



93 yo man with hypothermia

Sharon H. Chou

Endorama


February 7, 2013



History of Present Illness

- 93 year old Mexican man who travels between Chicago and Mexico.
 - His daughter was visiting him in Mexico, saw his edematous, erythematous, scaly legs, and brought him back to Chicago.
 - Found to be hypothermic to 33.1°C (91.6°F) rectally, new atrial fibrillation (HR 40-60).
 - TSH returned 14.18.
 - Received hydrocortisone 100 mg IV x1, followed by levothyroxine 100 mcg IV x1.

The First 24 hours



A horizontal timeline with vertical end caps at each end. Two vertical arrows point upwards from below the timeline to specific points. The first arrow is positioned under the 'HC100 mcg IV' label. The second arrow is positioned under the 'LT4 100 mcg IV' label. Above the timeline, physiological parameters (Temp, HR, BP) are listed in four columns, corresponding to different time points.

Temp	33.1 (91.6)	35.6 (96.1)	37.1 (98.8)	35.7 (96.3)
HR	39-58	59-70	53-74	43-64
BP	128/74	110/54	103/48	103/50

HC100 mcg IV

LT4 100 mcg IV

Past Medical History

- Past Medical History:
 - Diet-controlled diabetes mellitus type 2
 - NO history of thyroid problems
- Medications:
 - None
- Social History:
 - Living with a different daughter in Mexico
 - Quit tobacco over 30 years ago
- Family History:
 - No known thyroid disease

Past Medical History

- ROS:

- Weight loss of 3 kg in the last few months
- Good appetite
- No cold intolerance
- No dry skin
- + constipation
- No palpitations

Physical Exam

- BP 97/46 | Pulse 50 | Temp 36.1 °C (97 °F) (Tympanic) | Resp 16 | Ht 152.4 cm (5') | Wt 68.04 kg (150 lb) | BMI 29.30 kg/m² | SpO₂ 94%
- Constitutional: Patient appears stated age, in no acute distress.
- Eyes: Conjunctivae are not injected. Sclerae anicteric. R pupil is postsurgical. L pupils is round and reactive to light. Extraocular movements are intact.
- ENT: Mucous membranes moist. No buccal hyperpigmentation.
- Neck: Supple. No thyromegaly or nodules palpated.
- Cardiovascular: Bradycardic, irregularly irregular. Systolic murmur appreciated. Diminished distal pulses.
- Respiratory/Chest: Normal respiratory effort. No wheezes or crackles.
- Gastrointestinal/Abdomen: Normoactive bowel sounds. Soft, nontender, nondistended.
- Musculoskeletal/extremities: 3+ peripheral edema. Ulcer on ball of L foot.
- Neurological: Alert and oriented to person, Chicago, and December 1999. Normal deep tendon reflexes.
- Skin: Blanching erythematous rash on back. Dry, scaly erythematous rash in bilateral groin. Bilateral lower extremities erythematous, edematous, warm, and scaly. No acanthosis nigrans noted.
- Psychiatric: Somewhat confused, able to joke with daughter.



