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SURGICAL ENDOSCOPY
and Other Interventional Techniques

Neuroendocrine tumors of the pancreas

Benefits of new technologies

We read with interest the recent article by Van Nieuwenhove et al. reporting the benefits of magnetic resonance image (MRI) and laparoscopic ultrasonography (LUS) used to locate and remove neuroendocrine tumors of the pancreas [12]. Both MRI and intraoperative LUS can fail to locate tumor sites in some situations. First, these method can fail when the pancreas presents multiple cystic and nodular lesions. These morphologic changes of the pancreas, which increase with age [5] and in elderly patients, can make accurate location of the tumor difficult.

Second, as stated by the authors, when the diagnosis is confirmed by hormonal measurements, the size of the tumor often is very small, with 30% of gastrinomas smaller than 1 cm and 70 % of insulinomas smaller than 1.5 cm [3]. Owen, cited by the authors, described a 94% rate of identification with MRI [9], but no information concerning the size of the tumors is provided. In fact, the rate varies from 24% to 100 % because of the small series size, the variations in the imaging sequences used, and the histopathologic features of the tumor [4].

Third, another characteristic of these tumors is the high risk of local recurrence and lymph node metastasis. In such circumstances, MRI and LUS may be ineffective because of the postoperative adhesions and modifications [11].

Because most of these tumors present somatostatin receptor on their cellular membranes, somatostatin receptor imaging (SRI) with ^{111}In-DTPA- octreotide has great potential for helping to locate the tumor site, not only preoperatively, but also intraoperatively. The sensitivity of SRI for patients with gastrinomas varies from 60% to 90%. The sensitivity of SRI varied from 80% to 100% in patients with carcinoid, and was about 50% in patients with insulinoma [6].

We reported successful removal of a 6-mm insulinoma with intraoperative gamma probe detection labeled with ^{111}In-DTPA in an elderly patient [10]. Abdominal echography, computed tomography scan and MRI showed multiple nodular lesions in the pancreas. Selective pancreatic arteriography was unsuccessful, and only SRI detected a hotspot in the pancreatic tail. The radiolabeled octreotide was injected 48 h before surgery, and a handheld gamma probe (Navigator GPS, Tyco Health care, Norwalk, CT, USA) was used to detect the tumor. Laparoscopic ultrasonography failed to discriminate the insulinoma from other nodular lesions. We performed this operation by laparotomy because we had a rigid probe 1.5 cm in diameter that usually was used for detection of sentinel lymph nodes in breast cancer. It was impossible to introduce the probe by a laparoscopic port and scan all the pancreas. But theoretically, a probe for laparoscopic surgery could have allowed performance of the operative procedure by laparoscopic approach [2].

Finally, the authors reported the use of selective arterial stimulation and hepatic venous sampling (ASVS) in the management of insulinoma. More recently, some authors have evaluated this technique intraoperatively, showing benefits for locating occult insulinoma and confirming complete resection [1]. Before and after tumor resection, calcium stimulation through the selective artery according to the results of the preoperative ASVS and portal venous sampling are performed. Insulin secretion in response to calcium stimulation must disappear after resection of the tumor. Although ASVS seems to be the most accurate procedure for identifying insulinoma, no study has reported this technique by a laparoscopic approach.

In conclusion, the precise pre- and intraoperative location of neuroendocrine tumor is essential for successful surgical treatment, and the combination of all noninvasive and invasive methods, without exception, must be used to obtain the best management.

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