**Supplemental material 1**

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| **Author, year, and reference** | **Age** | **Gender** | **Past medical history** | **Ethnicity** | **Hyperthyroidism etiology (if Graves PD, UD)** | **Clinical criteria for TS** | **Possible precipitant** | **BWS** | **Laboratories and ancillary studies** | **Management** | **Outcome** |
| Albert, 2014 [16] | 12 years | F | None | Unknown/not specified | Graves disease (UD) | CV: Sinus tachycardia  GI: Emesis  CNS: Altered mental status (confusion) | Unknown/not specified | 75 | TSH <0.01 IU/L  fT4 87 pmol/L  T3 18.2 pmol/L  TSI positive  ECG with prolonged QTc interval and T wave abnormalities | Propranolol  Carbimazole  Prednisolone  Lugol's iodine | Thyroid function normalized at 6 weeks. Repeat ECG showed a QTc within the normal range. |
| Almaghraby, 2018 [17] | 9 years, 11 months | F | Trisomy 21  VSD repair  Unvaccinated | Unknown/not specified | Graves disease (UD) | CV: Sinus tachycardia, hypotension, hypoxic respiratory failure, cardiac arrest leading multiorgan system failure  GI: Non bloody diarrhea, emesis  CNS: Altered mental status (lethargy) | Unknown/not specified | 60 | Throat swab positive for S. pyogenes  TSH 0.01 IU/mL  fT4 4.52 ng/dL  T3 7.38 pg/mL  TSI positive | PTU switched to MMI to prevent further liver toxicity  Hydrocortisone  SSKI  Vasopressors  ECMO | Thyroid function started improving after 8 days.  Discharged from the hospital on day 10 to an inpatient rehabilitation facility (for 1 month). Cardiac dysfunction completely resolved within 3 months. |
| Aslan, 2011 [18] | 11 years | F | Prematurity (26 WGA) | Hispanic | Graves Disease (UD) | Thermoregulatory dysfunction: Fever  CV: Sinus tachycardia, hypertension, tachypnea, respiratory distress  CNS: Agitation | Unknown/not specified | 60 | Nasal swab + RSV antibody  TSH 0.01 IU/mL,  fT4 8.17 ng/dL,  fT3 1918 pg/mL,  TSI positive  TPO positive  TGAB positive | Esmolol  PTU  Dexamethasone  SSKI  Bronchodilators | One month after her hospital discharge, she was switched from PTU to methimazole, and the atenolol was discontinued. |
| Asaad, 2020 [19] | 19 years | F | None | Caucasian | Subacute thyroiditis | Thermoregulatory dysfunction: Fever  CV: Sinus tachycardia  GI: Emesis  CNS: Confusion, agitation | IV drug abuse, RUE abscess | 75 | Leukocytosis  TSH 0.026 IU/mL,  fT4 >6.99 ng/dL,  fT3 16.9 pg/mL,  Thyroid US: Diffusely enlarged heterogeneous thyroid gland with decreased flow on color Doppler  Blood culture + MRSA | Beta blocker  MMI  High dose hydrocortisone | Methimazole was discontinued when TGAB came back negative. Her thyroid tenderness improved, and her free T4 and T3 decreased over a 3-week period. Steroids were tapered off. |
| Bonfield, 2018 [20] | 4 years | F | None | Eastern European | Graves disease (UD) | Thermoregulatory dysfunction:  CV: Sinus tachycardia, hypertension  GI-hepatic dysfunction: hyperbilirubinemia | Unknown/not specified | Unknown/unable to calculate | TSH <0.05 mIU/L  TPO 541 IU/mL  fT4 101 pmol/L  Echocardiogram: sinus tachycardia  Echocardiogram: mild LVH  Thyroid US: diffuse thyroiditis, no focal lesion | Propranolol  carbimazole | Initial improvement on the cardiovascular parameters was noted within 5 days of treatment, with gradual improvement in other clinical signs and symptoms. Propranolol weaned off 5 months after presentation. |
| Bridwell, 2021[21] | 16 years | F | None | Black | Unknown/not specified | CV: Sinus tachycardia  GI: Abdominal pain and emesis | Unknown/not specified | 55 | TSH <0.03 uIU/mL  fT4 >7.0 ng/dL  CT abdomen: Volvulus and bowel obstruction  Electrolytes, glucose, Hep B, C, TORCH normal | Esmolol  Hydrocortisone | Surgical correction of midgut volvulus followed by “medical management” for thyrotoxicosis. |