Labs

~~141 106 20~~
~~4.7 29 0.9~~ 118
Ca 8.8, Phos 3.6, Mg 2.3

Total protein 6.8, alb 2.9
Tbili 0.2, alk phos 103
AST 23, ALT 20

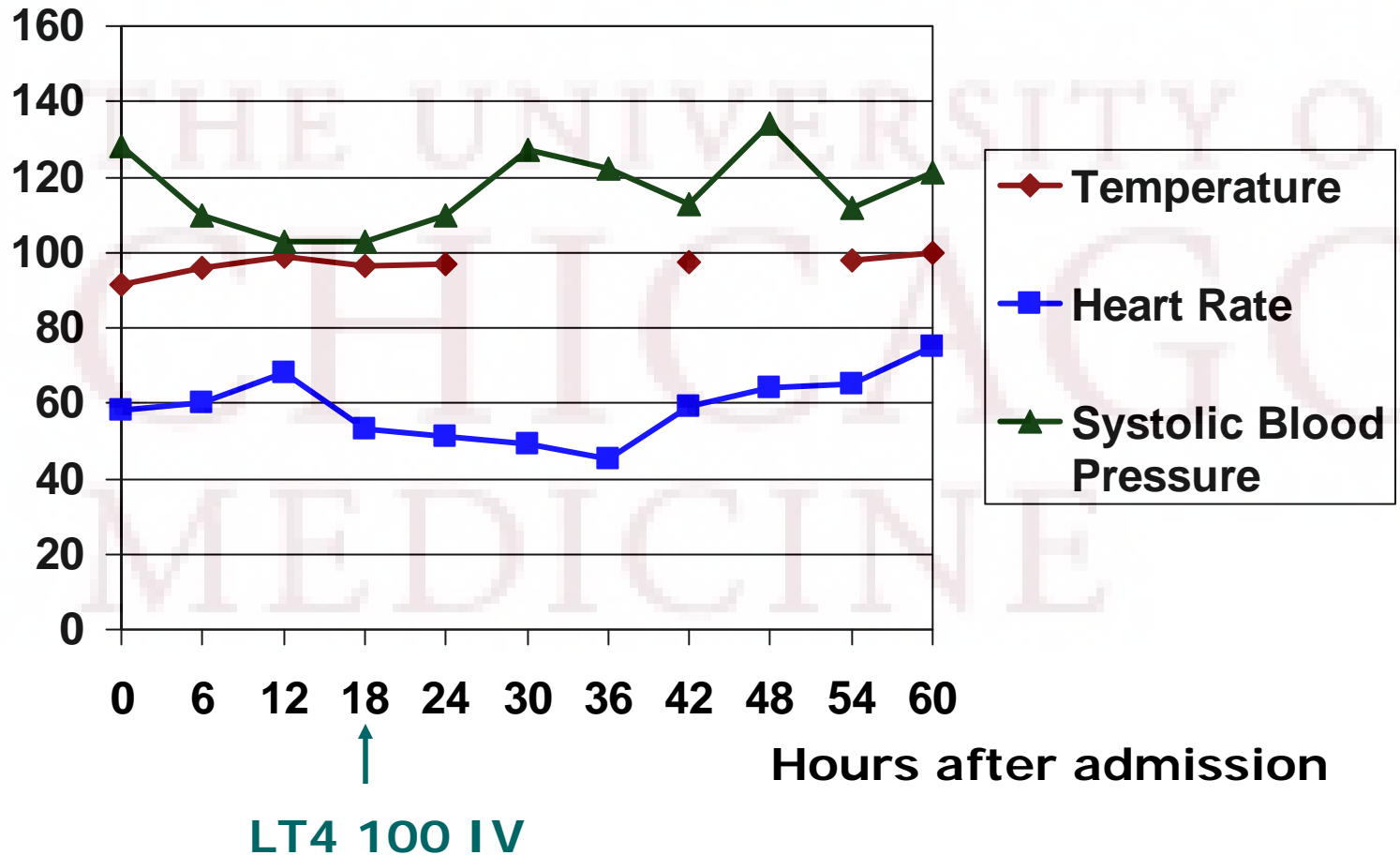
CK 32, CKMB 6.7
TropT 0.03
BNP 1061 (<450)

~~14.6~~
~~7.2 185~~
~~42.4~~

TSH 14.18
fT4 1.58 (0.9-1.7)
T4 5.6 (5-11.6)
T3 64 (80-195)
Neg TPO, Tg antibodies

A1c 6.7
Cort stim:
11:30 AM 20 (19.8)→28

The Effects





Assessment & Plan

- Subclinical Hypothyroidism:
 - LT4 12.5 mcg daily
 - Recheck in 1 month
- Concern for Adrenal Insufficiency:
 - Cort stim
- Hypothermia:
 - Sepsis: pneumonia, cellulitis
 - Vascular insufficiency
 - Malnutrition
 - Neuromuscular inefficiency (extremes of age, impaired shivering, inactivity)
 - Environmental exposure
- Diabetes mellitus type 2, diet controlled: BS 118-145.

Subclinical Hypothyroidism in the Elderly

- 15% in individuals >80 years old
 - Compared to <2% in those 20-60 years old
- Age ≥ 65 : Not associated with impairment in physical and cognitive function, depression, poor quality of life, metabolic disturbances, or mortality.
- Age <65: Associated with mild cognitive impairment, cardiovascular risk, neuromuscular dysfunction.

Gesing et al. [Thyroid Res.](#) 2012 Nov 24;5(1):16.

De Jongh et al. [Eur J Endocrinol.](#) 2011 Oct;165(4):545-54.



