A 63-year-old woman was admitted with acute aortic dissection (AAD), retrograde type B. Although aggressive blood pressure lowering by medical therapies was performed, hepatic enzymes elevated remarkably on hospital day 2. Computed tomography showed hepatic hypoperfusion in a broad area (A and B, arrows) caused by extension of AAD to the celiac artery (arrowheads). Angiograms showed pulsatile lumen narrowing of the right hepatic artery (C, arrow, Online Video 1) and no development of collateral flow. Intravascular ultrasonography images revealed that false lumen compressed the true lumen between the celiac trunk and right hepatic artery (C, arrowheads, Online Video 2). After implantation of 2 self-expandable stents (7/40 mm and 10/40 mm), angiograms showed improvement of right hepatic artery flow. Intravascular ultrasonography revealed obliterated false lumen by the stents in the true lumen (D, Online Videos 3 and 4). Hepatic failure recovered after endovascular procedures. Endovascular stenting for main branches may be an effective treatment strategy for AAD involving crucial organs.