| Cao, 2015 [22] | 1.5 months | M | Unknown/not specified | Unknown/not specified | Neonatal hyperthyroidism (from maternal Graves disease) | Thermoregulatory dysfunction: Fever  CV: Tachycardia, hypotension  Neuro: Irritability | Unknown/not specified | Unknown/not specified | TSH 0.005 uIU/mL  T3 6.34 nmol/L  T4 > 309 nmol/L  Hypernatremia  Leukocytosis  Elevated procalcitonin  Metabolic acidosis with hyperchloremia (normal anion gap) | Propranolol  PTU  Hydrocortisone  Empiric antibiotic treatment | Gradually improved and was followed up in the local hospital monthly. |
| Chantra, 2016 [11] | 15 years | F | Graves disease of difficult control. History of 3 RAI ablations | Unknown/not specified | Graves disease (PD) | Thermoregulatory dysfunction: Hypothermia, decreased peripheral perfusion  CV: Cardiogenic shock secondary to PAH  CNS: Seizure | Unknown/not specified | 65 | TSH 0.29 mU/L  FT3 >30 pg/mL  FT4 3.65 ng/dL  Elevated AST, ALT  Thrombocytopenia  Prolonged coagulation times low fibrinogen, elevated D-dimer  Chest Xray with cardiomegaly with dilated pulmonary arteries  Echocardiogram: Compressed left ventricle by right ventricle, severe TR LVEF 49% | Initially on propranolol but worsened cardiac function.  MMI instead of PTU (due to “shock liver”).  Lugol's solution Dexamethasone  Milrinone | Improved upon treatment of PAH, received fourth RAI ablation (family refused surgery). |
| Chauhan, 2020[14] | 16 years | F | Unknown/not specified | Unknown/not specified | Graves disease (UD) | Thermoregulatory dysfunction: Fever  CV: Sinus tachycardia, hypertension, atrial flutter  CNS: Slurring speech, ataxia, altered sensorium, encephalopathy | Not specified | >50 | TSH 0.02 mIU/L  fT4 7 ng/dl  T4 > 24.9 mcg/dl  TSIG elevated  TgAb elevated  US thyroid: enlarged thyroid | Propranolol, then labetalol  MMI  Nicardipine sodium nitroprusside  SSKI  Hydrocortisone Cholestyramine Dexamethasone Failure  Thyroidectomy | Failure to improve with medical management, she had life threatening hypertension and encephalopathy, needed thyroidectomy on day 13, after which neurological status and blood pressure normalized. |
| Creo, 2018 [6] | 13 years | F | None | Black | Unknown/not specified | Thermoregulatory dysfunction: Fever  CV: Sinus tachycardia, hypertension  GI: Diarrhea  CNS: After contrast injection she developed agitation and altered mental status  Presented with “choking” due to goiter. | Unknown/not specified | 85 | TSH undetectable  fT4 > 7.7 ng/dL  CT neck: Homogeneously enlarged thyroid  Echocardiogram: Normal LV and LVSF | Propranolol followed by esmolol drip  PTU  Iodine solution Hydrocortisone Cholestyramine | Mental status and vital signs improved within 2 hours. Thyroid function normalized within 24 hours. Hospitalized for 5 days. Discharged on propranolol, methimazole, lugol iodine solution. Returned for thyroidectomy 11 days after. |
| Crudo, 2021 [23] | 15 years | F | Type 1 DM  Autoimmune hypothyroidism  Recurrent episodes of DKA and TS | Caucasian | Hashimoto/ autoimmune thyroiditis | Thermoregulatory dysfunction: Fever  CV: Tachycardia, hypertension  CNS: Altered mental status, seizures | DKA | Unknown/not specified | TSH 0.163 uIU/mL  fT4 2.9 ng/dL  T3 210 ng/dL  TSI index less than baseline  Normal brain CT | Fluids and insulin infusion for DKA.  TS managed with esmolol, MMI, methylprednisolone, SKI | DKA resolved in <24 hours and she was transitioned to her home regimen of insulin.  Thyroid hormone levels became normal after 72 hours of therapy. |
