Center for Thyroid, Parathyroid and Adrenal Disease
at Jersey Shore University Medical Center
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For questions or patient referrals, please contact Meridian Surgical Associates at 732.776.4770 or fax 732.776.3763.
About Jersey Shore University Medical Center

From modest beginnings as a convalescent home in 1904 to its current status as the region's only university-level teaching hospital, Jersey Shore University Medical Center has led the way in providing quality patient care for over 100 years. Located in Neptune, New Jersey, the university medical center continues to grow to meet the needs of the community, demonstrated by the completion of its landmark expansion in 2009. Jersey Shore provides the highest level of services and programs in a patient-focused healing environment. With over 900 physicians and dental staff in 60 specialty areas, Jersey Shore physicians are at the forefront of leading-edge technology applications and clinical research, and provide exceptional personal care and attention.

- The region's leading state-designated Surgery provider
- The region's only Level II Trauma Center
- The region's only university-level academic medical center
- The region's Stoke Rescue Center
- The region's only Center for Treatment of Paralysis and Reconstructive Nerve Surgery
- The region's first state-designated Children's Hospital
- The region's first system to achieve Magnet Designation for Nursing Excellence, which has been maintained for more than 10 years

A Member of the Meridian Health Family

Jersey Shore University Medical Center is a proud member of the Meridian Health family, which also includes K. Hovnanian Children’s Hospital in Neptune, Ocean Medical Center in Brick, Riverview Medical Center in Red Bank, Southern Ocean Medical Center in Manahawkin, Bayshore Community Hospital in Holmdel, and the Meridian Partner Companies which includes home care agencies, long-term care, ambulatory care and surgery centers, ambulance services, and occupational health services located throughout Monmouth and Ocean counties.

With 12,000 dedicated team members, more than 2,400 volunteers, and affiliations with over 2,000 of the region's finest physicians. Meridian Health is one of New Jersey’s leading health care providers.

Meridian has been named for four straight years as one of FORTUNE's “100 Best Companies to Work For” and one of the top 100 Most Wired Health Systems in the United States. The hospitals of Meridian Health are the first in the region to have received the prestigious Magnet Award for Nursing Excellence four times.
About the Center for Thyroid, Parathyroid and Adrenal Disease

Through the collaboration of multiple specialists, the Center for Thyroid, Parathyroid and Adrenal Disease at Jersey Shore University Medical Center offers a unique multi-disciplinary approach to provide high quality care across the range of diseases of the thyroid gland, parathyroid glands and adrenal glands. Our program is one of the few in the state with a dedicated endocrine surgeon, who offers expertise in minimally invasive surgical techniques in addition to medical management and advanced surgical procedures.

Thyroid conditions remain under-diagnosed in the community and we believe it is critical for our team to work together with primary care physicians and obstetricians/gynecologists to provide the very best care to patients. Along with the endocrine surgeon and endocrinologists, our team consists of radiologists, pathologists, oncologists, genetic counselors and speech therapists to offer comprehensive medical and surgical treatment options for patients.

In addition, our program conducts several clinical trials and holds monthly thyroid cancer support groups and seminars throughout the year.

Conditions We Treat

**Thyroid**
- Thyroid Nodules and multinodular goiter
- Thyroid cancer, such as papillary thyroid carcinoma, follicular thyroid carcinoma, Hurthle cell carcinoma, and medullary thyroid carcinoma
- Hyperthyroidism and Graves' Disease

**Parathyroid**
- Primary hyperparathyroidism
- Secondary and Tertiary hyperparathyroidism (renal)
- Parathyroid carcinoma

**Adrenal Glands**
- Adrenal tumors (incidentalomas)
- Functional (overactive) adrenal tumors, such as Cushing's syndrome, Conn's syndrome (primary hyperaldosteronism or aldosteronism), pheochromocytoma, and virilizing adrenal tumors (sex-hormone producing adrenal gland tumors)
- Adrenocortical carcinoma

