MRSA Thyroiditis and Thyrotoxicosis: A Case Report

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ABSTRACT

Objectives:
1) Learn that methicillin-resistant *staphylococcus aureus* (MRSA) thyroiditis causing thyrotoxicosis is a rare and potentially life-threatening condition.
2) Understand the diagnosis and management of suppurative thyroiditis and related thyrotoxicosis.
3) Understand the rising incidence of both community acquired and hospital acquired MRSA infections.

Methods:
We present a patient with MRSA thyroiditis and thyrotoxicosis who was evaluated by the otolaryngology - head and neck surgery service of an academic, tertiary care hospital in 2012. The literature was also reviewed through a directed PubMed search, and a relevant case was identified and discussed.

Results:
A patient was transferred from an outside hospital in respiratory failure with a recent history of progressive neck pain and dysphagia. Computed tomography of the neck revealed an enlarged and inflamed thyroid gland, which was causing airway compression. Thyrotoxicosis was subsequently identified. MRSA was cultured in samples from an ultrasound guided thyroid biopsy and a surgical debridement. Antibiotics were started, and the thyrotoxicosis was followed clinically. With this management, the thyrotoxicosis resolved, and hypothyroidism ensued. A literature review revealed only one previously reported case of MRSA thyroiditis and thyrotoxicosis, which resolved with medical management.

Conclusion:
MRSA thyroiditis with associated thyrotoxicosis represents a rare condition caused by a bacterium that is becoming more common in community and hospital settings. To our knowledge, this is the second reported case of this particular clinical entity. Prompt identification of a causative organism and thyrotoxicosis can allow for potentially life-saving interventions.

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INTRODUCTION

Acute suppurative thyroiditis is an uncommon thyroid disease. Thyrotoxicosis can be a dangerous sequela of such an infection due to the destruction of gland architecture and the release of thyroid hormone. Though MRSA is not an infrequent cause of head and neck soft tissue infections, it has rarely been associated with suppurative thyroiditis and thyrotoxicosis. We present a patient with MRSA thyroiditis causing thyrotoxicosis and compare her management to a previously reported case.

METHODS AND MATERIALS

A patient with MRSA thyroiditis and thyrotoxicosis was identified from the experience of the otolaryngology-head and neck surgery service at the Baylor College of Medicine and The Methodist Hospital. Additionally, the PubMed database was queried for “MRSA thyroiditis and thyrotoxicosis.” Inclusion criterion were applied to any patient with culture proven MRSA thyroiditis and thyrotoxicosis. Exclusion criteria were applied to omit cases without documented follow-up and cases without available translation into the English language.

CASE PRESENTATION

A 45 year-old obese female with asthma and schizophrenia presented to our service for evaluation of a thyroid mass. She had been previously hospitalized at an outside facility with complaints of fever, dysphagia and odynophagia. During this hospitalization, she became acutely toxic while being treated with clindamycin for a presumptive bacterial pharyngitis. She was intubated and transferred to the intensive care unit (ICU) for management of respiratory failure, tachycardia and hypertension. She was subsequently transferred to our institution for further evaluation. Upon arrival, she was was afebrile with stable vital signs. A firm mass could be palpated in the anterior neck, and associated soft tissue cellulitis was noted. A white blood cell count of 8100 cells/μL, a TSH of 0.01 mIU/L and a free T4 of 5.2 ng/dL were measured. A contrast enhanced CT of the neck was performed, which revealed an inflamed thyroid gland with evidence of abscess formation **(figure 1)**. A direct laryngoscopy was performed during the patient’s second hospital day, which revealed edema of the pharyngeal and laryngeal mucosa. Specifically, no distinct pharyngeal or laryngeal lesions or fistulae were noted. An ultrasound guided fine needle aspiration of the thyroid gland revealed a MRSA infection. The patient was started on systemic dexamethasone and vancomycin. A neck exploration, thyroid biopsy and tracheotomy were also performed. The thyroid gland and part of the adjacent anterior tracheal wall were noted to be necrotic during this procedure **(figure 2)**. In the day following surgery, the patient was able to be weaned from the ventilator and transferred to a lower acuity surgical floor. Her TSH was 0.03 mIU/L and free T4 2.1 ng/dL on the eleventh hospital day. On the seventeenth hospital day, her TSH had risen to 1.09 mIU/L and free T4 to 0.4 ng/dL. A modified barium swallow study revealed severe pharyngeal dysphagia, and a gastrostomy tube was placed. Once clinically stable, the patient was discharged. Within one month after discharge, she was tolerating an oral diet and was able to be decannulated.