| Das, 2021 [24] | 16 years | F | Graves disease  Dilated cardiomyopathy (not on heart failure) | Unknown/not specified | Graves disease (PD) | CV: Heart failure in setting of dilated cardiomyopathy (myocarditis excluded) | COVID-19 infection | Unknown/not specified | TSH 0.01 mU/L  fT4 >7.7 ng/dl  T3 3.7 ng/ml  TSI elevated  TSI index elevated  TgAb elevated  TPO Ab elevated  SARS-Cov positive (nasal PCR)  Rest of infectious workup negative  MISC labs negative except D-dimer | Metoprolol  MMI  Heart failure medications | Discharged home on heart failure medication and metoprolol. Cardiac function improved after several months |
| Grimes, 2004 [25] | 18 years | F | Graves disease, intermittent asthma | Unknown/not specified | Graves disease (PD) | Thermoregulatory dysfunction: Fever  CV: Tachycardia and hypertension | Surgery (thyroidectomy) | Unknown/not specified | Normal end-tidal carbon dioxide level.  TSH <0.1 uIU/mL  fT4 7.01 | Esmolol aliquots +  Metoprolol  Fentanyl  Cooling blanket  Icepacks  IV fluids.  PTU restarted 6 hours after surgery. | Discharged the next day after surgery. |
| Hecht, 2012 [26] | 7 years | F | Asthma, recurrent lower respiratory infections | Unknown/not specified | Graves disease (UD) | Thermoregulatory dysfunction: Fever  CV: Tachycardia  Neuro: Generalized tonic clonic seizure | Unknown/not specified | Unknown/not specified | TSH 0.02 mIU/L  fT4 87.5 pmol/L  fT3 0.34 pmol/L  TSI elevated  US neck: enlarged thyroid  Tc-99m uptake high | Propranolol, MMI switched to carbimazole, dexamethasone | Successful thyroidectomy 1.5 months later and initiation of levothyroxine. Discontinuation of atenolol, dexamethasone and carbimazole. Euthyroid on 8-month follow/up. |
| Higaki, 2020 [27] | 10 years | F | None | Asian | Graves disease (UD) | Thermoregulatory dysfunction: Fever  CV: Tachycardia  CNS: AMS, seizure | Influenza A infection  \*\*presented with airway obstruction due to goiter, respiratory failure | Unknown/not specified | TSH <0.3 mU/L  fT4 6.46 ng/dl  T3 7.51 pg/ml  TSI elevated  Elevated Thyroglobulin low  Hyponatremia 125 mEq/L  Echocardiogram with low ejection fraction  CT chest trachea narrowed with nodular goiter  Normal brain CT, MRI with lesion on corpus callosum | Landiolol  Thiamazol  Hydrocortisone SSKI | Level of consciousness and thyroid gland swelling causing airway obstruction improved.  Thyroid function tests on day 5 demonstrated significantly improved thyroid hormones |
| Kadmon, 2001 [28] | 7.5 years | M | Graves disease | Hispanic | Graves disease (PD) of difficult control | Thermoregulatory dysfunction: Fever  CV: Tachycardia  GI: Vomiting, diarrhea  CNS: Seizure | Methimazole withdrawal (5 days) /RAI uptake  Authors believe it was methimazole withdrawal | Unknown/not specified | TSH < 0.03 mU/L, T3 32.5 nmol/L  T4 596 nmol/L  fT4 > 154 pmol/L  ( 9-days post PTU withdrawal) | Propranolol  On day 9 after discontinuing the methimazole he was treated with 7 mCi 131-I  PTU  Dexamethasone  Lugol’s solution | Four days after treatment with 131 I, he vomited and had a brief generalized tonic-clonic seizure. In the emergency room, he was postictal and afebrile with normal vitals. After 5 days of medical therapy, he had no further seizures, and he was discharged on propranolol and PTU. |
| Kamasaki, 2013 [29] | 14 years | M | Moyamoya disease (bilateral carotid stenoses) | Asian | Graves disease (UD) | Thermoregulatory dysfunction (slight fever)  CV: Tachycardia, hypertension | Not specified but in the setting of Moyamoya presentation | Unknown/not specified | TSH <0.1 mIU/L  fT4 3.4 pg/dl  fT3 10.08 ng/  TgAb negative  TSI negative  TPOAb positive  US of thyroid gland- heterogeneous echotexture  Echocardiogram normal | Bisoprolol  Thiamazole  SSKI | Thyrotoxic symptoms remitted within a week.  Thyroid function normalized within a week of stopping thiamazole. He returned 2 weeks later with palpitations, at that point TSI positive and scintigraphy showed increased uptake of 99mTc.  He received treatment again with antithyroid drugs for remission. |