**Familial Endocrine Syndromes**
- Multiple Endocrine Neoplasia (MEN) type 1 (MEN 1) syndrome, type 2A and 2B (MEN 2A and MEN 2B) syndromes, familial medullary thyroid carcinoma (FMTC) syndrome, and others
- Laparoscopic adrenalectomy: anterior transperitoneal and posterior retroperitoneoscopic
- Open adrenalectomy
- Thyroid and neck ultrasound
- Parathyroid ultrasound
Ultrasound guided fine needle aspiration thyroid biopsy. This is performed with on-site adequacy assessment by cytologist and with option to perform genetic tests such as Afirma (Veracyte) Gene Classifier test and molecular mutation (markers) assessment by miRInform Thyroid Test (Asuragen)

Treatment Options

Surgical Expertise

- Thyroid and parathyroid surgeries under local and general anesthesia
- Minimally invasive thyroid and parathyroid surgeries
- Video-assisted endoscopic parathyroidectomy and thyroidectomy
- Same day (outpatient) thyroid and parathyroid surgeries
- Sutureless surgery
- Intraoperative PTH monitoring
- Intraoperative recurrent laryngeal nerve monitoring
- Intraoperative external branch of the superior laryngeal nerve monitoring
- Modified radical neck dissection and radical neck dissection
- Laparoscopic transabdominal lateral adrenalectomy
- Laparoscopic posterior retroperitoneal adrenalectomy
- Open adrenalectomy
- Thyroid ultrasound
- Ultrasound guided FNA biopsy of thyroid nodules

Minimally Invasive Video-Assisted Endoscopic Parathyroidectomy

In comparison to traditional methods, the video-assisted endoscopic parathyroidectomy procedure at Jersey Shore University Medical Center provides patients with a minimally invasive approach to treat hyperparathyroidism.

Prior to surgery, a nuclear radiologist has the ability to detect parathyroid adenomas in about 85-90% of patients, using the latest Sestamibi SPECT/CT scan. In addition, an endocrine surgeon performs an ultrasound in order to localize the adenoma. When an adenoma is localized, the surgical procedure will be completed in approximately 15-20 minutes.

During surgery, the surgeon places an incision on a patient's natural skin crease while using video assistance for magnification to remove the adenoma. Following its removal, intra-operative Parathyroid Hormone (PTH) monitoring is utilized to determine appropriate treatment.
Key Patient Benefits

- Significant reduction in pain resulting in increased satisfaction with procedure
- Same day procedure with only a 3 hour observation period following surgery
- Faster recovery as patients have ability to return to regular routine within 1-2 days after surgery
- Minimized visibility of the scar – no drains or stitches necessary (only skin glue)

Laparoscopic Adrenalectomy: The Posterior Retroperitoneoscopic Approach

The posterior retroperitoneal approach (from the back) allows for performing truly minimally-invasive laparoscopic surgery to remove adrenal gland tumors in comparison to the laparoscopic trans-abdominal approach from the front. By approaching from the back, it eliminates the need to mobilize the liver, spleen, and/or tail of the pancreas, making the surgical approach much easier for the patient.

Key Patient Benefits

- Significant reduction in pain resulting in increased satisfaction with procedure
- Faster recovery as patients have ability to return to regular routine within hours after surgery
- Minimized visibility of the scar

Meet Our Team

Alexander L. Shifrin, M.D., FACS, FACE, ECNU
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Thyroid Cancer Support Group Facilitator
Thyroid Cancer Survivor

Joan Hallman, B.S.N., RN-BC, O.C.N.
Oncology Nurse Navigator
Thyroid Cancer Support Group Facilitator

Angel Fay, M.S., CGC
Cancer Genetic Coordinator
Thyroid Cancer Support Group

Presented by the Departments of Surgery and Medicine at Jersey Shore University Medical Center, in partnership with ThyCa: Thyroid Cancer Survivors’ Association, Inc., an international nonprofit organization for thyroid cancer patients, survivors and families.

