As we plan for our upcoming Annual Meeting, I realized I am approaching the end of my term as Chapter President. This has been an exciting and fun year. In the words of Matt Mostofi “just as you get the job down, your term is over!” Matt was there to guide me through and I will stay involved to help Nate MacDonald as he takes the helm. In this newsletter I thought I would reflect upon some of the major accomplishments we have made with the help of many members and our dedicated staff.

Our first order of business was to review and revise the Chapter’s strategic plan which we began last June with a Strategic Planning Retreat. We identified three main areas of focus; leadership development, communications, and member services. As a result of the retreat, we have developed a leadership and advocacy fellowship and now have two fellows, Kathleen Kerrigan, MD and Leon Adelman, MD enrolled in this mentoring program! We have changed the name of the Board meetings to Monthly Meetings to encourage more membership attendance. We have created new student, resident, and ED physician of the year awards and have doubled efforts to engage EM residents in our organization which has resulted in consistent resident participation. Currently we are reaching out to past presidents to tap into their expertise for mentoring and leadership and to re-engage these leaders in our organization.

On the communications front, we have applied for and have been awarded an ACEP Chapter grant to develop more robust electronic communications with our

MACEP Legislative Update
Ronna Wallace, Legislative Consultant

MACEP ADVOCATES FOR STRONGER MENTAL HEALTH PARITY REGULATIONS
Gregory Volturo, MD, MACEP President, and Matthew Mostofi, MD, MACEP Past President appeared before the Division of Insurance (DoI) and MassHealth recently to deliver an important message from MACEP – proposed parity regulations should be strengthened to ensure full parity for behavioral health patients.

The regulations reflect Chapter 224 of the Acts of 2012’s requirement that the Division of Insurance and MassHealth implement and enforce the federal Mental Health Parity and Addiction Equity Act (MHPAEA) as well as applicable state mental health parity laws, including continually monitoring and enforcing commercial insurers’ compliance with parity and regulations through annual reports, audits, and public hearings. Based on this requirement, the Division has set forth Emergency Regulations 211 CMR 154.00 – Enforcement of Mental Health Parity – and is now seeking comments and looking to make these regulations permanent.

MACEP would like to recognize the physicians, nurses and EMS providers who so heroically provided care to patients from the Boston Marathon tragedy. Their skills and quick response, undoubtedly saved lives. It is times like this, where the commitment to help others and dedication to duty held by all health care providers throughout the Commonwealth shines like a guiding beacon.
membership, creating online communities and utilizing social networks to share information and to keep our membership informed of chapter activities. MACEP in now on Facebook and Twitter! We are in the process of purchasing software to create a “members only” area on the website where we can host discussion forums and catalog information, creating more value for our membership.

In terms of member services, this year’s Annual Meeting will prove to be one of the best with several nationally recognized speakers. With the passage of major health care reform here in Massachusetts this past July, there were a number of areas in the legislation of concern for Emergency Physicians. MACEP has continued to advocate for behavioral health parity. We have been able to utilize the data we gathered from our point in time psychiatric boarder study as well as our more comprehensive psychiatric boarder study which was completed with an ACEP Chapter grant, enrolling over 800 patients, to demonstrate to the Division of Insurance the current disparity in care that exists for behavioral health patients, when insurers require pre or post authorization for emergency psychiatric admissions. We have also been able to demonstrate the impact of these treatment delays on EDs throughout the Commonwealth where behavioral health patients boarding in EDs, while awaiting psychiatric evaluation and admission have at times occupied over 40% of all ED beds! MACEP is clearly viewed as an organization focused on advocacy for our patients!

As new regulations are developed around the use of the prescription monitoring program, MACEP is at the table. We are working to assure that any new regulations do not place a burden on Emergency Physicians which could subsequently result in delays in our EDs, but yet allow us to use this valuable tool when clinical judgment deems it appropriate.

These are just a few of the many activities over the past year. I must recognize our Executive Director Tanya Pearson and our Lobbyist Ronna Wallace for their dedication and hard work. They are the heart of our organization. They keep us focused, well informed and connected to the political landscape around healthcare. Please take the opportunity to personally thank them at our Annual Meeting.

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**PRESCRIPTION MONITORING PROGRAM REGULATORY UPDATE**

Chapter 244 of the Acts of 2012, An Act Relative to Prescription Drug Diversion, Abuse and Addiction required the Department of Public Health to promulgate regulations that require all prescribers, or authorized support staff,
to utilize the PMP prior to seeing a new patient. MACEP continues to work closely with DPH to carve out those circumstances in which this requirement is unrealistic, including but not limited to emergency situations, and stressing the importance of a physician’s clinical judgment on appropriate usage of the program.