| Ladd, 2020 [5] | 2 years, 9 months | F | Speech delay | Unknown/not specified | Graves disease (UD) | Thermoregulatory dysfunction: Fever  CV: Tachycardia (with widened pulse pressure)  GI: Emesis, diarrhea  CNS: Generalized seizure | Unknown/not specified | >45 | TSH <0.02 mIU/L  FT4 of 60.30 pmol/L  T3 4.7 nmol/L  TSI positive  TPO positive | Propranolol  MMI  Hydrocortisone Lugol's iodine solution | Discharged 13 days later on methimazole and propranolol. Two and a half months after presentation, propranolol was discontinued and methimazole was weaned. The patient has now remained clinically stable and euthyroid on 10 mg daily of methimazole for > 6 months. |
| Laliberte, 2014 [30] | 15 years | M | Mild spastic cerebral palsy, no intellectual disability | Unknown/not specified | Cervical trauma  (Consistent with possible preexistent hyperthyroidism) | Thermoregulatory: Fever  CV: Sinus tachycardia, hypertension | Trauma +- Anesthesia induction and intubation | Unknown/not specified | WBC 11,300 /hpf  TSH undetectable  T4 30.5 mcg/dl  T3 508 pg/mL | Propranolol  MMI  SSKI | Resolution of symptoms. Discharged 6 days post-op on methimazole and propranolol. |
| Landgraf, 2008 [15] | 16 years | F | Obesity  Asthma  History of thyroid storm 2 years prior. Not on medications  Delivered a healthy boy by C-section 2 years prior  Seen in ED 1 week prior for thyrotoxic symptoms, antithyroid and beta-blocker prescribed but never filled. | Black | Hyperthyroidism (unknown specific etiology) | Thermoregulatory dysfunction: Fever  CV: Tachycardia, hypertension, tachypnea  CNS: Somnolence | Unknown/not specified | Unknown/not specified | TSH suppressed  FT4 24 mcg/dL  T3 650 ng/dL  ESR elevated  Urine toxicology negative  Urine pregnancy test negative  Iron deficiency anemia  Chest and neck Xray normal | Not specified that they gave any other treatment upfront besides ablation. | Because of a significant history of non-compliance and lack of medical follow-up, radioactive iodine ablation therapy was discussed and initiated. |
| Lee, 2011 [45] | 11 years | F | None | Asian | Graves disease (UD) | Thermoregulatory dysfunction: Fever  CV: Tachycardia, hypertension  GI: Abdominal pain, diarrhea, vomiting  CNS: Agitation, headache, seizure after 2 days | Unknown/not specified | Unknown/not specified | TSH: 0.08 μIU/mL  FT4: 5.82 ng/dL  T3: 690 ng/dL  TSI, and TgAb positive  Abnormal EEG  Echocardiogram with mitral valve prolapse | Propranolol  PTU  Hydrocortisone  Lugol’s solution | Thyrotoxic symptoms persisted including fever after 2 days of treatment w/ PTU and propranolol. He presented AMS, had a seizure, EEG abnormal, normal MRI. Normal electrolytes. Infectious workup negative. Added lugol solution and hydrocortisone. Improved after 12 days. Discharged on propranolol and PTU for 2 weeks, then just PTU. EEG and echo normalized after 1 year (took topiramate for that period of time). |
| Lee, 2011[45] | 11 years | M | Growth hormone deficiency (on treatment) | Asian | Graves disease (UD) | Thermoregulatory dysfunction: Fever  CV: Tachycardia, hypertension  CNS: Irritability, seizure | Unknown/not specified | Unknown/not specified | TSH: 0.01 μIU/mL  FT4: 5.22 ng/dL  T3: 596 ng/dL  Positive TSI, TgAb  Normal infectious workup  Normal EEG/MRI | Propranolol  PTU  Lugol’s solution Hydrocortisone | Clinically euthyroid on antithyroid medication. |