First Monday of each month
6:00 p.m. to 7:30 p.m.
Jersey Shore University Medical Center
Medical Staff Board Room, Brennan Pavilion

Group Facilitators:
Donald Winters, R.Ph, MPA
Thyroid Cancer Survivor
Joan Hallman, R.N.
Oncology Nurse Navigator

Physician Sponsors:
Alexander Shifrin, M.D.,
Endocrine Surgeon
Sunil Asnani, M.D.,
Endocrinologist
Danielle Lann, M.D.,
Endocrinologist

For more information, please call 1-800-560-9990.
Endocrine Clinical Studies

Medical breakthroughs are made possible through clinical research. With the combination of our surgeons’ expertise and the Center’s state-of-the-art facilities, they are able to conduct various clinical trials, bringing them closer to discovering the next groundbreaking treatment option. Because of their heavy involvement in clinical research, they are able to provide patients with the best possible care.

1. **TITLE:** “A Pilot Study of Genetic Evaluation of Families with Endocrine Cancers in MEN1 syndrome” collaboration with CINJ (Functional Genomics Core, Cancer Informatics Core) and the Princeton Sequencing Core. The aim of this study is to identify modifying genetic factors that exist and that may influence phenotypic presentation of the disease in 3 unrelated MEN 1 families with different clinical presentation of the disease. ClinicalTrials.gov Protocol, Record IIU03-07. Principal Investigator: Alexander Shifrin

2. **TITLE:** Phase III Trial of E7080 in 131I-Refractory Differentiated Thyroid Cancer. A Multicenter, Randomized, Double-Blind, Placebo-Controlled, Phase 3 Trial of Lenvatinib (E7080) in 131I-Refractory Differentiated Thyroid Cancer. Sponsor: Eisai Inc. This is a multicenter, randomized, double-blind, Placebo-controlled Phase 3 study to compare the PFS of subjects with 131I-refractory DTC and radiographic evidence of disease progression within the prior 12 months, treated with E7080 (Lenvatinib) 24 mg by continuous once daily (QD) oral dosing versus Placebo. ClinicalTrials.gov Identifier: NCT01321554. Principal Investigator: Alexander Shifrin

3. **TITLE:** “Retrospective Study of the Expression of the Tyrosine Kinase Receptor C-Kit, Proliferation Antigen Ki-67, and Tumor Suppressor P53 in Differentiated Types of Thyroid Cancer” Principal Investigator: Alexander Shifrin, MD. Sub-Investigators: Theodore Matulewicz, MD, Arthur Topilow, MD, Department: Surgery, Oncology, Pathology, JSUMC.

4. **TITLE:** “Preoperative ultrasonography in primary hyperparathyroidism is more accurate and valuable when performed by an endocrine surgeon.” Principal Investigator: Alexander Shifrin, MD, Sub-Investigators: Sunil Asnani, MD, Jerome Vernick, MD. Department: Surgery and Endocrinology, JSUMC.

5. **TITLE:** “Comparison of local and general anesthesia for thyroid surgery” Principal Investigator: A Shifrin. Department of Surgery and Anesthesiology, JSUMC

6. **TITLE:** “Molecular Profiling of Indeterminate Thyroid Nodule Fine Needle Aspirates to Determine patterns predictive of Benign or Malignant Disease” Sponsored by Veracyte, Inc 7000 Shoreline Court, Ste 250, South San Francisco, CA 9480. PI’s: JSUMC Site, Erik Alexander, MD and Bryan Haugen, MD
7. **TITLE:** “Role of RET proto-oncogene mutation in the development of simultaneous medullary and papillary thyroid carcinomas in 107 members of the family with the RET V804M proto-oncogene mutation”. Principal Investigator: A. Shifrin.

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**Medical Abstracts**

**Innate Immune Responses to Adenoviral Vector-Mediated Acute Pancreatitis**

Alexander L. Shifrin, MD,* Narendra Chirmule, PhD,† Guang-Ping Gao, PhD,‡, James M. Wilson, MD, PhD,‡ and Steven E. Raper, MD*§

**Objectives:**
The role of innate immunity in the development of acute viral pancreatitis is not well understood. The aim of the study was to characterize the role of the innate immune system, especially macrophages, natural killer (NK), and NK T (NKT) cells, in the generation of immune responses to intrapancreatic delivery of recombinant adenoviral vector.

**Methods:**
Adenoviral vectors expressing β-galactosidase or green fluorescent protein genes with viral capsid conjugated covalently with carbocyanine dye were directly injected into the pancreas of C57Bl/6 mice.

