FDG PET were performed in June 2017. A, Figure displays from left to right T1-weighted Gd-enhanced MRI, <sup>18</sup>F-FDG PET, and PET-MR fusion, showing a 15-mm hypervascular hypermetabolic ( $SUV_{max}$ , 22) pituitary lesion with sellar and suprasellar extension as well as optic chiasm compression. Thoracoabdominal PET did not evidence any extracerebral hypermetabolic focus. Corticosteroid therapy was initiated with doses fluctuating between 20 and 50 mg/kg per day. MRI and <sup>18</sup>F-FDG PET reevaluation was performed in April 2018 (B), showing a global morphologic and metabolic stability of the pituitary lesion (17 mm;  $SUV_{max}$ , 20). Corticosteroid therapy was continued at 1 mg/kg per day, in association with 2 injections of 1 g of rituximab 15 days apart in May 2018. Therapeutic response was assessed on brain MRI and <sup>18</sup>F-FDG PET in July 2018 (C), showing a substantial reduction in the size (11 mm) and enhancement of the lesion on MRI, and complete metabolic response on <sup>18</sup>F-FDG PET ( $SUV_{max}$ , 5). IgG4-RD is a multiorgan immune-mediated condition whose clinical features may mimic malignant, infectious, and inflammatory disorders.<sup>2</sup> IgG4 hypophysitis is a rare but probably underdiagnosed condition.<sup>3</sup> According to a recent consensus, the definite diagnosis should rely on the presence of clinical organ involvement, elevated IgG4 serum level, and plasmacyte and IgG4 plasma cell infiltration with fibrosis on histopathologic sample.<sup>1</sup> Corticosteroid therapy stands as the first-line standard-of-care approach, whereas rituximab may be used as second- or third-line treatment.<sup>4</sup> Recent data tend to demonstrate that <sup>18</sup>F-FDG PET may be a useful imaging modality for the differential diagnosis of IgG4-RD, mapping of involved organs, and biopsy guiding.<sup>5,6</sup> Although imaging procedures to monitor therapy response are still challenging, <sup>18</sup>F-FDG PET may have potential as an effective imaging technique for monitoring response in IgG4-RD,<sup>7-10</sup> and may as well have the ability to identify disease relapse earlier than other imaging techniques.<sup>11</sup> The present case report suggests that iterative <sup>18</sup>F-FDG PET monitoring during therapy may have potential benefit in pituitary IgG4-RD to assess metabolic response and guide therapeutic adjustment.