| Lee, 2011[45] | 14 years | M | Hyperthyroidism | Asian | Graves disease (PD) | CV: Hypertension  CNS: Seizure (not febrile) | Unknown/not specified | Unknown/not specified | TSH 0.07 μIU/mL  FT4 2.81 ng/dL  T3 209 ng/dL  Positive TSI | Propranolol  PTU | Clinically euthyroid on antithyroid medication, seizure free. |
| Lu Y, 2013 [31] | 14 years | F | None | Unknown/not specified | Not Unknown/not specified | Thermoregulatory dysfunction: Fever  CV: Tachycardia  Neuro: Agitation, confusion, psychosis, seizure  Given antibiotics + fluid resuscitation, but mental status deteriorated | Unknown/not specified | 70 | TSH: <0.03 mIU/mL  FT4: 2.54 ng/dL  \*\*no antibodies were done  Drug screen negative  ECG: Sinus tachycardia  Chest Xray clear  LP normal  Normal brain CT | [Β-](https://www.sciencedirect.com/topics/medicine-and-dentistry/beta-adrenergic-receptor-blocking-agent)blocker  T[hioamid](https://www.sciencedirect.com/topics/medicine-and-dentistry/thioamide)e  Glucocorticoids | Hemodynamic status and thyroid function improved. Discharged 5 days after. |
| Nagarayan, 2022 [12] | 15 years | F | Graves disease | Unknown/not specified | Graves disease (PD) | Thermoregulatory dysfunction: Fever, chills  CV: Tachycardia, Hypotensive delayed capillary refill  \*\*Presented with dysphagia, fever for 5 days, discontinued methimazole and atenolol since | Strep pyogenes bacteremia and sepsis  Suspended medications since symptoms started | Unknown/not specified | TSH: 0.01 μIU/mL  Neutropenia  CT with bilateral tonsillar abscess/phlegmon  Blood culture positive for Streptococcus pyogenes | Lugol’s iodide Hydrocortisone  5 cycles of plasmapheresis  G-CSF  \*\*Beta blocker could not be used as she was in septic shock | Thyroid function normalized after 5 courses of plasmapheresis (3 on consecutive days and 2 more on alternate days). Thyroid function improved. Thyroidectomy was performed the day after the last cycle. Discharged home after 2 weeks on levothyroxine. 6-month follow up reassuring. |
| Majlesi, 2010[32] | 2 years | F | None | Caucasian | Levothyroxine ingestion (6 mg total) | Given activated charcoal 1.5 hours after. Discharged home after 24 hours  On day 5 post ingestion:  Thermoregulatory dysfunction: Fever  CV: Tachycardia, hypertension  GI: Vomiting, diarrhea  Neuro: Tremor, irritability, lethargy | Levothyroxine overdose | Unknown/not specified | 6-hour post ingestion:  TSH: Undetectable  T4: 68.1 ug/dL  T3: 472 ng/dL | On day 5 when she came back to ED:  Propranolol Prednisolone  Normal saline solution  Ibuprofen | Clinically euthyroid. |
| Matsubara, 2021 [33] | 9 years | F | None | Asian (Japanese) | Graves disease (UD) | Thermoregulatory dysfunction: Fever  CV: Tachycardia  GI: Diarrhea, hepatitis  CNS: Altered mental status | Unknown/not specified | 85 | Leukocytosis  Elevated CRP  AST 80 U/L, ALT 54 U/L  Metabolic acidosis  Hyponatremia  TSH: 0.013 μIU/mL  FT4: 5.2 ng/dL  Positive TSI, TPO, TgAb  CSF clear  Blood cultures negative  MRI: Lesions in corpus callosum  \*\*Neurological manifestations attributed to thyroid storm | Methylprednisolone pulses followed by thiamazole | Thyroid function and clinical picture improved on steroid treatment. Thiamazole started on day 11 of admission, discharged on day 12 without neurological sequelae. |
| Merchant, 2019 [46] | 20 months | F | McCune Albright with associated fibrous dysplasia and central precocious puberty | Hispanic | McCune Albright (secondary hyperthyroidism) | Unknown/not specified | Influenza A infection (5 weeks after diagnosis of McCune Albright) | Unknown/not specified | FT4 6.7 ng/dL  T3 > 781 ng/dL  Negative TSI  Nuclear scan with increased iodine uptake | MMI  and steroids at maximum doses  (minimal improvement) | She achieved appropriate suppression of pubertal hormones 18 months after thyroidectomy. |