**Results:**
Fluorescent microscopy of the pancreas showed that 30 minutes after vector administration, adenoviral particles localized to cell membranes, internalized, and localized to the nucleus by 4 hours, and transgene expression began at 24 hours. Immunohistochemical staining showed macrophages entering the pancreas shortly after vector administration, with maximal infiltration at day 4, and then disappearing as antigen-expressing cells were eliminated. Intrapancreatic macrophages appeared to deliver viral capsid proteins to the spleen. Flow cytometry showed that NK and NKT cells migrate to the pancreas and persist. Serum cytokines IL-6, IL-10, and IL-12 were all elevated.

**Conclusion:**
Macrophages and NK and NKT cells play a major role in the development of acute adenovirus-mediated pancreatitis.

**Key Words:**
rodent, adenoviral vector, macrophages, natural killer cells, natural killer T lymphocytes, interleukin-6, interleukin-10, interleukin-12
Macrophage ablation attenuates adenoviral vector–induced pancreatitis
Alexander L. Shifrin, MD, Narendra Chirmule, PhD, Yi Zhang, PhD, and Steven E. Raper, MD, a,d Philadelphia and Wayne, Pa

Background:
The objective of these studies is to determine the effects of macrophage ablation on the course of acute viral pancreatitis. Macrophages secrete proinflammatory cytokines triggering local pancreatic and systemic inflammation in the acute phase of virus-induced pancreatitis. We hypothesized that ablation of macrophages should attenuate the host inflammatory response in a mouse model of adenovirus-induced pancreatitis.

Methods:
Liposome-encapsulated dichloromethylene-diphosphonate, a macrophage-depleting agent, was used before direct pancreatic injection of a recombinant adenovirus expressing a marker gene in C57Bl/6 and IL-6 knockout (KO) mice.

Results:
C57Bl/6 mice depleted of macrophages had diminished pancreatic inflammation in the first 24 hours after vector administration. IL-6 KO mice depleted of macrophages had more severe inflammation than similarly treated C57Bl/6 mice. C57Bl/6 mice depleted of macrophages, and IL-6 KO mice had prolonged transgene expression and diminished cytotoxic T lymphocyte responses to adenoviral vector. Mortality was highest in IL-6 KO mice depleted of macrophages. Depletion of macrophages also prevented detectable serum IL-6, IL-10, or IL-12 levels in C57Bl/6 mice.

Conclusions:
The data suggest that macrophages play a role in the acute inflammatory response to viral vector–induced pancreatitis and that IL-6 may be protective. Understanding of the mechanisms that initiate the host immune cascade will allow more effective use of adenoviral vector–based pancreatic gene delivery. (Surgery 2005;137:545-51.)

From the Department of Surgery, University of Pennsylvania School of Medicine, Philadelphia, Merck Research Laboratories, Wayne, Department of Medicine, University of Pennsylvania School of Medicine, Philadelphia, and Philadelphia Veteran's Affairs Medical Center

Tumoricidal activity of high-dose tumor necrosis factor-α is mediated by macrophage-derived nitric oxide burst and permanent blood flow shutdown
Chandrakala Menon*, Todd W. Bauer, Scott T. Kelley, Dan J. Raz, Joshua I. Bleier, Krina Patel, Kirsten Steele, Indira Prabakaran, Alexander Shifrin, Donald G. Buerk, Chandra M. Sehgal and Douglas L. Fraker

Department of Surgery, University of Pennsylvania, Philadelphia, PA; Department of Physiology, University of Pennsylvania, Philadelphia, PA; Department of Radiology, University of Pennsylvania, Philadelphia, PA