Subclinical Hypothyroidism and Heart Disease in Elderly

	Euthyroid	Subclinical hypothyroid			
		Overall	TSH 4.5–6.9	TSH 7.0–9.9	TSH 10.0–19.9
CHD					
Person-years	26,627	3,887	2,782	719	306
No. of events	788	130	94	26	10
Incidence (95% CI) per 1000 person-years	29.6 (27.6–31.7)	33.4 (28.2–39.7)	33.8 (27.6–41.4)	36.2 (24.6–53.1)	25.9 (13.9–48.1)
HR (95% CI)	1.0	1.12 (0.93–1.36)	1.12 (0.90–1.39)	1.26 (0.85–1.87)	0.85 (0.45–1.87)
HF					
Person-years	31,887	4,731	3,377	883	470
No. of events	790	128	96	21	11
Incidence (95% CI) per 1000 person-years	24.8 (23.1–26.6)	27.1 (22.8–32.2)	28.4 (23.3–34.7)	23.8 (15.5–36.5)	23.4 (13.0–42.3)
HR (95% CI)	1.0	1.05 (0.87–1.27)	1.12 (0.90–1.38)	0.89 (0.58–1.38)	0.80 (0.44–1.47)
CV death					
Person-years	35,348	5,250	3,766	980	503
No. of events	639	116	82	22	12
Incidence (95% CI) per 1000 person-years	18.1 (16.7–19.5)	22.1 (18.4–26.5)	21.8 (17.5–27.0)	22.4 (14.8–34.1)	23.9 (13.5–42.0)
HR (95% CI)	1.0	1.07 (0.87–1.31)	1.10 (0.87–1.38)	1.04 (0.68–1.60)	0.92 (0.51–1.65)

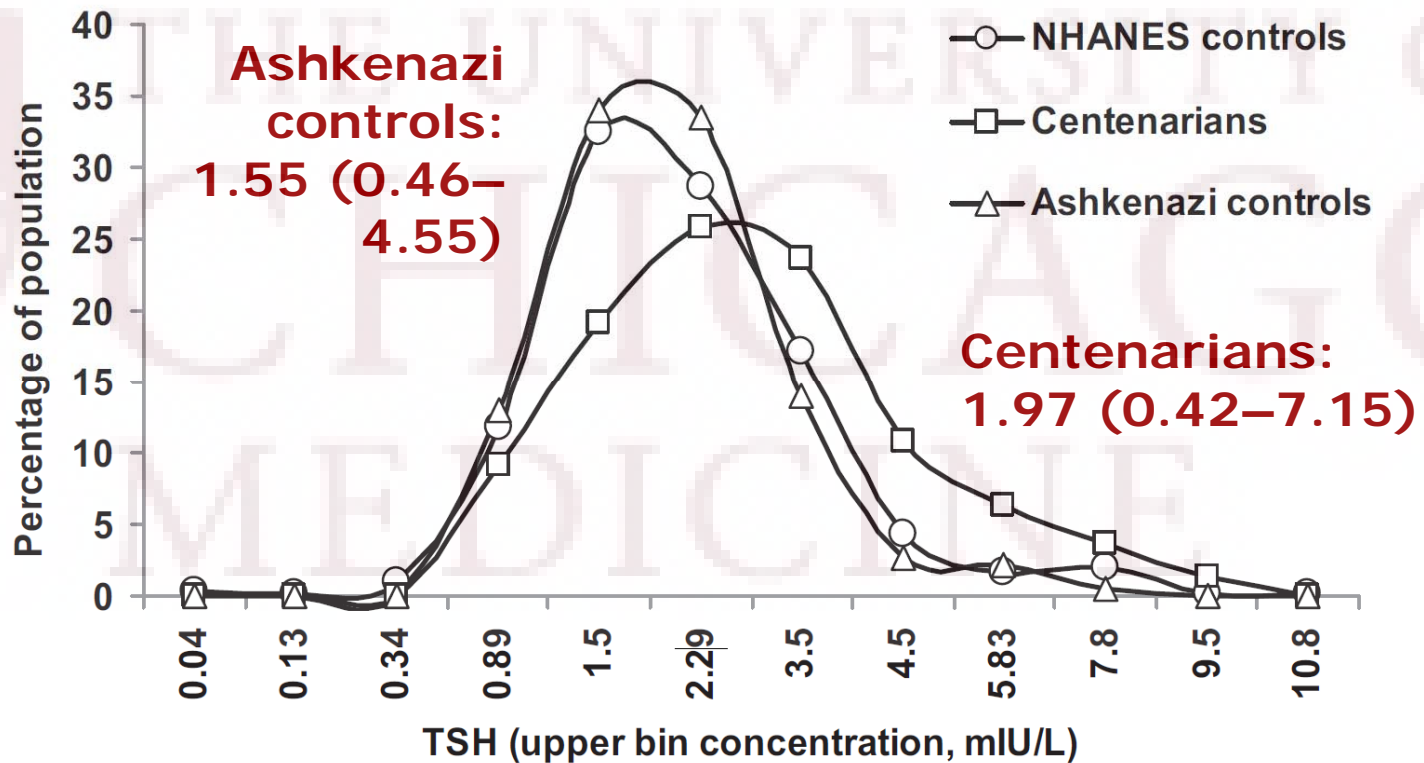
Adjusted for age, sex, race, and initiation of thyroid medication during follow-up period.



