**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 tachycardiaGI: EmesisCNS: Altered mental status (confusion) | Unknown/not specified | 75 | TSH <0.01 IU/L fT4 87 pmol/LT3 18.2 pmol/LTSI positiveECG with prolonged QTc interval and T wave abnormalities  | PropranololCarbimazolePrednisoloneLugol'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 21VSD repairUnvaccinated | Unknown/not specified | Graves disease (UD) | CV: Sinus tachycardia, hypotension, hypoxic respiratory failure, cardiac arrest leading multiorgan system failureGI: Non bloody diarrhea, emesisCNS: Altered mental status (lethargy) | Unknown/not specified | 60 | Throat swab positive for S. pyogenesTSH 0.01 IU/mLfT4 4.52 ng/dLT3 7.38 pg/mLTSI positive | PTU switched to MMI to prevent further liver toxicityHydrocortisoneSSKIVasopressorsECMO | 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: FeverCV: Sinus tachycardia, hypertension, tachypnea, respiratory distressCNS: Agitation | Unknown/not specified | 60 | Nasal swab + RSV antibodyTSH 0.01 IU/mL,fT4 8.17 ng/dL,fT3 1918 pg/mL,TSI positiveTPO positiveTGAB positive | EsmololPTUDexamethasoneSSKIBronchodilators | 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: FeverCV: Sinus tachycardiaGI: EmesisCNS: Confusion, agitation | IV drug abuse, RUE abscess | 75 | LeukocytosisTSH 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 DopplerBlood culture + MRSA | Beta blockerMMIHigh 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, hypertensionGI-hepatic dysfunction: hyperbilirubinemia | Unknown/not specified | Unknown/unable to calculate | TSH <0.05 mIU/LTPO 541 IU/mLfT4 101 pmol/LEchocardiogram: sinus tachycardiaEchocardiogram: mild LVHThyroid US: diffuse thyroiditis, no focal lesion | Propranololcarbimazole | 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/mLfT4 >7.0 ng/dLCT abdomen: Volvulus and bowel obstructionElectrolytes, glucose, Hep B, C, TORCH normal | EsmololHydrocortisone | 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: FeverCV: Tachycardia, hypotensionNeuro: Irritability | Unknown/not specified | Unknown/not specified | TSH 0.005 uIU/mLT3 6.34 nmol/LT4 > 309 nmol/LHypernatremiaLeukocytosisElevated procalcitoninMetabolic acidosis with hyperchloremia (normal anion gap) | PropranololPTUHydrocortisoneEmpiric 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 perfusionCV: Cardiogenic shock secondary to PAHCNS: Seizure | Unknown/not specified | 65 | TSH 0.29 mU/LFT3 >30 pg/mLFT4 3.65 ng/dLElevated AST, ALTThrombocytopeniaProlonged coagulation times low fibrinogen, elevated D-dimerChest Xray with cardiomegaly with dilated pulmonary arteriesEchocardiogram: 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 DexamethasoneMilrinone | 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: FeverCV: Sinus tachycardia, hypertension, atrial flutterCNS: Slurring speech, ataxia, altered sensorium, encephalopathy | Not specified  | >50 | TSH 0.02 mIU/LfT4 7 ng/dlT4 > 24.9 mcg/dlTSIG elevatedTgAb elevatedUS thyroid: enlarged thyroid | Propranolol, then labetalolMMINicardipine sodium nitroprusside SSKIHydrocortisone Cholestyramine Dexamethasone FailureThyroidectomy | 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: FeverCV: Sinus tachycardia, hypertensionGI: DiarrheaCNS: After contrast injection she developed agitation and altered mental statusPresented with “choking” due to goiter. | Unknown/not specified | 85 | TSH undetectablefT4 > 7.7 ng/dLCT neck: Homogeneously enlarged thyroidEchocardiogram: Normal LV and LVSF | Propranolol followed by esmolol dripPTUIodine 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 DMAutoimmune hypothyroidismRecurrent episodes of DKA and TS | Caucasian | Hashimoto/ autoimmune thyroiditis | Thermoregulatory dysfunction: FeverCV: Tachycardia, hypertensionCNS: Altered mental status, seizures | DKA | Unknown/not specified | TSH 0.163 uIU/mL fT4 2.9 ng/dLT3 210 ng/dLTSI index less than baselineNormal 