Thank you to all those who responded to MACEP’s request for action with written testimony in opposition to the draft regulations. In response to overwhelming physician opposition, the Department has postponed consideration of final regulations until the May Public Health Council meeting. For a complete list of all written testimony received by the DPH go to [http://www.mass.gov/eohhs/gov/laws-regs/dph/proposed-regulations/prescription-monitoring-program-2013.html](http://www.mass.gov/eohhs/gov/laws-regs/dph/proposed-regulations/prescription-monitoring-program-2013.html). So stay tuned. More to come in this important issue for emergency physicians and their patients.

---

**MACEP Annual Meeting**

**Wednesday, May 8, 2013**

*8:30 AM - 3:00 PM*

MMS Conference Center

860 Winter Street

Waltham, MA

Each year, MACEP’s Annual Meeting offers members and other practicing emergency physicians, residents and other providers of health care the opportunity to gain up-to-date information in carefully selected clinical and policy areas affecting delivery of emergency patient care. This program includes breakfast and lunch and is free for MACEP members and all emergency medicine residents.

**LEARNING OBJECTIVES**

- Recognize up-to-date methods for treating pediatric patients in the emergency room
- Recognize the types of emergencies and disasters that can impact emergency medicine
- Describe recent evidence based advances in assessment of the trauma patient

This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education through the joint sponsorship of the American College of Emergency Physicians and MA Colg of Emer Phys. The American College of Emergency Physicians is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

The American College of Emergency Physicians designates this live activity for a maximum of 5.00 AMA PRA Category 1 Credits™. Physicians should claim only credit commensurate with the extent of their participation in the activity.

Approved by the American College of Emergency Physicians for a maximum of 5.00 hours of ACEP Category I credit.

**ANNUAL MEETING SCHEDULE**

**Wednesday, May 8, 2013**

*8:30 – 9:00 AM*

Registration/Continental Breakfast

*9:00 – 9:30 AM*

Residency Research Grant Presentations

*9:30 – 10:30 AM*

Mistakes You Don’t Want to Make in Pediatric Patients

Richard Cantor, MD, FACEP

*10:30 – 11:00 AM*

Break and view exhibits

**11:00–11:45 AM**

Resident Jeopardy

**11:45 – 1:00 PM**

Disaster Response Panel

Lessons Learned from Super Storm Sandy

Silas Smith, MD – New York University/Bellevue Hospital

Running a Hospital During the Haiti Earthquake

Hilarie Cranmer, MD – Director of Disaster Response, MGH Global Health

Lessons Learned from The Station Night Club Fire in RI

Selim Suner, MD – Providence, RI

Panel Moderator: Mary-Elise Manuell, MD, MA, FACEP – Director, Center of Excellence for Emergency Preparedness Education & Training

**1:00 – 1:15 PM**

View exhibits

**1:15 – 2:00 PM**

Attendee Lunch and MACEP Business Meeting

**2:00 – 3:00 PM**

Death of the Dinosaur: Debunking Trauma Myths

William Mallon, MD, FACEP

Register online at [www.macep.org](http://www.macep.org).
Emergency Physicians - Physician Assistants - Nurse Practitioners - ED and Hospital Based Providers
Join us and actively manage realistic case scenarios to further hone your clinical and technical skills under the guidance of PEM board certified experts. Learn to manage emergencies in infants, school age children and adolescents and the opportunity to practice in a safe and controlled environment.

MORE HANDS ON SIMULATION AND REDUCED LECTURE

SMALL GROUP SETTING
FOR DISCUSSIONS AND DIDACTICS

STATE OF THE ART, COMPUTER-DRIVEN, HIGH-FIDELITY PEDIATRIC MANIKINS

SIMULATION LAB DESIGNED TO REPLICATE A RESUSCITATION BAY

NEW SIMULATION SCENARIOS
- Respiratory emergencies
- Neurologic emergencies
- Cardiac emergencies
- Metabolic emergencies
- Surgical emergencies
- Pediatric shock
- PALS algorithms
- I/O Access & Alternative Routes for Drug Administration
- Infant LP