| Mochizuki, 2014 [34] | 14 years | F | Mild developmental delay | Asian | Graves disease (UD) | Termoreg dysfunction: Fever, diaphoresis  CV: Tachycardia  GI: Diarrhea | Rewarming after traumatic brain injury  \*\*they noted sedation may suppress the stress-induced reaction, and rewarming may reveal them | Not specified | TSH <0.005 μIU/mL  FT4 5.0 ng/dL  FT3 13.5 pg/mL.  Positive TSI | Propranolol  MMI  SSKI  Corticosteroids | Suppressed TSH, normalized FT4 and T3. |
| Morrison, 2007 [35] | 5 years | M | Mild asthma | Hispanic | Graves disease (UD) | CV: Tachycardia, severe hypertension | Surgery (Myringotomy with tympanostomy, tonsillectomy and adenoidectomy) and/or anesthesia  \*Malignant hyperthermia ruled out | Unknown/not specified | TSH <0.010 mcIU/mL  fT4 3.58 ng/dL  TSI: elevated | Labetalol during surgery.  Started on PTU | Discharged home next day. Doing well at follow-up. |
| Niles, 2019 [13] | 15 years | M | ALL with recent induction chemotherapy | Caucasian | Infectious thyroiditis | Thermoregulatory dysfunction: Fever  CV: Tachycardia, hypotension, systolic HF  Neuro: Brisk reflexes, tremor.  \*presented with neck pain and swelling, dizziness, odynophagia as well. Previously treated for Strep throat.  \*Despite clearance of candidemia, tachycardia and palpitations persisted. On day 7 diagnosed with HF and therefore thyroid storm. | Candidemia (C. tropicalis), candida thyroiditis | Unknown/not specified | ANC 30 cells/microL  TSH 0.08 IU/mL  FT4 > 6.9 ng/dL  Negative TSI | MMI (started on day 3) switched to PTU as soon as he was diagnosed with TS  High dose steroids  3 rounds of plasmapheresis | Heart function improved after 3 rounds of plasmapheresis.  Had hypothyroid phase.  Thyroidectomy 9 weeks after. Found to have a granulomatous, necrotizing cavitary fungal abscess  Moderately impaired cardiac and renal function (latter one likely due to amphotericin) |
| Nogami, 2021 [1] | 14 year | M | None | Asian (Japanese) | Graves disease (UD) | Thermoregulatory dysfunction: Diaphoresis, fever  CV: Tachycardia  GI: Diarrhea, vomiting  Neuro: Agitation, altered mental status | Unknown/not specified | 70 | TSH <0.01 uIU/mL  FT4 7.65 ng/dL  T3 24.7 pg/mL  Positive TSI | Propranolol,  PTU then MMI, Lugol’s solution Hydrocortisone, Acetaminophen | Not described, “discharged home without complications” |
| Nogami, 2021 [1] | 10 years | M | None | Asian (Japanese) | Graves disease (UD) | Thermoregulatory dysfunction:  CV: Tachycardia, hypertension  GI: Abdominal pain, diarrhea  Neuro: Somnolence, lethargy | Unknown/not specified | 45 | TSH <0.01 uIU/mL  FT4 7.81 ng/dL  FT3 32.61 pg/mL  Positive TSI | Landiolol  MMI  Hydrocortisone | On the seventh day, he was discharged and continued to take propylthiouracil and propranolol. He was free of seizures during the months following admission and remained in a euthyroid state. |
| Nogami, 2021 [1] | 13 years | F | None | Asian (Japanese) | Graves’ disease (UD) | Thermoregulatory dysfunction:  Fever  CV: Tachycardia,  GI: Vomiting, diarrhea  Neuro: Difficulty speaking, comatose | Unknown/not specified | 120 | TSH <0.01 uIU/mL  FT4 3.48 ng/dL  T3 7.03 pg/mL  Positive TSI | Landiolol  MMI  Lugol’s solution  Hydrocortisone, Acetaminophen | Brain herniation, cerebellar infarction. Death 5 days after admission. |