Treatment of Subclinical Hypothyroidism in Elderly

- Controversial
- Improves lipid profile but no clear evidence that it decreases CV or all-cause mortality
- Does not improve cognitive function
- Higher TSH levels ($>8-10$) were associated with progression to overt hypothyroidism

TSH and longevity





TSH and longevity

- Decline in thyroid function
 - Increase in prevalence of acquired autoimmune thyroid disease
 - Atrophic nonautoimmune changes
- Reset in TSH set point
- Reduced TSH bioactivity
- Chronic illness, medications
- Genetic predisposition
 - Offsprings had higher TSH levels, estimated heritability of 0.33
 - 2 SNPs in the promoter/enhanced region of TSHR gene

Atzmon et al. [J Clin Endocrinol Metab.](#) 2009 Apr;94(4):1251-4.

Atzmon et al. [J Clin Endocrinol Metab.](#) 2009 Dec;94(12):4768-75.



Animal Studies

- Inducing hypothyroidism in young rats resulted in living 4 months longer.
- Inducing hyperthyroidism led to a 3 month life span reduction.
- May be due to reduced metabolic rate, body temperature, oxygen consumption, and reactive oxygen species generation.

Ooka et al. [Mech Ageing Dev.](#) 1983 Jun;22(2):113-20.

Ooka et al. [Mech Ageing Dev.](#) 1986 Feb;33(3):275-82.

Brown-Borg. [Ageing Res Rev.](#) 2007 May; 6(1):28-45.



Hospital Course

- No definitive infection found, antibiotics tapered.
- Started on anticoagulation for atrial fibrillation, led to melena.
- Worsening respiratory status from pulmonary edema, was DNR/DNI.
- Made comfort care.



Take Home Points

- Subclinical hypothyroidism in the elderly is not generally associated with adverse effects, in contrast to the younger population.
- Thus, treatment for subclinical hypothyroidism in the elderly is controversial.
- **Leave 93 year olds alone!**

References

- Atzmon et al. [J Clin Endocrinol Metab.](#) 2009 Apr;94(4):1251-4.
- Atzmon et al. [J Clin Endocrinol Metab.](#) 2009 Dec;94(12):4768-75.
- Brown-Borg. [Ageing Res Rev.](#) 2007 May; 6(1):28-45.
- De Jongh et al. [Eur J Endocrinol.](#) 2011 Oct;165(4):545-54.
- Gesing et al. [Thyroid Res.](#) 2012 Nov 24;5(1):16.
- Hyland et al. [J Clin Endocrinol Metab.](#) 2012 Nov 16.
- Ooka et al. [Mech Ageing Dev.](#) 1983 Jun;22(2):113-20.
- Ooka et al. [Mech Ageing Dev.](#) 1986 Feb;33(3):275-82.



Subclinical Hypothyroidism and Heart Failure

	HF Events					
	Euthyroidism		Subclinical Hypothyroidism		HR (95% CI), Age/Sex-Adjusted	HR (95% CI), Multivariate Model*
	Events	Participants	Events	Participants		
Total population	1762	22 674	250	2068	1.26 (0.91–1.74)	1.22 (0.93–1.59)
Sex†						
Male	977	10 793	120	730	1.33 (0.91–1.94)	1.28 (0.93–1.76)
Female	785	11 881	130	1338	1.03 (0.85–1.24)	1.07 (0.84–1.36)
<i>P</i> for interaction					0.24	0.38
Age, y‡						
18–49§	15	2756	2	107	4.56 (0.57–36.30)	5.52 (0.66–46.25)
50–64	128	5798	10	373	1.39 (0.62–3.08)	1.79 (0.47–6.80)
65–79	1370	12 666	205	1428	1.31 (0.92–1.87)	1.30 (0.93–1.82)
≥80	249	1454	33	160	1.01 (0.69–1.46)	0.98 (0.66–1.44)
<i>P</i> for trend					0.16	0.10