NEW 2013 CURRICULUM
7:15 A.M. REGISTRATION & CONTINENTAL BREAKFAST
7:45 A.M. INTRO TO SIMULATION, Frank Overly, MD
8:30 AM SIMULATION SESSION 1
With Airway Skills
10:00 AM RESPIRATORY, Linda Brown, MD, MSCE
• Severe asthma, severe croup, bronchiolitis
• The Pediatric Airway
10:55 A.M. SIMULATION SESSION 2
With Access Skills
12:15 P.M. LUNCH
1:00 P.M. SIMULATION SESSION 3
Pediatric Pearls Part 1
2:30 P.M. BREAK
3:00 P.M. SIMULATION SESSION 4
Pediatric Pearls Part 2
5:00 P.M. QUESTIONS AND ANSWERS

REGISTRATION INFORMATION
Early registration fee: $595
Early registration deadline: April 30, 2013
Late registration fee: $695
Please register early. Space is limited to ensure personalized training. Enrollment is limited to approximately 12 participants. Registration fee is nonrefundable due to small class size.

Please make check payable to: Rhode Island Hospital Medical Simulation Center
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Providence, RI 02903
Attn: Jennifer Taveira

You may also register online at www.rihsimctr.org
To request reasonable accommodations, please contact the Rhode Island Hospital SIM Center at 401-444-6237

CREDIT DESIGNATION
Rhode Island Hospital designates this educational activity for a maximum of 8.25 AMA PRA Category 1 Credits. Physicians should only claim credit commensurate with the extent of their participation in the activity.

CONTACT INFORMATION
Jennifer Taveira, 401-444-6237
E-mail: jtaveira1@lifespan.org

Rhode Island Hospital is accredited by the Rhode Island Medical Society to sponsor continuing medical education for physicians.

For information on accreditation, accessibility, directions and more, please visit our website at www.rihsimctr.org
Summary: The outcome of this study was intra-abdominal injury requiring acute intervention (therapeutic laparoscopy, angiographic embolization, blood transfusion for abdominal hemorrhage, IVFs for two nights for pancreatic/GI injuries). The authors in this study prospectively enrolled pediatric trauma patients through PECARN. Inclusion criteria were GCS<15 with blunt torso trauma, blunt trauma with paralysis or multiple nonadjacent long bone fractures, blunt torso trauma due to high speed (>40mph), ejection, rollover, car vs. pedestrian, fall >20ft, crush injury to torso, assault involving abdomen, or physician concern for abdominal trauma resulting in CT, FAST, lab tests, CXR, pelvis x-ray. The exclusion criteria were if the injury was greater than 24 hours, if it was penetrating trauma, if there was a preexisting neurologic disorder impeding exam, if it was a known pregnancy, if it was a transfer from an outside hospital with an already completed CT or DPL. The authors obtained multiple variables. Follow-up included phone calls at least seven days after original ED visit. If that was unsuccessful, they mailed the guardians a survey. If the survey was not returned, they reviewed records including local morgue records.

They enrolled 12,044 patients out of 14,882 eligible patients. 6.3% of the patients (761 patients) had intra-abdominal injuries. 203 underwent an acute intervention (of which 191 had a CT-scan). Using binary recursive partitioning, they discovered in descending order of importance that patients who did not present with evidence of abdominal wall trauma (seat-belt sign), GCS <14, abdominal tenderness, evidence of thoracic wall trauma, complaints of abdominal pain, decreased breath sounds, or vomiting (inter-rater agreement with kappa values greater than 0.6) were at very low risk for intra-abdominal injury undergoing acute intervention. The sensitivity was 97%, specificity was 42.5%, NPV was 99.9%, PPV 2.8%, and negative LR of 0.07.

Analysis: As noted above, seven history and physical exam finding (without lab or US findings) identifies children with blunt torso trauma who are at very low risk for intra-abdominal injury undergoing acute intervention. It is important to note that the study is NOT suggesting that everyone with a positive finding be scanned as that would increase the overall utilization of CT. Instead, the study is building the foundation for additional studies to help guide physicians in determining which pediatric trauma patients do not need a CT scan of the abdomen. The addition of FAST and basic lab tests provide important additional information, capturing the few cases of intra-abdominal injury requiring intervention that were "missed" by the decision rule. This study created a prediction rule using various aspects of the history and physical. However, the prediction rule still requires external validation.

Summary: This is a retrospective cross-sectional analysis of ED visits from the National Hospital Ambulatory Medical Care Survey (NHAMCS) during 1996-2007 which identifies the national trend of CT and ultrasound utilization in patients who present to the ED with suspected renal colic.