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 diseaseDilated 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/LfT4 >7.7 ng/dlT3 3.7 ng/mlTSI elevatedTSI index elevatedTgAb elevatedTPO Ab elevatedSARS-Cov positive (nasal PCR)Rest of infectious workup negativeMISC labs negative except D-dimer | MetoprololMMIHeart 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: FeverCV: Tachycardia and hypertension | Surgery (thyroidectomy) | Unknown/not specified | Normal end-tidal carbon dioxide level. TSH <0.1 uIU/mLfT4 7.01 | Esmolol aliquots + MetoprololFentanylCooling blanketIcepacksIV 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: FeverCV: TachycardiaNeuro: Generalized tonic clonic seizure | Unknown/not specified | Unknown/not specified | TSH 0.02 mIU/LfT4 87.5 pmol/LfT3 0.34 pmol/LTSI elevatedUS neck: enlarged thyroidTc-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: FeverCV: TachycardiaCNS: AMS, seizure | Influenza A infection\*\*presented with airway obstruction due to goiter, respiratory failure | Unknown/not specified | TSH <0.3 mU/LfT4 6.46 ng/dlT3 7.51 pg/mlTSI elevatedElevated Thyroglobulin lowHyponatremia 125 mEq/LEchocardiogram with low ejection fractionCT chest trachea narrowed with nodular goiterNormal brain CT, MRI with lesion on corpus callosum | LandiololThiamazolHydrocortisone 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: FeverCV: TachycardiaGI: Vomiting, diarrheaCNS: Seizure  | Methimazole withdrawal (5 days) /RAI uptakeAuthors believe it was methimazole withdrawal | Unknown/not specified | TSH < 0.03 mU/L, T3 32.5 nmol/LT4 596 nmol/LfT4 > 154 pmol/L( 9-days post PTU withdrawal) | Propranolol On day 9 after discontinuing the methimazole he was treated with 7 mCi 131-IPTUDexamethasoneLugol’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/LfT4 3.4 pg/dlfT3 10.08 ng/TgAb negativeTSI negativeTPOAb positiveUS of thyroid gland- heterogeneous echotextureEchocardiogram normal | BisoprololThiamazoleSSKI | 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: FeverCV: Tachycardia (with widened pulse pressure)GI: Emesis, diarrheaCNS: Generalized seizure | Unknown/not specified | >45 | TSH <0.02 mIU/L FT4 of 60.30 pmol/L T3 4.7 nmol/L TSI positiveTPO positive | PropranololMMIHydrocortisone 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: FeverCV: Sinus tachycardia, hypertension | Trauma +- Anesthesia induction and intubation | Unknown/not specified | WBC 11,300 /hpfTSH undetectableT4 30.5 mcg/dlT3 508 pg/mL | PropranololMMISSKI | Resolution of symptoms. Discharged 6 days post-op on methimazole and propranolol. |
| Landgraf, 2008 [15] | 16 years | F | ObesityAsthmaHistory of thyroid storm 2 years prior. Not on medications Delivered a healthy boy by C-section 2 years priorSeen in ED 1 week prior for thyrotoxic symptoms, antithyroid and beta-blocker prescribed but never filled. | Black | Hyperthyroidism (unknown specific etiology) | Thermoregulatory dysfunction: FeverCV: Tachycardia, hypertension, tachypneaCNS: Somnolence | Unknown/not specified | Unknown/not specified | TSH suppressedFT4 24 mcg/dLT3 650 ng/dLESR elevatedUrine toxicology negativeUrine pregnancy test negativeIron deficiency anemiaChest 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: FeverCV: Tachycardia, hypertensionGI: Abdominal pain, diarrhea, vomitingCNS: Agitation, headache, seizure after 2 days | Unknown/not specified | Unknown/not specified | TSH: 0.08 μIU/mLFT4: 5.82 ng/dLT3: 690 ng/dLTSI, and TgAb positiveAbnormal EEGEchocardiogram with mitral valve prolapse | PropranololPTUHydrocortisoneLugol’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: FeverCV: Tachycardia, hypertensionCNS: Irritability, seizure | Unknown/not specified | Unknown/not specified | TSH: 0.01 μIU/mLFT4: 5.22 ng/dLT3: 596 ng/dLPositive TSI, TgAbNormal infectious workupNormal EEG/MRI | Propranolol PTULugol’s solution Hydrocortisone | Clinically euthyroid on antithyroid medication. |
