



A rare case of Carbimazole related rhabdomyolysis

Authors: Dr Emma Johnson, Dr Thomas Crabtree, Dr Nawal Ibraheem, Dr David Hughes.



Hospital: Royal Derby Hospital, Uttoxeter Road, Derby, DE22 3NE

University Hospitals of Derby and Burton
NHS Foundation Trust

INTRODUCTION

Rhabdomyolysis is the breakdown of skeletal muscle causing release of intracellular muscle components.(1) There are many causes of rhabdomyolysis, including drugs, trauma, intense exercise, metabolic disorders and electrolyte disturbances. Many drugs can cause rhabdomyolysis but is most commonly associated with statins, often in combination with cytochrome P450 inhibitors (e.g. clarithromycin). Rhabdomyolysis can potentially cause significant morbidity (including acute kidney injury) and mortality if left untreated.(1)

Carbimazole is the first line treatment for hyperthyroidism. It decreases synthesis of thyroid hormones by inhibiting thyroperoxidase and thus reducing iodination of thyroglobulin. The exact pathway of causation of rhabdomyolysis is unknown.(2)

Common features of anti-thyroid drug related rhabdomyolysis/myopathy (3)	Present in this case
Asian ethnicity	No
Young to middle aged female	Yes
Onset of muscles weakness within 3 months of drug taken	No – over 6 months
Proximal muscle weakness	Yes
Supressed or normal TSH	Yes
Elevated muscle enzymes	Yes – CK >30 000
Graves disease with hyperthyroidism	Yes

CASE

A 38 year old female presented to the Emergency Department in May 2018 with a 4 day history of severe sudden onset bilateral thigh pain and weakness. Her only prior health problem was primary hyperthyroidism for which she had been receiving carbimazole therapy (started December 2017). At diagnosis, Thyroid Stimulating Hormone (TSH) was 0.05 mU/L and T4 46.4 pmol/L.

On admission, her Creatinine Kinase (CK) was found to be 32721 U/L. Common causes of rhabdomyolysis were excluded including: bacterial and viral infection, autoimmune, heatstroke, alcohol excess and trauma. Her CK gradually decreased after stopping carbimazole and receiving intravenous fluids. She stayed in hospital for 8 days and was discharged with a CK of 383 U/L. Prior to discharge propylthiouracil therapy was commenced as her thyroid function tests worsened (TSH <0.05 mU/L, T4 20.0 pmol/L). This was used as a bridging therapy prior to definitive surgical cure. Whilst on propylthiouracil her CK remained low.

DISCUSSION

Rhabdomyolysis secondary to anti-thyroid drugs (including propylthiouracil) appears to be relatively rare, though the specific incidences have not been researched. The mechanism of carbimazole induced Rhabdomyolysis is not fully understood.(2) Other case reports have suggested a possible genetic susceptibility as many of the reported cases are in Asian females.(4) Others suggest that rapid improvement of hyperthyroidism may be a contributing factor.(3) However, our case goes against this theory as the patient had been on carbimazole for over 6 months and was still thyrotoxic when diagnosed with rhabdomyolysis.

Other adverse reactions to anti-thyroid drugs are more well known. Mild effects of thionamides effect ~20% of patients and include arthralgia, GI upset, headaches. The most well known major side effect of thionamides is agranulocytosis, for which patients are counselled to report symptoms of. Other major side effects include ANCA+ vasculitis and hepatic necrosis.(2)

CONCLUSIONS

Although not yet fully understood, this rare cause of rhabdomyolysis is important for clinicians to be aware of because of its simple yet effective management of stopping the culprit medication, monitoring kidney function and treating with IV fluids as appropriate. Clinicians should be highly suspicious of rhabdomyolysis in patients presenting with acute onset muscular-skeletal symptoms when taking anti-thyroid drugs.

REFERENCES

1. Torres, P. A., Helmstetter, J. A., Kaye, A. M., & Kaye, A. D. (January 01, 2015). Rhabdomyolysis: pathogenesis, diagnosis, and treatment. *The Ochsner Journal*, 15, 1, 58-69.
2. Rang, H. P., Ritter, J. M., Flower, R. J., & Henderson, G. (2016). *Rang and Dale's pharmacology*, Chapter 34, pages 422-423.
3. Tsang, C. C., Hui, W. S., Lo, K. M., Yeung, J. H., & Cheng, Y. L. (2015). Anti-thyroid drugs-related myopathy: is carbimazole the real culprit?. *International journal of endocrinology and metabolism*, 13(1), e17570. doi:10.5812/ijem.17570
4. Lim, A. Y. Y., Kek, P. C., & Soh, A. W. E. (July 01, 2013). Carbimazole-induced myositis in the treatment of Graves' disease: A complication in genetically susceptible individuals?. *Singapore Medical Journal*, 54, 7.)