The goal of this study was to determine if changing trends in image utilization result in changes in diagnosis rates of urolithiasis, diagnosis of other significant disorders, or hospital admission rate. The study also identifies patient and hospital characteristics that may influence use of CT. Nonpregnant adult patients presenting to the ED with the chief complaint of flank pain or kidney pain were included, resulting in 3,818 ED visits for study. The main outcome was proportion of visits receiving CT and/or US testing and secondary outcomes were diagnosis rates of urolithiasis and hospital admission rates. They also evaluated CT use during the most recent 3 year period by looking at multiple patient and hospital factors and used multivariate logistic regression analysis to identify independent predictors of CT utilization.

Over the study period, there was a dramatic increase in utilization of CT, from 4% in 1996-1998 up to 42.5% in 2005-2007. There was minimal use of US that decreased over study period from 5.3% to 2.4%. The proportion of visits with diagnosis of urolithiasis remained stable, ranging 17.8%-19.5%. Additionally, there was no change in the hospital admission rate which remained stable at 10-12% or rate of patients receiving an alternate diagnosis. CT utilization was found to be higher for patients with severe pain, rapid triage time, males, and lower for patients at rural hospitals, and those seen by nonphysician providers.

Analysis: This study shows that, despite a 10 fold increase in the utilization of CT scans in the evaluation of patients with flank pain, there was no change in the proportion of visits diagnosed with urolithiasis or alternative diagnoses, or patients admitted to the hospital. The authors use this
information to state that the choice of CT over US is not supported by any evidence that increased use of CT has changed the diagnosis or treatment rates.

A potential problem is that intravenous pyelogram (IVP) was not included as an imaging study. Patients without CT or US were listed as having no imaging. The paper showing superiority of CT over IVP was published in 1995, thus practice patterns were still in the beginning stages of change in the early years of the study population. A proportion of the increased CT utilization likely represents a change from IVP to CT rather than no imaging to CT and minimal changes in rate of diagnosis may be a result of this.

MACEP is Now Active in Social Media

Online social networking has changed the way people interact, and a recent study showed that nonprofit organizations have set the pace for social media marketing since 2007. Why? It’s truly a cost effective way to reach members and supporters. In correspondence with today’s era of social media, MACEP is introducing pages on LinkedIn, Facebook, and Twitter.

MACEP’s Social Media Strategic Plan clearly offers the reasons behind implementing these three sites specifically. LinkedIn is the largest professional network that allows people to exchange knowledge, ideas, and opportunities through connecting with others and following groups and companies. Facebook allows users to build and maintain connections by interacting through adding “friends” and viewing groups’ pages. And Twitter provides a real-time information network that permits users to share short bursts of information with the public, using key tag words. By utilizing these social media platforms, MACEP hopes to target current members and physicians as well as the general public. Connect with MACEP to learn about organization calendar events, the industry’s emerging trends, relevant health and safety information, educational opportunities for physicians, and so much more.

Additionally, not only it is important to communicate effectively, but it is also essential to hear what others have to say. Start a discussion on the LinkedIn page, comment on the Facebook page, and send MACEP a tweet on Twitter. Be prepared to engage, learn, and share!

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Baltimore, MD

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Kimball Medical Center, Lakewood
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NEW YORK
Columbia Memorial Hospital, Hudson
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HealthAlliance Hospital – Broadway Campus, Kingston
A 145-bed community hospital with 47,000 annual ED visits.
Richmond University Medical Center, Staten Island
A 450-bed teaching hospital with 63,000 annual ED visits.

St. Peter’s Hospital, Albany
A 440-bed community teaching hospital with 52,000 annual ED visits.

NORTH CAROLINA
Southeastern Regional Medical Center, Lumberton
A 443-bed community hospital with 80,000 annual ED visits.

RHODE ISLAND
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Case Management: Thyroid Storm
Boston Medical Center, Department of Emergency Medicine
Maura Dickinson, MD, Resident Author
Sushama Scalera, MD, Resident Editor
Kristin Carmody, MD, Faculty Reviewer

CC: Palpitations.

HPI: A 57-year-old female with no significant past medical history presented to the Emergency Department (ED) for palpitations. She was working in her garden when she experienced a sensation of heart racing that started one hour prior to arrival. She reported similar episodes of heart racing in the recent past, but this episode lasted longer than previous ones. Over the past eight weeks, she had also experienced intermittent tremors, hot flashes, and an unintentional 20-pound weight loss. She had been going through menopause over the past few months and had attributed her symptoms to this. She reported no headache, chest pain, vomiting, diarrhea, abdominal pain, or focal weakness.