This study investigates the role of tumor nitric oxide (NO) and vascular regulation in tumor ulceration following high-dose tumor necrosis factor-α (TNF) treatment. Using TNF-responsive (MethA) and nonresponsive (LL2) mouse tumors, tumor NO concentration was measured with an electrochemical sensor and tumor blood flow by Doppler ultrasound. Mice were also pretreated with a selective inducible nitric oxide synthase (iNOS) inhibitor, 1400 W. Tumors harvested from TNF-treated mice were cryosectioned and immunostained for murine macrophages, or/and iNOS. MethA tumor-bearing mice were depleted of macrophages. Pre- and post-TNF tumor NO levels were measured continuously, and mice were followed for gross tumor response. In MethA tumors, TNF caused a 96%
response rate, and tumor NO concentration doubled. Tumor blood flow decreased to 3% of baseline by 4 hr and was sustained at 24 hr and 10 days post-TNF. Selective NO inhibition with 1400 W blocked NO rise and decreased response rate to 38%. MethA tumors showed tumor infiltration by macrophages post-TNF and the pattern of macrophage immunostaining overlapped with iNOS immunostaining. Depletion of macrophages inhibited tumor NO increase and response to TNF. LL2 tumors had a 0% response rate to TNF and exhibited no change in NO concentration. Blood flow decreased to 2% of baseline by 4 hr, recovered to 56% by 24 hr and increased to 232% by 10 days. LL2 tumors showed no infiltration by macrophages post-TNF. We conclude that TNF causes tumor infiltrating, macrophage-derived iNOS-mediated tumor NO rise and sustained tumor blood flow shutdown, resulting in tumor ulceration in the responsive tumor.

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Keywords:
high-dose TNF; nitric oxide; blood flow; macrophage; tumor

Rapid intraoperative insulin assay: a novel method to differentiate insulinoma from nesidioblastos is in the pediatric patient
Vivian E Strong*, Alexander Shifrin and William B Inabnet

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Introduction:
Hyperinsulinism is the most common cause of recurrent and persistent hypoglycemia in infancy and childhood. Causes can include nesidioblastosis, pancreatic islet cell tumors such as insulinoma, and associations with multiple endocrine neoplasia syndromes. Although new, improved imaging techniques have allowed for more precise preoperative localization of insulinomas, the differentiation of nesidioblastosis and insulinoma, particularly in children, can be challenging. To improve intraoperative localization and confirmation of successful resection of insulinoma, a novel hormonal assay, the rapid intraoperative insulin assay, is reported for the first time in a pediatric patient. This intraoperative radioimmunoassay for insulin yields results within several minutes and confirms complete resection of insulinoma.
Case description:
We present a case of pancreatic insulinoma in a child with symptoms of severe hypoglycemia, causing seizures. The insulinoma was enucleated laparoscopically, and rapid intraoperative insulin assay used to determine the success of the procedure.

Discussion and evaluation:
This rapid intra-operative test provides a valuable adjunct for determining complete excision in complicated cases of recurrent or questionable insulinoma. Although not a common problem, for pediatric patients in whom the diagnosis is not clear, this test may provide a novel approach to confirming disease.

Conclusion:
We propose the use of this assay in facilitating intra-operative resection and confirmation of complete excision in pediatric patients. This population may especially benefit from this novel assay to confirm complete resection and to differentiate multiple etiologies of hyperinsulinism.

Safety of Same Day Discharge in Patients Undergoing Sutureless Thyroidectomy: A Comparison of Local and General Anesthesia
William B. Inabnet, M.D., Alexander Shifrin, M.D., Leaque Ahmed, M.D., and Prashant Sinha, M.D.

Background:
The thyroid gland is one of the most vascular organs in the body and surgical resection mandates meticulous surgical technique and hemostasis. The aim of this study was to assess the safety and efficacy of the electrothermal bipolar vessel sealing system in permitting ambulatory thyroid surgery under local anesthesia.

Methods:
From January 1, 2004, to December 31, 2005, 224 consecutive patients underwent thyroid surgery using the LigaSure for hemostasis. Whenever possible, local/regional anesthesia with conscious sedation was utilized during the procedure. A descriptive analysis was performed to evaluate patient characteristics and outcome measures.