| Noh, 2016 [36] | 16 years | F | None | Unknown/not specified | Hashimoto/ autoimmune thyroiditis | Thermoregulatory dysfunction:  Fever, diaphoresis  CV: Palpitations, tachycardia  GI: Hepatitis  Neuro: Dizziness, agitation, confusion | DKA, Moya-moya | 65 | TSH <0.001 U/mL  fT4 9.1 ng/dL  fT3 7.24 ng/mL  Positive TSI and TPO | MMI  Lugol solution  Hydrocortisone | Neurological status resolved within 1 month. Clinically euthyroid after 8 weeks. |
| Page, 2008 [37] | 18 years | M | None | Unknown/not specified | TSH-secreting pituitary adenoma | Thermoregulatory dysfunction:  Fever  CV: Tachycardia, hypertension  Neuro: Lethargy, confusion  \*No infectious cause identified for the fever and AMS | Adenoma resection (developed immediately after) | Unknown/not specified | TT4 24.6 μg/dL  FT4 6.8 ng/dL  TT3 316 ng/dL  \*Night before intervention he had a normal CBC, electrolytes, cortisol, TSH 6.4 mIU/L  Histology of tumor consistent with pituitary adenoma. IHQ positive for both TSH and GH | B- blockers  PTU  Dexamethasone | Thyroid hormone levels returned to baseline and clinical manifestations subsided 4 days postoperatively.  Beta-blocker discontinued 7 days postoperatively.  Cortisol level normal 48 hours after discontinuation of dexamethasone  At follow up his thyroid hormones had doubled, imaging showed residual tumor. He was initiated on somatostatin analogue. |
| Pandhia, 2019 [38] | 17 years | F | None | Black | Hashimoto/ autoimmune thyroiditis | CV: Persistent supraventricular tachycardia (refractory to adenosine treatment)  GI: Nausea, vomiting, diarrhea | Unknown/not specified | 45 | TSH 0.17 μIU/mL  FT 4.9 μIU/mL  FT3 >20 pg/ml  Positive TPO  Thyroid US: Enlarged, heterogeneous, and hypervascular gland | Propranolol  MMI, Hydrocortisone | Symptoms resolved in a few hours. |
| Rohrs, 2014 [39] | 11 years | F | Graves disease | Caucasian | Graves disease (PD) | Thermoregulatory dysfunction:  CV: Tachycardia  Neuro: Lethargy, unresponsiveness, seizure, right upper extremity weakness | RAI ablation | Unknown/not specified | TSH <0.01 mIU/L  FT4 >6 ng/dL  T3 >500 ng/dL | Propranolol  PTU (switched to MMI)  SSKI  Hydrocortisone | Clinically euthyroid 8 months post ablation. Left MCA stroke.  Seizure disorder |
| Sen, 2018[40] | 16 years | M | None | Hispanic | Trauma | Thermoregulatory dysfunction:  Fever  CV: Tachycardia, hypertension  Neuro: Agitation | Electrical injury to neck and chest that required bilateral leg amputation, complicated with pseudomonas pneumonia | 75 | TSH 0.043 IU/mL  FT4 2.98 ng/dL  FT3 3.7 pg/mL (normal)  TSI, TPO, TSHAb, and anti-thyroglobulin normal  CT of head, neck, chest, abdomen and spine- no abnormalities | Propranolol  MMI  Hydrocortisone | Clinically euthyroid after a few days. Methimazole and hydrocortisone were weaned and discontinued after several weeks. Post burn sequelae (wound infections,, pneumonia) |
| Sonoda, 2019[9] | 17 years | M | Galactosemia  Congenital portosystemic venous shunt  PAH | Japanese | PGI2 induced | CV: Tachycardia,  heart failure. PAH exacerbation. | Prostaglandin treatment  (known to cause hyperthyroidism) | Unknown/not specified | TSH < 0.01 IU/mL  FT4 6.3 ng/dL  TSI positive  Thyroglobulin antibody positive  CRP 1.8 mg/dl | Thiamazole  SSKI  Hydrocortisone  High dose methylprednisolone and  destructive radioiodine therapy (88th day of admission) | Discharged after 132 days  PGI2 was continued due to severe PAH. |
| Tamgumus, 2021, [41] | Newborn (35+3 WGA) | M | Prematurity Meconium stained amniotic fluid | Caucasian (Celtic irish) | Neonatal hyperthyroidism (maternal TSI) | CV: Tachycardia, pulmonary hypertension, reduced cardiac function | Maternal history of Graves disease | Unknown/not specified | TSH <0.01 mIU/L  fT4 78.4 pmol/L  TSI elevated  TPO normal | Esmolol  Carbimazole  Lugol’s iodine | Lugol iodine stopped after 4 days. Carbimazole weaned. Subsequently became hypothyroid and placed on replacement therapy. |