PMHx: “Irregular heart beat” at age 25, migraines, ovarian cyst removal at age 47.

SOCHx: Married for 40 years, no children, retired financial officer, denies use of tobacco/alcohol/illicit drugs.

Medications: None.

Allergies: NKDA.

PHYSICAL EXAM
Vitals: T 100.6 BP 190/120 P 180 RR 26 O2 Sat 99% on RA
Gen: No acute distress. Awake, alert and oriented to person, place, time and purpose.
Respiratory: Clear to auscultation bilaterally. No respiratory distress.
Cardiac: Irregularly irregular rhythm. Rate is tachycardic, Clear S1 and S2 without murmurs, rubs or gallops.

ED COURSE
Upon arrival to the ED, the patient was quickly moved into the resuscitation room due to her rapid heart rate. She was placed on a cardiac monitor and an electrocardiogram (ECG) was obtained. Two large-bore IVs were placed and blood was drawn for testing. The ECG showed atrial fibrillation with rapid ventricular response (RVR) (Figure 1). For the rapid heart rate, labetalol 20 mg IV was given for initial stabilization.

STUDIES
Laboratory values revealed TSH of 0.02, Free T4 of 2.64, and T3 Uptake of 43.5. Troponin 0.243, CK 54, CK-MB 2.1, cardiac index 3.9. The remaining labs, including a complete blood count, basic metabolic panel, serum toxicology screen, and coagulation panel were unremarkable. A chest x-ray was also performed which did not show any acute pathology.

A diagnosis of thyroid storm was made and the patient received propranolol 3mg IV, propylthiouracil (PTU) 600mg, Lugol's iodine, and placed on an esmolol infusion. The Endocrinology service was consulted and recommended administration of dexamethasone 2mg IV. The patient was transferred to the medical intensive care unit (MICU) for further management and monitoring.

HOSPITAL COURSE
In the MICU, the patient’s tachycardia was well controlled with the esmolol infusion and she converted into a normal sinus rhythm during her hospital stay. She was transitioned to oral propranolol and was continued on Potassium Iodide Oral Solution, PTU, and dexamethasone. Serial cardiac enzymes were drawn and trended down. Her elevated troponin was thought to be due to rate-related ischemia. Over the next few days, the patient reported improvement in her symptoms without any palpitations. Her free T3 trended downwards, while the thyroglobulin antibody and thyroid peroxidase antibody returned positive. At discharge on hospital day 4, endocrinology recommended discontinuing potassium iodide oral solution and dexamethasone and to continue PTU and propranolol as an outpatient.

(Figure 1) ECG with atrial fibrillation with RVR

CASE continued on page nine
INTRODUCTION

Thyrotoxicosis is a spectrum of hyper-metabolic states that occurs when the body tissues are exposed to an excess amount of circulating thyroid hormone. Thyrotoxicosis can present with a range of severity and clinical symptoms. Thyroid storm, also known as thyrotoxic crisis, represents the most extreme presentation of thyrotoxicosis. Early recognition and treatment of the disorder is essential for survival, as the mortality rate ranges from 20% to 30%.¹

Why does thyroid storm occur?
The pathophysiology of thyroid storm is not well defined; however it is believed that thyroid hormones (free T3/T4) cause an increase in systemic adrenergic activity. In a well-regulated system, there is a balance in the amount of thyroid hormone circulating. During thyrotoxicosis, an increase of thyroid hormone occurs causing increased systemic adrenergic activity. If a severe imbalance occurs, the patient goes into a state called thyroid storm. This typically occurs when a patient with a known thyroid disorder or a patient without a prior diagnosis who has presented with subacute thyrotoxicosis in the past encounters a state of extreme stress. The extreme stress leads to an excess of catecholamines, resulting in further decompensation. Examples of precipitating causes include infection, noncompliance with thyroid medications, uncontrolled diabetes, acute heart failure, stroke, and myocardial infarcts.²