| Lee, 2011[45] | 14 years | M | Hyperthyroidism  | Asian | Graves disease (PD) | CV: HypertensionCNS: Seizure (not febrile) | Unknown/not specified | Unknown/not specified | TSH 0.07 μIU/mLFT4 2.81 ng/dLT3 209 ng/dLPositive TSI | PropranololPTU | Clinically euthyroid on antithyroid medication, seizure free. |
| Lu Y, 2013 [31] | 14 years | F | None | Unknown/not specified | Not Unknown/not specified | Thermoregulatory dysfunction: FeverCV: TachycardiaNeuro: Agitation, confusion, psychosis, seizureGiven antibiotics + fluid resuscitation, but mental status deteriorated | Unknown/not specified | 70 | TSH: <0.03 mIU/mLFT4: 2.54 ng/dL\*\*no antibodies were doneDrug screen negative ECG: Sinus tachycardiaChest Xray clearLP normalNormal brain CT | [Β-](https://www.sciencedirect.com/topics/medicine-and-dentistry/beta-adrenergic-receptor-blocking-agent)blockerT[hioamid](https://www.sciencedirect.com/topics/medicine-and-dentistry/thioamide)eGlucocorticoids | 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, chillsCV: Tachycardia, Hypotensive delayed capillary refill\*\*Presented with dysphagia, fever for 5 days, discontinued methimazole and atenolol since | Strep pyogenes bacteremia and sepsisSuspended medications since symptoms started | Unknown/not specified | TSH: 0.01 μIU/mLNeutropeniaCT with bilateral tonsillar abscess/phlegmonBlood culture positive for Streptococcus pyogenes | Lugol’s iodide Hydrocortisone 5 cycles of plasmapheresisG-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 hoursOn day 5 post ingestion:Thermoregulatory dysfunction: FeverCV: Tachycardia, hypertensionGI: Vomiting, diarrheaNeuro: Tremor, irritability, lethargy | Levothyroxine overdose | Unknown/not specified | 6-hour post ingestion: TSH: UndetectableT4: 68.1 ug/dLT3: 472 ng/dL | On day 5 when she came back to ED:Propranolol Prednisolone Normal saline solutionIbuprofen | Clinically euthyroid. |
| Matsubara, 2021 [33] | 9 years | F | None | Asian (Japanese) | Graves disease (UD) | Thermoregulatory dysfunction: FeverCV: TachycardiaGI: Diarrhea, hepatitisCNS: Altered mental status | Unknown/not specified | 85 | LeukocytosisElevated CRPAST 80 U/L, ALT 54 U/LMetabolic acidosisHyponatremiaTSH: 0.013 μIU/mLFT4: 5.2 ng/dLPositive TSI, TPO, TgAbCSF clearBlood cultures negativeMRI: 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/dLT3 > 781 ng/dLNegative TSINuclear 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, diaphoresisCV: TachycardiaGI: 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/mLFT4 5.0 ng/dLFT3 13.5 pg/mL.Positive TSI | PropranololMMISSKICorticosteroids | 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/mLfT4 3.58 ng/dLTSI: 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: FeverCV: 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/microLTSH 0.08 IU/mLFT4 > 6.9 ng/dLNegative TSI | MMI (started on day 3) switched to PTU as soon as he was diagnosed with TSHigh dose steroids3 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 abscessModerately 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, feverCV: TachycardiaGI: Diarrhea, vomitingNeuro: Agitation, altered mental status | Unknown/not specified | 70 | TSH <0.01 uIU/mLFT4 7.65 ng/dLT3 24.7 pg/mLPositive 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, hypertensionGI: Abdominal pain, diarrheaNeuro: Somnolence, lethargy | Unknown/not specified | 45 | TSH <0.01 uIU/mLFT4 7.81 ng/dLFT3 32.61 pg/mLPositive TSI | LandiololMMI 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:FeverCV: Tachycardia, GI: Vomiting, diarrheaNeuro: Difficulty speaking, comatose | Unknown/not specified | 120 | TSH <0.01 uIU/mLFT4 3.48 ng/dLT3 7.03 pg/mLPositive TSI | LandiololMMILugol’s solutionHydrocortisone, 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, diaphoresisCV: Palpitations, tachycardiaGI: HepatitisNeuro: Dizziness, agitation, confusion | DKA, Moya-moya | 65 | TSH <0.001 U/mLfT4 9.1 ng/dLfT3 7.24 