Results:
Eighty-two percent (n=184) of all unselected patients presenting for thyroid surgery had their procedure performed under local/ regional anesthesia with conscious sedation whereas 18% (n=40) received general anesthesia. When comparing these two groups, the local anesthesia patients were more likely to be female (85% vs. 68%, p ≤ 0.05) and younger (mean age=50 vs. 61 years, p≤0.05). Forty percent of the local anesthesia patients underwent a total thyroidectomy compared to 58% in the general anesthesia group (p≤0.05). The mean duration of surgery was shorter in the local anesthesia patients (71 minutes vs. 101 minutes, p≤0.05) and the mean gland weight was also less (26.9 g vs. 63.9g, p≤0.05). There was one hematoma in the local anesthesia group, but overall the morbidity was not different. Eighty-eight percent of the local anesthesia patients were discharged same day of surgery compared to 45% of the general anesthesia patients.

Conclusions:
The electrothermal bipolar vessel sealing system permits safe, same day discharge in patients undergoing thyroid surgery with a low complication rate irrespective of the type of anesthesia.
One hundred and seven family members with the rearranged during transfection V804M proto-oncogene mutation presenting with simultaneous medullary and papillary thyroid carcinomas, rare primary hyperparathyroidism, and no pheochromocytomas: Is this a new syndrome—MEN 2C?

Alexander L. Shifrin, MD, FACS, Cristina Xenachis, MD, Angela Fay, MS, CGC, Theodore J. Matulewicz, MD, Yen-Hong Kuo, ScM, MS, and Jerome J. Vernick, MD, FACS, Neptune and Matawan, NJ

Background:
The rearranged during transfection (RET) V804M proto-oncogene mutation is rare and associated with medullary thyroid carcinoma (MTC). We present 40 members from a total cohort of 107 family members with this mutation.

Methods:
Family members were tested for RET mutations, calcitonin levels, and screened for pheochromocytoma and primary hyperparathyroidism (PHPT). Thyroidectomies were performed on 15 members. Surgery and pathology reports were obtained and reviewed. A pedigree was constructed.

Results:
A high penetrance was found for MTC and simultaneous papillary thyroid carcinoma (PTC; 40%). The incidence of PHPT was low (13%). There were no findings of pheochromocytoma. The course in the first family generation was indolent, with late onset of MTC. The second generation experienced earlier disease development; onset occurred earliest in the third generation. The second generation experienced a higher incidence of PTC than the first.

Conclusion:
This is the largest family with this mutation reported to date. However, it does not fit the classic familial MTC or MEN2A cancer syndrome. Considering that PTC is not an incidental finding, but the result of an inherited RETV804M mutation, we propose to identify this phenotypic expression as a unique syndrome consistent with manifestations of MTC, PHPT, and PTC. (Surgery 2009;146:998-1005.)
Single nucleotide polymorphisms act as modifiers and correlate with the development of medullary and simultaneous medullary/papillary thyroid carcinomas in 2 large, non-related families with the RET V804M proto-oncogene mutation

Alexander L. Shifrin, MD, FACS, Jennifer B. Ogilvie, MD, FACS, Michael T. Stang, MD, Angela Musial Fay, MS, Yen-Hong Kuo, PhD, Theodore Matulewicz, MD, Cristina Z. Xenakis, MD, and Jerome J. Vernick, MD, FACS, Neptune and Matawan, NJ, New York, NY, and Pittsburgh, PA

Background:
Single nucleotide polymorphisms (SNPs) may function as modifiers of the RET proto-oncogene, resulting in the expression of medullary thyroid carcinoma (MTC) and papillary thyroid carcinoma (PTC). We present 2 non-related Italian-American families (Family 1, n = 107; Family 2, n = 31) with the RET V804M mutation. We have correlated the presence of specific SNPs and the rare RET V804M mutation to MTC, C-cell hyperplasia (CCH), and PTC.

Methods:
Sequencing was performed on exons 10, 11, and 13-16 of the RET proto-oncogene. The presence of MTC, CCH, and PTC were correlated to specific SNPs.

Results:
In both families, 3 SNPs in exon 11 (G691S), exon 13 (L769L), and exon 15 (S904S) were detected in 100% of patients with overt MTC. The SNP L769L was present in all patients including patients with PTC, MTC, and CCH.

Conclusion:
SNP analysis revealed a similar pattern between the 2 families. SNPs in exon 11 (G691S) and exon 15 (S904S) appear to influence the development of MTC. A SNP in exon 13 (L769L) may serve as a modifier in the development of simultaneous MTC and PTC, as well as presentation of MTC, in patients with the RET V804M mutation. (Surgery 2010;148:1274-81.)