How will a patient with thyroid storm present?
Patients in thyroid storm classically present with symptoms consistent with a marked hyper-metabolic state across multiple organ systems. Disruption of the thermoregulatory system causes diaphoresis, flushing, and hyperpyrexia. Another key clinical characteristic of thyroid storm is malfunction of the cardiorespiratory system leading to sinus tachycardia, atrial fibrillation, high pulse pressure, and occasionally heart failure. Chest pain can also occur due to increased oxygen demand and coronary artery spasm. In addition, dyspnea results from decreased lung compliance, engorged pulmonary capillary beds, or left ventricular failure. When the central nervous system is involved, patients may display anxiety, delirium, or coma. Patients may also have a fine tremor and hyper-reflexia. Moreover, patients may present with nausea, vomiting, and diarrhea, resulting in dehydration and shock. Palpation of the neck may reveal a diffuse enlargement of the thyroid and a bruit. Elderly patients often present with nonspecific complaints including weight loss, fatigue, generalized weakness, or palpitations.²³

How do I make the diagnosis of thyroid storm?
Making the diagnosis of thyroid storm can be challenging, as many conditions can present with similar symptoms. Physicians must maintain a high index of suspicion, gather a detailed history, identify pertinent risk factors, and perform a thorough physical examination. Physical examination findings in thyrotoxicosis include tachycardia, diaphoresis, lid lag, extension tremor, and large-muscle weakness.

Probability of Impending Thyroid Storm

<table>
<thead>
<tr>
<th>Presenting Symptom</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Thermoregulatory Dysfunction</strong></td>
<td></td>
</tr>
<tr>
<td>99°-99.9°F</td>
<td>5</td>
</tr>
<tr>
<td>100°-100.9°F</td>
<td>10</td>
</tr>
<tr>
<td>101°-101.9°F</td>
<td>15</td>
</tr>
<tr>
<td>102°-102.9°F</td>
<td>20</td>
</tr>
<tr>
<td>103°-103.9°F</td>
<td>25</td>
</tr>
<tr>
<td>&gt;104°F</td>
<td>30</td>
</tr>
<tr>
<td><strong>Central Nervous System Effects</strong></td>
<td></td>
</tr>
<tr>
<td>Absent</td>
<td>0</td>
</tr>
<tr>
<td>Mild Agitation</td>
<td>10</td>
</tr>
<tr>
<td>Delirium, psychosis, lethargy</td>
<td>20</td>
</tr>
<tr>
<td>Seizure or coma</td>
<td>30</td>
</tr>
<tr>
<td><strong>Gastrointestinal Dysfunction</strong></td>
<td></td>
</tr>
<tr>
<td>Absent</td>
<td>0</td>
</tr>
<tr>
<td>Diarrhea, nausea, vomiting, abdominal pain</td>
<td>10</td>
</tr>
<tr>
<td>Unexplained jaundice</td>
<td>20</td>
</tr>
<tr>
<td><strong>Cardiovascular Dysfunction (beats/minute)</strong></td>
<td></td>
</tr>
<tr>
<td>90-109</td>
<td>5</td>
</tr>
<tr>
<td>110-119</td>
<td>10</td>
</tr>
<tr>
<td>120-129</td>
<td>15</td>
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<tr>
<td>130-139</td>
<td>20</td>
</tr>
<tr>
<td>&gt;140</td>
<td>25</td>
</tr>
<tr>
<td><strong>Atrial Fibrillation</strong></td>
<td></td>
</tr>
<tr>
<td>Absent</td>
<td>0</td>
</tr>
<tr>
<td>Present</td>
<td>10</td>
</tr>
<tr>
<td><strong>History of Precipitating Event</strong></td>
<td></td>
</tr>
<tr>
<td>Absent</td>
<td>0</td>
</tr>
<tr>
<td>Present</td>
<td>10</td>
</tr>
</tbody>
</table>

(Table 1) Thyroid storm is unlikely if total score <25, impending if 25-44, and highly likely if >45.⁷

Basic thyroid tests should be used to supplement the history and physical examination findings. Typical findings include an elevated free T3 and free T4, low TSH, and elevated T3 uptake levels. Normal TSH levels practically exclude hyperthyroidism, except in cases of pituitary adenoma. Many conditions, including renal failure, liver disease and certain drugs, can lower the TSH level, and therefore, concurrent assessment of free T4 and free T3 levels are recommended.