ng/mLPositive TSI and TPO  | MMILugol solutionHydrocortisone | 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:FeverCV: Tachycardia, hypertensionNeuro: Lethargy, confusion\*No infectious cause identified for the fever and AMS | Adenoma resection (developed immediately after) | Unknown/not specified | TT4 24.6 μg/dLFT4 6.8 ng/dLTT3 316 ng/dL\*Night before intervention he had a normal CBC, electrolytes, cortisol, TSH 6.4 mIU/LHistology of tumor consistent with pituitary adenoma. IHQ positive for both TSH and GH | B- blockersPTUDexamethasone | 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 dexamethasoneAt 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/mLFT 4.9 μIU/mLFT3 >20 pg/mlPositive TPOThyroid US: Enlarged, heterogeneous, and hypervascular gland  | PropranololMMI, Hydrocortisone | Symptoms resolved in a few hours. |
| Rohrs, 2014 [39] | 11 years | F | Graves disease | Caucasian | Graves disease (PD)  | Thermoregulatory dysfunction:CV: TachycardiaNeuro: Lethargy, unresponsiveness, seizure, right upper extremity weakness | RAI ablation | Unknown/not specified | TSH <0.01 mIU/LFT4 >6 ng/dLT3 >500 ng/dL | PropranololPTU (switched to MMI) SSKIHydrocortisone | Clinically euthyroid 8 months post ablation. Left MCA stroke.Seizure disorder |
| Sen, 2018[40] | 16 years | M | None | Hispanic | Trauma | Thermoregulatory dysfunction:FeverCV: Tachycardia, hypertensionNeuro: Agitation | Electrical injury to neck and chest that required bilateral leg amputation, complicated with pseudomonas pneumonia | 75 | TSH 0.043 IU/mLFT4 2.98 ng/dLFT3 3.7 pg/mL (normal)TSI, TPO, TSHAb, and anti-thyroglobulin normalCT of head, neck, chest, abdomen and spine- no abnormalities | PropranololMMIHydrocortisone | 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 | GalactosemiaCongenital portosystemic venous shuntPAH | Japanese | PGI2 induced  | CV: Tachycardia,heart failure. PAH exacerbation.  | Prostaglandin treatment (known to cause hyperthyroidism) | Unknown/not specified | TSH < 0.01 IU/mLFT4 6.3 ng/dLTSI positiveThyroglobulin antibody positiveCRP 1.8 mg/dl | ThiamazoleSSKIHydrocortisoneHigh dose methylprednisolone anddestructive radioiodine therapy (88th day of admission) | Discharged after 132 daysPGI2 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/LfT4 78.4 pmol/LTSI elevatedTPO normal | EsmololCarbimazoleLugol’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 uteroMeconium aspiration and pneumothorax | Unknown/not specified | Unintentional levothyroxine overdose (0.003 g) | CV: Tachycardia, hypertension CNS: GTC, altered mental statusGI: Diarrhea\*Symptoms occurred on day 3 post ingestion | Levothyroxine overdose | Unknown/not specified | TSH 0.26 mU/LT4 >24 ug/dLNormal glucose and electrolytesNormal acetaminophen and salicylate levelsNo 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: FeverCV: Atrial fibrillation, hypertension | Pneumonia with empyema | 65 | TSH <0.004 mU/LFT4 7.16 ng/dlFT3 27.8 ng/dl | PropranololMMIAntibiotics | Improvement of tachyarrhythmia within 48 hours but continued with fevers. |
| Underland, 2016 [44] | 5 years | M | None | Black | Graves disease (UD) | Thermoregulatory dysfunction: FeverCV: Tachycardia, hypertension,Cardiac failureGI: Vomiting, diarrheaCNS: Lethargy | Streptococcal pharyngitis  | Unknown/not specified | TSH: < 0.005 uU/mLFT4: > 7.77 ng/dLTSI positiveStreptozyme test positiveMicroscopic hematuria, proteinuriaBNP: 19 632 Chest X-ray: cardiomegalyEchocardiogram: Dilated cardiomyopathy with severely dilated left ventricle and severely decreased LVSF.Advanced bone age, consistent with long standing hyperthyroidism | AtenololMMIPenicillin 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, hypertensionGI: Abdominal painNeuro: Anxiety | Hepatoblastoma | 45 | TSH < 0.02 mcU/mLFT4: 5.8 ng/dLNegative TSI, TRAb, anti-thyroglobulin and anti-TPO antibodies. | PropranololMMI 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).