Ectopic Adrenocortical Adenoma
Alexander L Shifrin, Min Zheng, Jerome J Vernick; Department of Surgery, Jersey Shore University Medical Center, Neptune, NJ, USA; Department of Pathology, Jersey Shore University Medical Center, Neptune, NJ, USA

A 63-year-old female with an incidental right adrenal tumor identified on CT scan. MRI revealed a 5.4 × 3.9 × 2.9 cm “right adrenal mass” located under hepatic segment 5, displacing the gallbladder medially, and negative on T2-weighted images. Her past medical history, physical examination and laboratory data were negative for functional adrenal tumor. Laparoscopic exploration revealed a large oval mass under the segment 5 of the liver, 4 cm superior, anterior and lateral in relation to the normally located right adrenal gland. Frozen section confirmed an adrenocortical neoplasm. Considering the unknown behavior of this mass, the normal appearing adrenal gland was removed. Pathology was consistent with benign adrenocortical adenoma and normal right adrenal gland. A finding of the right side retroperitoneal mass and a normally located adrenal gland is a part of the differential diagnosis of adrenocortical adenoma arising from the aberrant adrenal gland.

Keywords:
Adrenal gland, Adrenocortical adenoma, Ectopic, Laparoscopic adrenalectomy.
NEUROENDOCRINE THYMIC CARCINOMA METASTATIC TO THE PARATHYROID GLAND THAT WAS REIMPLANTED INTO THE FOREARM IN PATIENT WITH MULTIPLE ENDOCRINE NEOPLASIA TYPE 1 SYNDROME: A CHALLENGING MANAGEMENT DILEMMA

Alexander L. Shifrin, MD; Virginia A. LiVolsi, MD; Min Zheng, MD, PhD; Danielle E. Lann, MD ; Svetlana Fomin, MD ; Evan C. Naylor, MD; Peter J. Mencel, MD; Angela M. Fay, MS, CGC ; Brian S. Erler, MD; Theodore J. Matulewicz, MD

Objective:
To describe a unique case of a metastatic thymic carcinoma to the hyperplastic parathyroid gland and to present a challenging management dilemma.

Methods:
Our patient is 60-year-old, intellectually disabled man with history of the multiple endocrine neo-plasia type 1 (MEN1) syndrome, a surgery in 1985 for hypercalcemia with removal of one parathyroid gland, surgery in 2007 with findings of extensively necrotic well differentiated neuroendocrine carcinoma (carcinoid tumor) of the thymus. In 2012, he presented with persistent hyper-calcemia (calcium level 11.7 mg/dL [range, 8.6-10.2]), and a parathyroid hormone (PTH) level of 225 pg/mL (range,15-65 pg/mL). He underwent a repeat neck exploration with removal of 2 small inferior and a large left superior 4.5 × 2.5 × 1.5cm parathyroid glands, all of which showed hyperplasia on intraoperative frozen section. A small portion of the superior gland was reimplanted into the patient's forearm. Final pathology showed the presence of a focus of neuroendocrine tumor within the left superior parathyroid gland with immunostain identical to the thymic carcinoma. His postoperative PTH level was 14 pg/mL and calcium 8.5 mg/dL. A positron emission tomography – computed tomography (PET-CT) and octreotide scans revealed an extensive metastatic disease within the lung, mediastinum, and bones.

Results:
We decided to leave a portion of the reimplanted parathyroid gland with possible metastatic thymic carcinoid in his forearm because of the presence a widespread metastatic disease and his intellectual disability that would result in noncompliance with calcium replacement in case of permanent hypocalcemia.

Conclusion:
Metastatic thymic carcinoma to the parathyroid gland has never been reported in the literature. We have described the first case and presented a challenging management dilemma. (Endocr Pract. 2013;19:e00-e00)

Abbreviations:
IGF-1= insulin-like growth factor-1; MEN1= multiple endocrine neoplasia type 1 syndrome; PP= pancreatic polypeptide; PTH = parathyroid hormone; SUV = standardized uptake values; VIP = vasoactive intestinal polypeptide.