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Martha A. Zeiger

Surgical Management of MEN-1 and -2: State of the Art **1047**

Göran Åkerström and Peter Stålberg

Multiple endocrine neoplasia syndrome type 1 (MEN-1) consists of endocrine tumors of the parathyroid, the endocrine pancreas-duodenum, and the pituitary. Surveillance and screening for the endocrinopathies is recommended in gene carriers. Surgery for MEN-1-related hyperparathyroidism is generally performed as radical subtotal parathyroidectomy, because less surgery is likely to result in persistent or recurrent disease. Multiple endocrine neoplasia syndrome type 2 (MEN-2) consists of medullary thyroid carcinoma, pheochromocytoma, and hyperparathyroidism. Prophylactic thyroidectomy based on DNA testing in the MEN-2 syndrome is considered one of the greater achievements in cancer treatment, because it may be performed before thyroid carcinoma development and provides cure for the patient.

Surgical Management of Non-Multiple Endocrine Neoplasia Endocrinopathies: State-of-the-Art Review **1069**

Christine S. Landry, Steven G. Waguespack, and Nancy D. Perrier

The development of genetic testing has given patients with familial endocrine diseases the opportunity to be identified earlier in life. The importance of this technological advancement cannot be underestimated, as some of these heritable diseases have significant potential for malignancy. This article focuses on the identification and surgical management of familial endocrinopathies of the thyroid, parathyroid, adrenal glands, and pancreas. Familial endocrinopathies discussed include hereditary nonmedullary carcinoma of the thyroid, Cowden disease, familial adenomatous polyposis, Carney complex, Werner syndrome, familial medullary thyroid carcinoma, Pendred syndrome, hereditary hyperparathyroidism jaw-tumor syndrome, familial isolated hyperparathyroidism, Beckwith-Wiedemann syndrome, Li-Fraumeni syndrome, neurofibromatosis I, von Hippel-Lindau disease, and tuberous sclerosis.

Surgical Management of Zollinger-Ellison Syndrome; State of the Art

1091

Ellen H. Morrow and Jeffrey A. Norton

Much has been learned about the diagnosis and treatment of Zollinger-Ellison Syndrome (ZES), and certain questions require further investigation. Delay in diagnosis of ZES is still a significant problem, and clinical suspicion should be elevated. The single best imaging modality for localization and staging of ZES is somatostatin receptor scintigraphy. Goals of surgical treatment for ZES differ between sporadic and MEN-1-related cases. All sporadic cases of ZES should be surgically explored (including duodenotomy) even with negative imaging results, because of the high likelihood of finding and removing a tumor for potential cure. Surgery for MEN-1-related cases should be focused on prevention of metastatic disease, with surgery being recommended when pancreatic tumors are greater than 2 cm. The role of Whipple procedure, especially for MEN-1 cases, should be explored further. Laparoscopic and endoscopic treatments are more experimental, but may have a role.

Insulinoma

1105

Aarti Mathur, Philip Gorden, and Steven K. Libutti

Insulinoma is a rare neuroendocrine tumor with an incidence of 4 per 1 million persons per year, which may occur as a unifocal sporadic event in patients without an inherited syndrome or as a part of multiple endocrine neoplasia type 1. Key neuroglycopenic and hypoglycemic symptoms in conjunction with biochemical proof establish the diagnosis. Once the diagnosis is established, the insulinoma is preoperatively localized within the pancreas with the goal of surgical excision for cure. This review discusses the historical background, diagnosis, and management of sporadic insulinoma.

Carcinoid Tumors

1123

Janice L. Pasiaka

Carcinoid tumors, which arise from the enterochromaffin cells of the gastrointestinal tract, encompass a diverse group of neoplasms. Once thought to be “carcinoma-like,” these neoplasms exhibit a biologic behavior that varies from an indolent, benign course to an aggressive, rapidly progressive, and deadly disease. Today the term carcinoid is reserved for neuroendocrine tumors arising from the small bowel or neuroendocrine tumors that can cause carcinoid syndrome. This newer terminology has yet to be universally adopted, adding to the confusion in the literature. For the general surgeon there are several “carcinoid” tumors that he or she must be familiar with because many of these lesions are encountered during emergency laparotomies or incidentally discovered during investigation for vague abdominal pain. This review focuses on the gastrointestinal neuroendocrine tumors that general surgeons are likely to encounter during their career.

