Antipsychotic-Induced Hypothermia

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INTRODUCTION

Antipsychotic drugs (APDs) are often used in the treatment of acute delirium in the elderly. Hypothermia as an adverse drug reaction secondary to APDs poses a diagnostic challenge in this population.

CASE PRESENTATION

ID: 86-year-old man admitted for acute delirium and psychosis
Past Medical History: Alzheimer dementia, Bipolar disorder - type 1
Medications: Recently transitioned from Risperidone to scheduled Haldol, Quetiapine added for agitation
Exam: Stable mentation, stable perfusion, no shivering
Labs: Blood cultures x2 negative, cortisol normal, TSH normal, glucose normal, electrolytes normal, bun/cr normal
Clinical Course

Time (day)	Haldol (mg/day)	Quetiapine (mg/day)	T (°F)
0	9	0	98.7
2		12.5	96.5
3		12.5	94.1
4		12.5	96.4
5-7		25	93.4
8		0	97.4

Table 1: Time, antipsychotic dosing, and core temperature.

- Bair Hugger therapy initiated, normothermia achieved
- Quetiapine discontinued, temperature normalized over one week

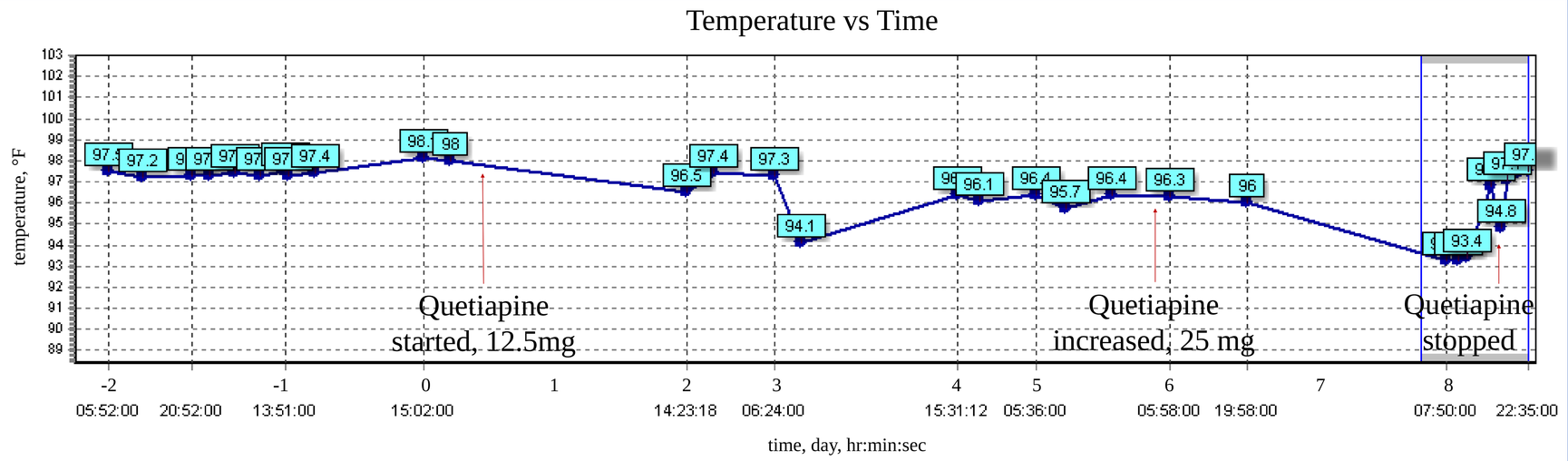


Figure 1. Temperature (°F) vs time (days). Note initial relative decrease in core temperature 48 hours after addition of Quetiapine, 12.5mg daily. Note further decrease after Quetiapine increased to 25mg daily, and recovery after discontinuation of atypical APD.

Figure 2A: Baseline EKG, T 98.2°F, VR 57 bpm, P-R 198 ms

Figure 2B: J-wave, T 94.1°F, VR 46 bpm, P-R 296 ms

Figure 2, A-B. J-waves (Osborn waves,) bradycardia, and prolonged P-R interval are EKG findings in hypothermia.[5] Severity of EKG changes parallels severity of hypothermia.

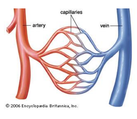
THERMOREGULATION

- Thermal set point regulated by serotonergic system (5-HT-2A) in pre-optic hypothalamus[3]
- Vasoconstriction, shivering regulated by ***α*** - adrenergic system[7]

Hypothermia[1]

- Mild: 32 to 35°C (90 to 95°F)
- Moderate: 28 to 32°C (82 to 90°F)
- Severe: below 28°C (82°F)

Pre-optic hypothalamic thermo-modulation by serotonergic (5-HT-2A) receptors



Vascular dilation, constriction regulated by ***α***-adrenergic receptors

→ APDs: 5-HT-2A, ***α***-adrenergic antagonism → APD-induced hypothermia

DISCUSSION

Differential Diagnosis for Hypothermia

- Exposure
- CNS failure (trauma, Parkinson Disease, hypothalamic dysfunction)
- Endocrine failure (hypothyroidism, hypoglycemia)
- Infection (severe sepsis)
- Uremia, medications, toxins

Additional Risk in Older Adults[3]

- Low physiologic reserve
- Chronic comorbid disease
- Medications impair compensatory response
- Hypothalamic structural change with age

APD-Induced Hypothermia[2-4,6,7]

- Monitor core temperature for 5-7 days after APD initiation
- Serotoninergic (5-HT-2A) antagonism may interfere with hypothalamic thermoregulation
- Alpha-adrenergic antagonism perpetuates hypothermic effect, by inhibiting vasoconstriction, shivering
- Meta-analysis suggests that atypical APDs are responsible for 55% of APD-induced hypothermia
- Discontinuation of the atypical antipsychotic and active re-warming lead to recovery from hypothermia and normalization of EKG changes

References
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