| Tsutaoka, 2005 [42] | 3 years | M | Exposed to cocaine in utero  Meconium aspiration and pneumothorax | Unknown/not specified | Unintentional levothyroxine overdose (0.003 g) | CV: Tachycardia, hypertension  CNS: GTC, altered mental status  GI: Diarrhea  \*Symptoms occurred on day 3 post ingestion | Levothyroxine overdose | Unknown/not specified | TSH 0.26 mU/L  T4 >24 ug/dL  Normal glucose and electrolytes  Normal acetaminophen and salicylate levels  No imaging. | None | Asymptomatic 1 week later and at 10- month follow up. |
| Thakur, 2020 [43] | 16 years | F | None | Asian (India) | Not reported | Thermoregulatory dysfunction: Fever  CV: Atrial fibrillation, hypertension | Pneumonia with empyema | 65 | TSH <0.004 mU/L  FT4 7.16 ng/dl  FT3 27.8 ng/dl | Propranolol  MMI  Antibiotics | Improvement of tachyarrhythmia within 48 hours but continued with fevers. |
| Underland, 2016 [44] | 5 years | M | None | Black | Graves disease (UD) | Thermoregulatory dysfunction: Fever  CV: Tachycardia, hypertension,  Cardiac failure  GI: Vomiting, diarrhea  CNS: Lethargy | Streptococcal pharyngitis | Unknown/not specified | TSH: < 0.005 uU/mL  FT4: > 7.77 ng/dL  TSI positive  Streptozyme test positive  Microscopic hematuria, proteinuria  BNP: 19 632  Chest X-ray: cardiomegaly  Echocardiogram: Dilated cardiomyopathy with severely dilated left ventricle and severely decreased LVSF.  Advanced bone age, consistent with long standing hyperthyroidism | Atenolol  MMI  Penicillin G | Over the next several days, his heart rate, blood pressure, and mental status improved and his thyroid function tests normalized  LVSF showed significant improvement after three weeks of treatment. Discharged home on methimazole and atenolol on hospital day 15. Hematuria slowly resolved after discharge over the next few days. Repeat labs performed 8 weeks after hospitalization showed normal electrolytes and C3 levels, confirming the diagnosis of poststreptococcal glomerulonephritis.  At follow-up, he had a bone age done which showed significantly advanced age, consistent with history of long-standing hyperthyroidism. Atenolol discontinued several months later. Remained on methimazole |
| Vyas, 2021 [10] | 21 months | M | None | Hispanic | Paraneoplastic | CV: Tachycardia, hypertension  GI: Abdominal pain  Neuro: Anxiety | Hepatoblastoma | 45 | TSH < 0.02 mcU/mL  FT4: 5.8 ng/dL  Negative TSI, TRAb, anti-thyroglobulin and anti-TPO antibodies. | Propranolol  MMI  SSKI | Methimazole dose requirements gradually decreased with eventual discontinuation 1 week after initiation of chemotherapy. He has remained clinically euthyroid off methimazole for almost 3 months with normal thyroid function. |

**Abbreviations:** Antithyroglobulin antibody (TgAb), thyroid receptor antibody (TRAb), acute lymphoblastic leukemia (ALL), diabetic ketoacidosis (DKA), diabetes mellitus (DM), Graves disease (GD), emergency department (ED), free thyroxine (FT4), free iodothyronine (FT3), heart failure (HF), left ventricular hypertrophy (LVH), left ventricular systolic function (LVSF), methimazole (MMI), middle cerebral artery (MCA), pulmonary arterial hypertension (PAH), previously diagnosed (PD), propylthiouracil (PTU), pulmonary arterial hypertension (PAH), radioactive iodine (RAI), SSKI (potassium iodide), tricuspid regurgitation (TR), thyroid storm (TS), thyroid-stimulating immunoglobulin (TSI), thyroid peroxidase antibodies (TPO), thyroid stimulating hormone (TSH), UD (undiagnosed), weeks of gestational age (WGA).