Molecular Markers in Thyroid Cancer Diagnostics

1139

Meredith Kato and Thomas J. Fahey III

Although fine-needle aspiration biopsy (FNA) remains the mainstay of the preoperative workup of thyroid nodules, it does not provide a diagnosis in up to 20% of nodules. This group of indeterminate lesions, including lesions with cellular atypia, suspicious cytology, and demonstrating a follicular pattern, provides one of the greatest challenges to researchers in thyroid cancer today. Over the last 2 decades, considerable work has been done to find molecular markers to resolve this diagnostic dilemma. This article explores some of the markers including galectin-3, HBME-1, BRAF, RET/PTC, PAX8-PPAR γ , hTERT, telomerase, miRNA, and microarray and multigene assays. Although no one marker has proven to be a panacea, several combinations of markers have shown great promise as an adjunct to FNA.

Recurrent Laryngeal Nerve Monitoring: State of the Art and Ethical and Legal Issues

1157

Peter Angelos

Despite many advances in surgical techniques during the last several decades, the risk for recurrent laryngeal nerve (RLN) injury during thyroid and parathyroid surgery has only declined, not disappeared. RLN monitoring is an attempt to reduce the risk of nerve injury during thyroid and parathyroid surgery. In this article, the author discusses how to use RLN monitoring, its effectiveness, and the options available. He also highlights potential legal and ethical issues that surround the use of this method.

Surgical Management of Well-Differentiated Thyroid Cancer: State of the Art

1171

James Suliburk and Leigh Delbridge

Nonmedullary well-differentiated thyroid cancer (WDTC) comprises a group of tumors including papillary thyroid carcinoma (PTC) and follicular thyroid carcinoma (FTC), with Hürthle cell carcinoma being a subtype of follicular carcinoma. This article reviews the epidemiology, pathogenesis, preoperative and diagnostic evaluation, imaging, and staging of WDTC. Different approaches to therapy and follow-up care are discussed. The prognosis for WDTC remains good and most patients can expect to be cured of their disease.

Sporadic and Familial Medullary Thyroid Carcinoma: State of the Art

1193

Tricia A. Moo-Young, Amber L. Traugott, and Jeffrey F. Moley

Medullary thyroid cancer (MTC) accounts for 5% to 10% of all thyroid cancers. The high frequency of familial cases mandates screening and genetic testing. The aggressiveness and age of onset of familial MTC differs depending on the specific genetic mutation, and this should determine the timing and extent of surgery. Sporadic MTC can present at any age, and

it is usually associated with a palpable mass and the presence of nodal metastases. Surgery is standard treatment for any patient presenting with resectable MTC. Further studies are needed to investigate the role of radiation therapy in the palliation and local control of postresection and advanced-stage MTC. New systemic therapies for metastatic disease are being investigated. Targeted molecular therapies, based on knowledge of the pathways affected by RET mutations, are being tested in multiple clinical trials.

Surgical Management of Primary Hyperparathyroidism: State of the Art

1205

John I. Lew and Carmen C. Solorzano

This article reviews the current state of the art regarding therapy for primary hyperparathyroidism. Clinical evaluation and indications for parathyroidectomy are described, followed by a review of surgical techniques currently being practiced and possible outcomes involved. Focused parathyroidectomy has become a successful alternative to conventional bilateral cervical exploration.

Secondary and Tertiary Hyperparathyroidism, State of the Art Surgical Management

1227

Susan C. Pitt, Rebecca S. Sippel, and Herbert Chen

This article reviews the current surgical management of patients with secondary and tertiary hyperparathyroidism. The focus is on innovative surgical strategies that have improved the care of these patients over the past 10 to 15 years. Modalities such as intraoperative parathyroid hormone monitoring and radioguided probe utilization are discussed.

Aldosteronomas—State of the Art

1241

Travis J. McKenzie, Joseph B. Lillegard, William F. Young, Jr, and Geoffrey B. Thompson

Primary aldosteronism (PA) is the most common cause of secondary hypertension in nonsmokers. Widespread screening of unselected hypertensives has identified PA in as many as 15% of patients. With such screening efforts using the PAC/PRA ratio and PAC, the widespread prevalence of the disease has become apparent while the relative percentage of APA has decreased. PA is confirmed by demonstrating lack of aldosterone suppressibility with sodium loading. Subtype evaluation is best achieved with high resolution CT scanning and AVS in the appropriate setting. In patients with PA and a unilateral source of aldosterone excess, laparoscopic adrenalectomy is the treatment of choice with excellent outcomes and low morbidity as compared with older open approaches. Patients with IHA, or those not amenable or agreeable to surgery, are best managed with a MR antagonist.

Adrenocortical Cancer	1255
Melissa Wandoloski, Kimberly J. Bussey, and Michael J. Demeure	
Adrenocortical carcinoma (ACC) is a rare endocrine malignancy causing up to 0.2% of all cancer deaths. This article reviews the incidence, presentation, and pathology of ACC. Particular attention is paid to the molecular oncogenesis of this disease, and the surgical and therapeutic options available for its cure.	
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