

Use of the Burch-Wartofsky score when assessing the severity of hyperthyroidism, a retrospective study

Ysaline Duvieusart, Hannah Vennard, Andrew Kernohan and Jane McNeilly

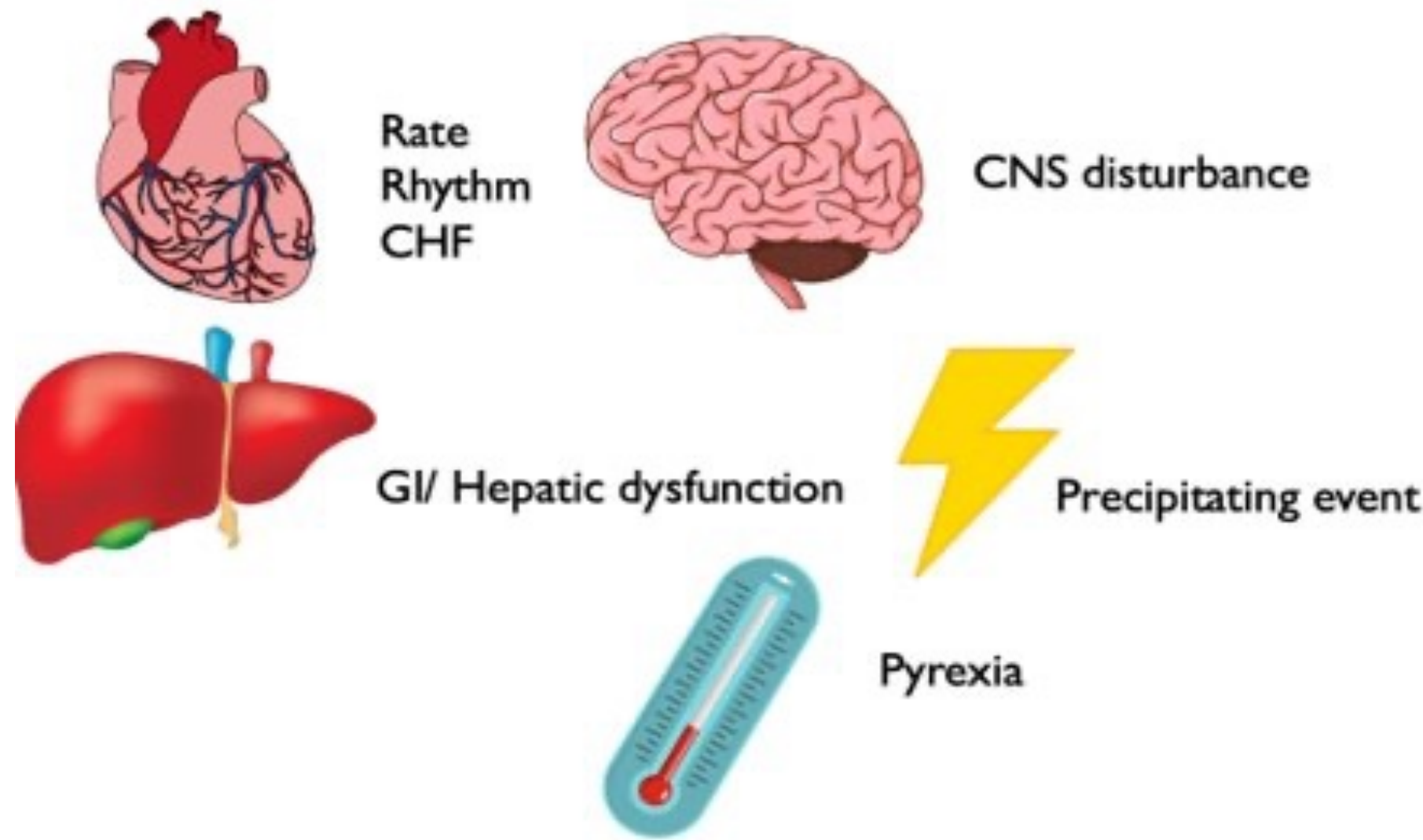
FY2, FY2, Consultant Endocrinologist, Clinical Biochemist
Queen Elizabeth University Hospital (QEUEH), Glasgow



BACKGROUND AND METHOD

Thyroid storm is a life-threatening endocrine emergency, which requires prompt intervention and treatment to improve outcomes. It represents the extreme end of the spectrum of thyrotoxicosis (1). The diagnosis is generally made clinically based on symptoms such as **hyperpyrexia, tachycardia, nausea, diarrhoea and change in cognition**.