Unfortunately, there is no distinct serum T4 or T3 levels that differentiate thyrotoxicosis from thyroid storm. It is also important to note that a normal or minimally elevated T3 in a critically ill patient is concerning for thyroid storm, as these patients can have a decreased ability to convert T4 to T3.⁴⁻⁶
To help differentiate thyroid storm from thyrotoxicosis, Burch and Wartofsky designed a point system based on presenting symptoms to determine the degree of thyroid dysfunction (See Table 1, p. 9). A higher number of total points suggest the probability of impending thyroid storm. It is important to treat the patient based on clinical suspicion even if the score is low. Other nonspecific laboratory findings can also occur in thyroid storm. Hyperglycemia may be seen secondary to inhibition of insulin release and increased glycogenolysis. In addition, mild hypercalcemia and elevated alkaline phosphatase occurs through hemococoncentration and enhanced thyroid hormone–stimulated bone resorption. Adrenocortical function is also affected by thyrotoxicosis, as thyroid hormone induces accelerated production and degradation of cortisol.  

What is the treatment of thyroid storm?

Because thyroid storm is rare, resuscitation and stabilization will be initiated long before a definitive diagnosis is made. Once the diagnosis is established, the treatment is aimed at the following goals:

1. Blocking synthesis and release of thyroid hormone: PTU and methimazole both block synthesis of thyroid hormone. PTU is the preferred agent as it also reduces peripheral conversion of T4 to T3. PTU is loaded at 600-1000 mg orally, then 200-300 mg orally (or per rectum) every 4-6 h for a total of 1200 mg per day for adults. Of note, the U.S. Food and Drug Administration has added a boxed warning regarding PTU, as there have been several cases of severe liver injury and acute liver failure with its administration.  

9. Approximately one hour after initiating the anti-thyroid medication, iodine compounds (Lugol’s solution or SSKI) are administered to halt the release of thyroid hormone. The delay in administration of iodine compounds is necessary to prevent increased thyroid hormone synthesis. Saturated solution of potassium iodide or Lugol solution at 6-8 drops orally every 6-8 hours are effective in the adult patient. Lithium carbonate can be substituted for those with allergies to iodine, 10. 11

2. Prevention of peripheral conversion of T4 to T3: PTU, propranolol, and glucocorticoids are good options to block peripheral conversion of T4 to T3. Glucocorticoids are also useful in treating relative adrenal insufficiency due to hyperthyroidism. Hydrocortisone 300mg IV then 100 mg every 8 hours is the preferred regimen. 8

3. Decreasing adrenergic symptoms: Beta-adrenergic blocking agents help decrease sympathetic outflow. Esmolol is short-acting and easy to titrate. The initial loading dose of 0.25 - 0.5mg/kg is followed by an infusion of 0.05 - 0.1mg/kg/min. 8, 12 Another commonly used drug is propranolol, which is longer acting. It can be given orally (60-80mg every 4 hours) or IV (0.5-1mg followed by 2 mg bolus over 15 minute every few hours). Propranolol also has the added advantage of decreasing peripheral conversion of T4 to T3, a characteristic that is lacking in treatment with other beta-adrenergic blocking agents. 13 Several case reports have shown that acute hemodynamic collapse can occur after the administration of oral propranolol and therefore, esmolol is preferred for the initial treatment. 14

4. Controlling systemic decompensation. It is important to aggressively hydrate patients in thyroid storm, as they may progress to vascular collapse. If volume repletion does not reverse hypotension, glucocorticoids and low alpha-adrenergic vasopressors may be necessary. Electrolytes and glycogen stores (via dextrose) may also need repletion. Acetaminophen is preferred over salicylates for defervescence, as salicylates have the potential to increase free T4 and T3.

5. Treating underlying conditions: Precipitating causes of thyroid storm should be identified and treated appropriately.

As thyroid storm is associated with a high mortality rate, patients should be admitted to an intensive care unit setting for close monitoring.

SUMMARY

Thyroid storm can be challenging for the emergency physician as the condition can mimic other disease processes. Although a rare condition, thyroid storm carries a high mortality and must therefore be considered in any critically ill patient with symptoms suggestive of the disease. Once laboratory data is available, it will often show a low TSH level in combination with elevated free T3, free T4 and T3 uptake levels. Treatment focuses on blocking the synthesis and release of thyroid hormone with PTU or methimazole, blocking peripheral conversion of T4 to T3 using steroids, decreasing adrenergic symptoms with esmolol or propranolol, controlling systemic decompensation with hydration, and treating underlying conditions.

REFERENCES


Medical Orders for Life-Sustaining Treatment (MOLST) Implemented Across Massachusetts

In accordance with recommendations by the Massachusetts Department of Public Health and the Massachusetts Expert Panel on End-of-Life Care, health care institutions throughout the Commonwealth have begun implementing the MOLST process and form.