Figure 1. Contrast enhanced CT of the neck

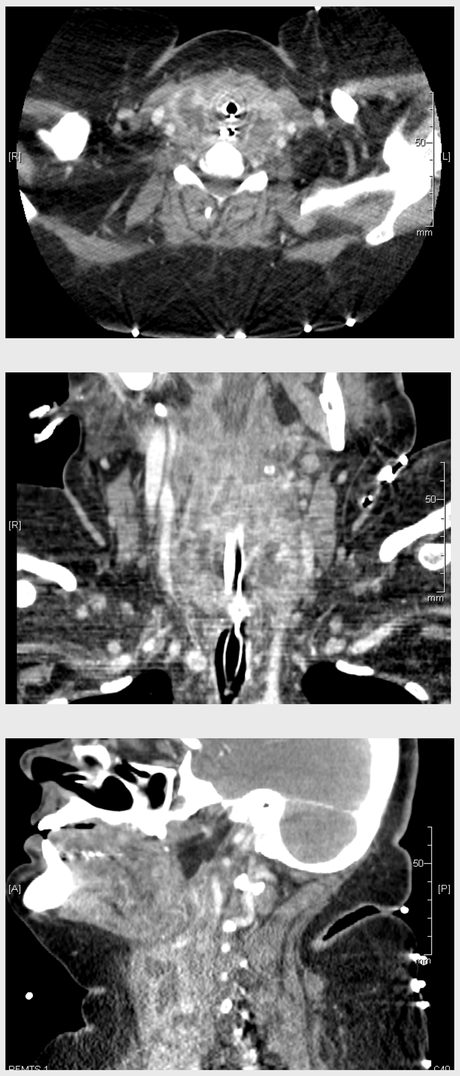

Figure 2. Thyroid biopsy showing a residual follicle surrounded by inflamed and necrotic tissue

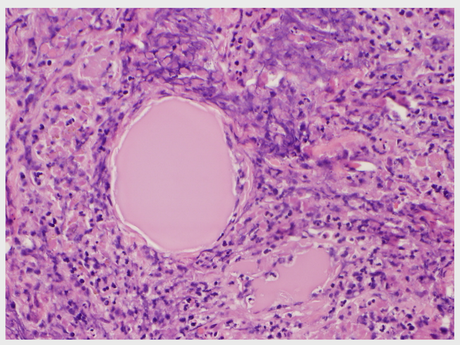

Table 1. Cases of MRSA thyroiditis and thyrotoxicosis

Patient	Age/Gender	Comorbidities	Method of diagnosis	Therapy
Our patient	45/F	Obesity, asthma	Ultrasound guided biopsy	Directed antibiotics (clindamycin followed by vancomycin), surgical debridement, tracheotomy, gastrostomy
Lethert et al. (1)	30/F	Crohn’s disease, immunosuppression	Ultrasound guided biopsy	Directed antibiotic (vancomycin), propanolol

RESULTS

A literature search for cases of thyrotoxicosis due to acute suppurative thyroiditis caused by MRSA identified one additional case **(table 1)**. No surgical intervention was required in this case, and propanolol was used for the management of clinical thyrotoxicosis.

DISCUSSION

Acute suppurative thyroiditis, also referred to as microbial inflammatory thyroiditis, is rarely encountered due to the robust blood supply to the thyroid gland. In the pediatric population, suppurative thyroiditis has been associated with branchial cleft anomalies, occasionally as the initial finding of a third cleft cyst.[2] While infected branchial clefts can be identified in adults, suppurative thyroiditis has also been reported in women between 20 and 40 years of age with a known nodular goiter.[3,4,5] Contrast enhanced computed tomography of the neck is helpful to identify the etiology of the infection and define the extent of the disease for treatment planning. The mainstay of management is directed antibiotic therapy following the identification of a causative organism from an aspirate or the surgical drainage of an associated abscess. Treating a predisposing etiologic factor, such as a pharyngeal fistula or immunosuppression, is important for the prevention of recurrence.[6] Despite the increasing prevalence of MRSA in head and neck soft tissue infections, this pathogen has not yet developed a strong association with acute suppurative thyroiditis.[7,8] Gram positive bacteria are ultimately identified in many cases, but a variety of bacterial, mycobacterial and fungal infections have been previously reported.

Clinically significant changes in thyroid hormone levels are not always seen in acute suppurative thyroiditis. However, thyrotoxicosis arising from acute suppurative thyroiditis is potentially life threatening. Hyperthyroidism results from the expulsion of thyroid hormone from the affected gland. Followed by a rise in serum thyroglobulin, levels of absolute and free T3 and T4 increase, which leads to a compensatory depression in TSH. If thyrotoxicosis occurs, it generally self-resolves, and propanolol can be used to manage the acute symptoms.[2] Most patients return to a euthyroid state, though long-term hypothyroidism can occur depending on the extent of damage to the gland.[5]

CONCLUSIONS

Acute suppurative thyroiditis is a potentially lethal infectious process that requires prompt diagnosis and treatment. The appearance of associated thyrotoxicosis can be the hallmark of an aggressive infection and should be managed concurrently if clinically significant. MRSA is not commonly associated with acute suppurative thyroiditis with thyrotoxicosis, but it is becoming a more common isolate in soft tissue infections of the neck and should be considered when choosing empiric antibiotic therapy in this clinical setting.

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