The Burch-Wartofsky (WB) score is one of the two scales recommended to determine the likelihood of thyroid storm. The use of the WB scale is recommended by the European Society of Endocrinology, to allow for early identification of at risk patients (2,3).



Retrospective Audit

Inclusion criteria: Inpatients with fT4 >25 pmol/l Jan '21 and Nov '21.

Exclusion criteria: Patients who were in the maternity or oncology unit, on levothyroxine or with detectable TSH.

A total of **51 patients** were included. Data regarding the following was collected:

- Descriptive characteristics
- Antibody status
- Acute diagnosis/treatment

The WB score and associated suggested diagnosis was retrospectively collected from patient notes. **The use of WB score acutely and its effect on patient management was assessed.**

Burch-Wartofsky Scoring system

Thermoregulatory dysfunction	points	Gastrointestinal-hepatic dysfunction	points
Temperature °C		Manifestation	
37.2-37.7	5	Absent	0
37.8-38.2	10	Moderate (diarrhea, abdominal pain, N&V)	10
38.2-38.8	15	Severe (jaundice)	15
38.9-39.4	20		
39.5-39.9	25		
≥ 40	30		
Cardiovascular	points	CNS disturbance	points
Tachycardia (bpm)		Manifestation	
100-109	5	Absent	0
110-119	10	Moderate (delirium, psychosis, extreme lethargy)	20
120-129	15	Severe (seizure, coma)	30
130-139	20		
≥ 140	25		
Atrial Fibrillation	points	Precipitating event	points
Absent	0	Status	
Present	10	Absent	10
		Present	0
Congestive cardiac failure	points		
Absent	0		
Mild	5		
Moderate	10		
Severe	20		