MOLST UPDATE (MARCH 2013)

March was a busy month for MOLST statewide implementation. The MOLST team continues to offer technical assistance to health care settings. March sessions included:

“A Walk Through the MOLST Toolkit” for institutions preparing for implementation. The MOLST Implementation Toolkit (see [http://www.molst-ma.org/tool-kit-implementing-molst-institutions](http://www.molst-ma.org/tool-kit-implementing-molst-institutions)) contains a wealth of resources for care settings getting ready for MOLST, including assessment tools, planning guides, and checklists. Each health care institution can adopt the features that are most useful in their setting.

Certified home health agencies also had an opportunity to learn how to implement MOLST in March, with an informative presentation by Dr. Mary Valliere, MOLST Medical Consultant, and Jena Adams, MOLST Training and Education Consultant, concerning how to incorporate MOLST into home health agency policies and procedures.

Future technical assistance activities include Brown Bag Call-in session on May 20, 2013 (see [http://www.molst-ma.org/technical-assistance-conference-calls-institutions-implementing-molst](http://www.molst-ma.org/technical-assistance-conference-calls-institutions-implementing-molst)), featuring the MOLST team, who will respond to questions from callers. These will be drop-in call sessions for health care institutions that have moved beyond the beginning stages of implementing MOLST. If you’re feeling stalled in the process, or just don’t know where to find an answer to your question, this is the time to call. No registration is required. We will have medical and training experts on the line to take your questions, and also a legal expert on May 20. You’re welcome to submit your questions in advance via email. Please check the MOLST website frequently for newly listed educational and training events.

The MOLST Program is also pleased to announce that non-English translations of the MOLST form will soon be available. In the near future you’ll be able to download from the MOLST website ([www.molst-ma.org](http://www.molst-ma.org)) a non-English educational packet, including translated versions of the MOLST FAQs for patients and families (in Spanish, European Portuguese, Vietnamese, and Chinese-Simplified Mandarin), the MOLST brochure, the MOLST form, and a bi-lingual instruction sheet. Please check the website in mid to late April to access these materials. Translations in other languages will be done in the future.

MOLST implementation continues to make progress throughout every region of Massachusetts. As of the end of February, 33% of the many targeted clinical care settings have participated in a MOLST training or technical assistance session, or have obtained the MOLST form. If you haven’t already done so, join the many Massachusetts health care institutions now that are moving toward full MOLST implementation!

The MOLST process and medical order form were developed to ensure that persons with advanced illness will have their decisions regarding life-sustaining treatments known, communicated, and honored. A valid Massachusetts MOLST form “constitutes an actionable medical order that can be recognized and honored across health care settings.” (MADPH Circular Letter: DHCQ 12-3-560).

To facilitate and promote the appropriate use of the MOLST process and form in Massachusetts health care institutions by 2014, statewide MOLST outreach and training efforts were launched in early 2012. Coordination of the MOLST expansion is a collaboration of the Massachusetts Department of Public Health, the Massachusetts Executive Office of Elder Affairs, and Commonwealth Medicine at the University of Massachusetts Medical School.

For more information and resources about MOLST, or to find out how to implement MOLST, please visit [www.molst-ma.org](http://www.molst-ma.org).
MASSACHUSETTS COLLEGE OF EMERGENCY PHYSICIANS

Calendar of Events

2013

April 23, 2013
MACEP Monthly Meeting
Marriott Courtyard Hotel
Marlboro, MA
4:30 - 6:30 PM

April 23, 2013
Past Presidents’ Reception
The Metropolitan Club
Chestnut Hill, MA
6:30 - 8:00 PM

May 8, 2013
MACEP Annual Meeting
MMS Conference Center
Waltham, MA
9:00 AM - 3:00 PM

June 25, 2013
MACEP Monthly Meeting
Marriott Courtyard Hotel
Marlboro, MA
4:30 - 6:30 PM

October 24, 2013
Resident Night & Job Fair
Millennium Bostonian Hotel
Boston, MA
5:00 - 8:00 PM

November 9, 2013
Annual EM Ultrasound Course
MMS Conference Center
Waltham, MA
7:30 AM - 6:30 PM

November 22, 2013
Annual Reimbursement & Coding Course
MMS Conference Center
Waltham, MA
7:30 AM - 3:30 PM

For more information, about any of these upcoming events, call MACEP at (781) 890-4407 or visit our website at www.macep.org.