Endoscopic ultrasound-guided Nd:YAG laser ablation of recurrent pancreatic neuroendocrine tumor: a promising revolution?

Endoscopic ultrasound (EUS) has developed from a diagnostic tool into a therapeutic one [1]. A 46-year-old woman was diagnosed with recurrent pancreatic neuroendocrine tumor (PNET) by positive $^{68}$Ga-[1,4,7,10-tetraazacyclododecane-1,4,7,10-tetraacetic acid]-1-Nal3-octreotide ($^{68}$Ga-DOTA-NOC) positron emission tomography (PET) (Fig. 1a). Two years earlier she had undergone curative distal pancreatectomy for previous PNET in the setting of multiple endocrine neoplasia type I. At computed tomography (CT) scan, the lesion appeared as a 9-mm nodular area with early contrast enhancement on the pancreatic residual body (Fig. 2a). The patient refused total pancreatectomy. Laser ablation under EUS guidance was therefore performed using a neodymium-doped yttrium aluminum garnet (Nd:YAG) laser, at 4.0W for 300 seconds (Fig. 3). No complications occurred during the procedure. At CT immediately after laser ablation, the ablated lesion appeared as a well-defined 35-mm coagulative necrotic area (Fig. 2b). Neither perilesional parenchymal alteration nor vascular damages were observed. The 2-month follow-up CT scan showed the ablated area to be 18 mm (Fig. 4a); at 1 year the area was 9 mm (Fig. 4b), with no metabolic activity on $^{68}$Ga-DOTA-NOC PET (Fig. 1b).

Laser ablation is a minimally invasive method for destroying tumors within solid organs, and works by directing low-power laser light energy into the tissue. It has been used for primary and secondary liver tumors [2–4]. The potential advantage of laser ablation over other laser-in-
duced thermotherapies is the short application time and the well-defined ablation area. Moreover, the use of thinner laser fibers enables insertion into standard EUS-needles and their potential application in deep abdominal organs, such as the pancreas, which are untreatable using the percutaneous approach. To date, our group has demonstrated the efficacy and safety of laser ablation with Nd:YAG in an in vivo animal model [5]. The current case is the first time we have applied this minimally invasive laser treatment to the human pancreas. These results must be further assessed in additional patients affected by PNETS who are not suitable for conventional treatments.

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