Total score
>45 Thyroid storm
25-45 Impending storm
<25 Storm unlikely

RESULTS

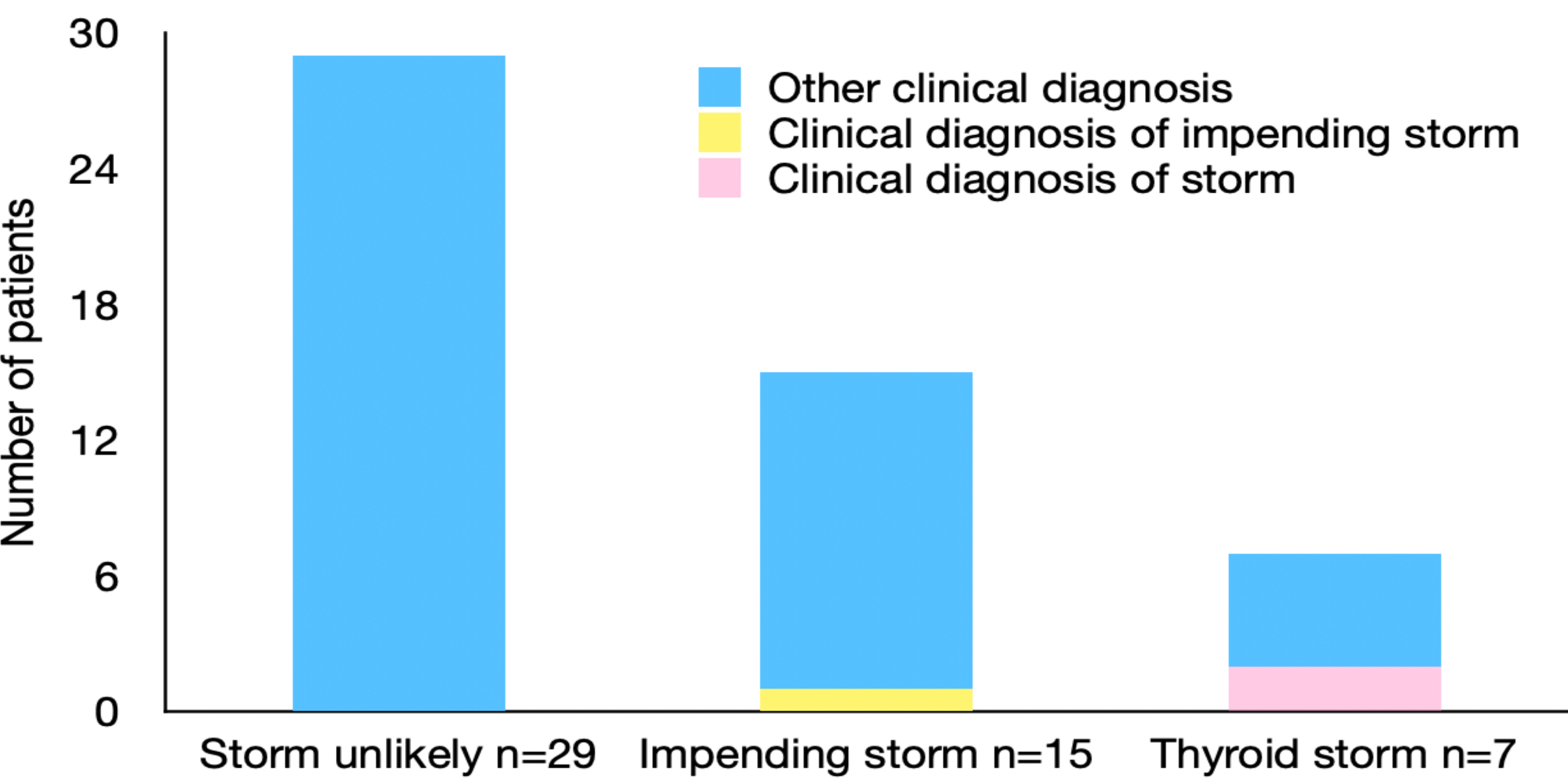
Of the 51 patients included the WB scale was used once.

Graph 1 shows the distribution of the retrospectively calculated WB scores.

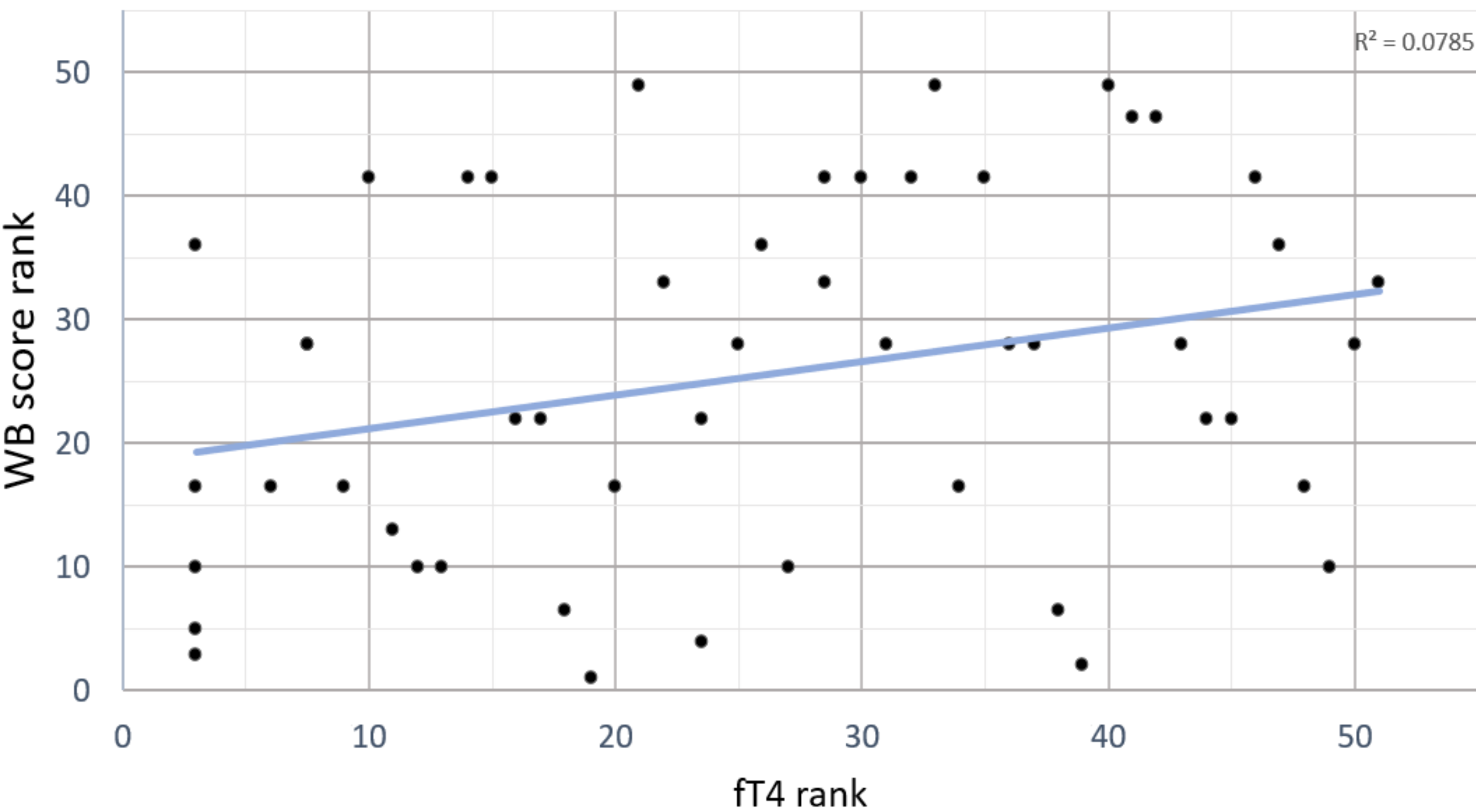
- Of 29 patients with a WB score <25 (storm unlikely) none were clinically identified at risk of impending storm/storm.
- Of 15 patients with a WB score of 25-45 (impending storm), 1 was identified clinically as impending storm.
- Of the 7 patients with a WB score of ≥45 (thyroid storm), 2 were clinically diagnosed with thyroid storm.

In no instances did the WB score suggest a less severe diagnosis than the clinical diagnosis.

Graph 1. WB Score and clinical diagnosis



Graph 2. Rank WB score vs Rank fT4



Graph 2 shows the correlation between the WB score and the fT4 using the log rank scale. The spearman coefficient is 0.28 (p<0.05). This suggests a weak positive correlation between the level of fT4 and the severity of the WB score.

CONCLUSIONS

The WB scoring system is not commonly used at the QEUEH, Glasgow. For those assessed as impending or likely storm on the Wartofsky scale, clinician diagnosis was less severe. Correlation between fT4 and WB score was weak. The use of the WB score in clinical practice may lead to a more standardized classification of patients, helping to identify patients who are at higher risk of clinical deterioration, requiring more aggressive treatment. As a result of this first audit cycle, clinical biochemistry are now prompting endocrinology review and the use of the WB scale for non-pregnant inpatients with fT4 > 25pmol/l and an undetectable TSH. We are planning re-audit in 2023.

REFERENCES

1. Carroll R, Matfin G. Endocrine and metabolic emergencies: thyroid storm. Ther Adv Endocrinol Metab [Internet]. 2010 Jun [cited 10 May 2022];1(3):139-145.
2. Burch HB, Wartofsky L. Life-threatening thyrotoxicosis. Thyroid storm. Endocrinol Metab Clin North Am. 1993 Jun;22(2):263-77. PMID: 8325286.
3. Ross DS, Burch HB, Cooper DS, Greenlee MC, Laurberg P, Maia AL, et al. Thyroid. 2016 Oct 1. 26(10):1343-1421.