

# High Ferritin and glucose metabolism in Diabetes- a case report.

Dr. M Yeo, Dr. K Kumar

## Background

Iron is a transition metal that acts as an oxidant. There is growing evidence that systemic iron overload could contribute to abnormal glucose metabolism. Further research has showed that iron overload can result in an increased in type 2 diabetes irrespective of the cause of gene involved<sup>1</sup>. Although the exact mechanism of iron-induced diabetes is uncertain, it is likely mediated by these three mechanisms: 1) insulin deficiency, 2) insulin resistance, and 3) hepatic dysfunction (Figure 1).

In this novel case study, we question the significance of high ferritin levels and type 1 diabetes (T1DM) in an 11 year old boy.

## Case study

11 year old boy, A, previously fit and well, presented with burning pains in his hands which affected his grip and fine motor skills. There was no family history of note and he was found incidentally to have an unexplained high ferritin level (414ug/L). In the following year he presented with dysuria and penile pain and was diagnosed with Balanitis Xerotica Obliterans.

His Ferritin levels continued to be monitored and they were persistently high (300-630ug/L) (Figure 2) Further investigations (including Iron studies, genetics, metabolic screening, autoimmune profile, copper studies, Hepatitis serology) done were normal.

At 15 years of age, he presented with new onset polyuria and polydypsia and was diagnosed with Type 1 Diabetes. At present diabetic control is still posing a challenge for him and he continues to have high ferritin levels. (Figure 3)

## Discussion/Conclusion

There is emerging evidence (cross-sectional and case control) that suggest a strong link exist between elevated body iron levels and risk of type 2 Diabetes<sup>1</sup> however there have not been any case reports of type 1 diabetes and high iron levels. High iron levels have been associated with hypertension, dyslipidaemia, metabolic syndrome and an increased risk of cardiovascular disease. High ferritin in pregnancy has also been related to increased risk of gestational diabetes.

In our case study, we question if a high ferritin level could have predicted future problems with glucose metabolism in our patient on initial presentation. We recognise that the causes of poor diabetic control is multifactorial. However, with the continual poor diabetes control and persistent high ferritin level in our patient, could the high ferritin levels pose an additional challenge for good diabetic control?

## Recommendations

- Patients with poorly controlled type 1 Diabetes should have their Ferritin levels checked as part of their annual review.
- Patients found to incidentally have a high Ferritin level and a normal Transferrin saturation level should be followed up for features of Metabolic syndrome<sup>2</sup>

## References

1. Kunutsor SK1, Apekey TA, Walley J, Kain K. Diabetes Metab Res Rev. 2013 May;29(4):308-18. 1)
2. Jasbir Makker,a,b, Ahmad Hanif,b Bharat Bajantri, b and Sridhar Chilimuria,b. Case Rep Gastroenterol 2015 Jan-Apr; 9(1): 7-14.

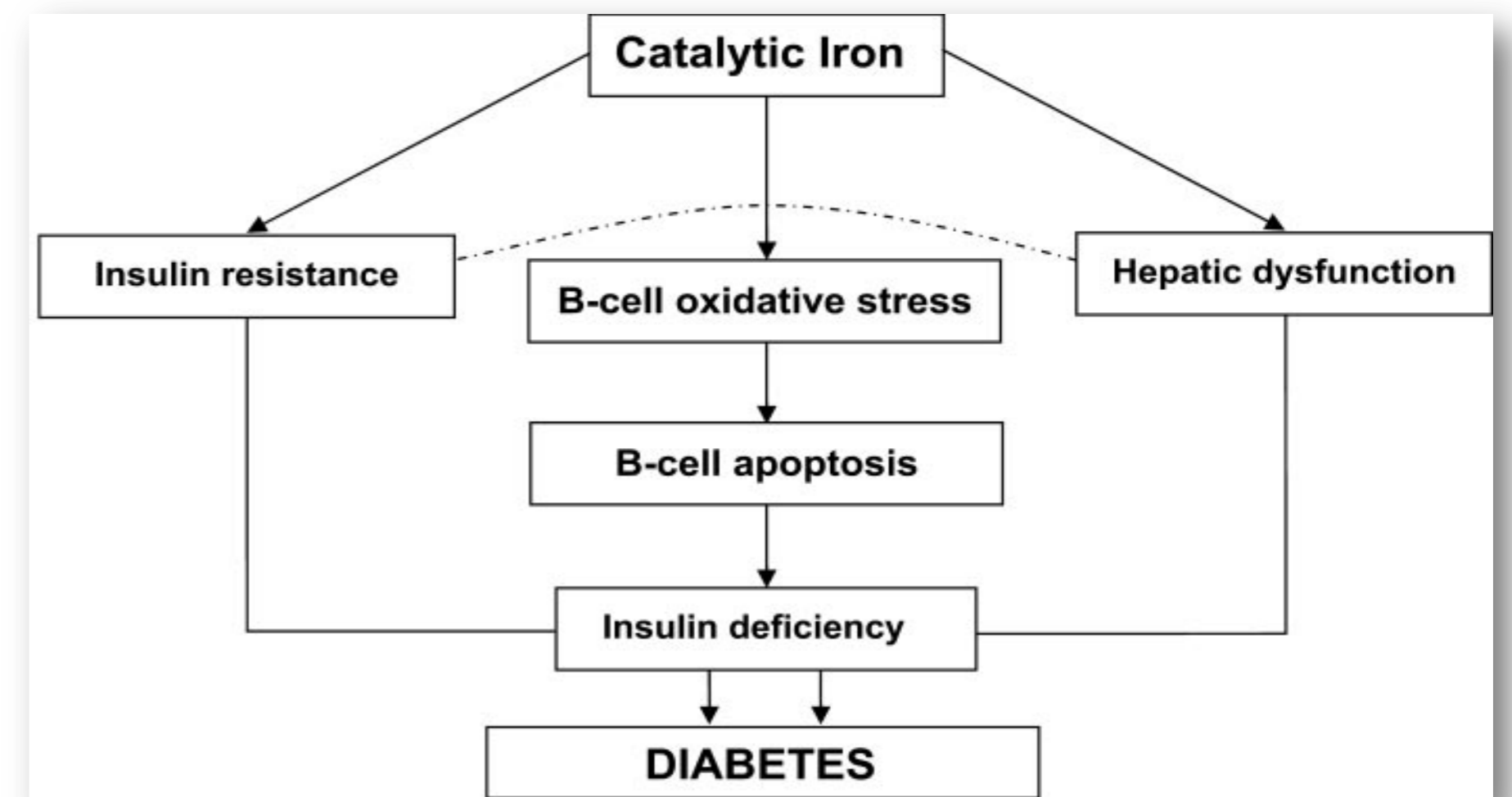


Figure 1—Pathogenic pathways for iron in induction of type 2 diabetes.

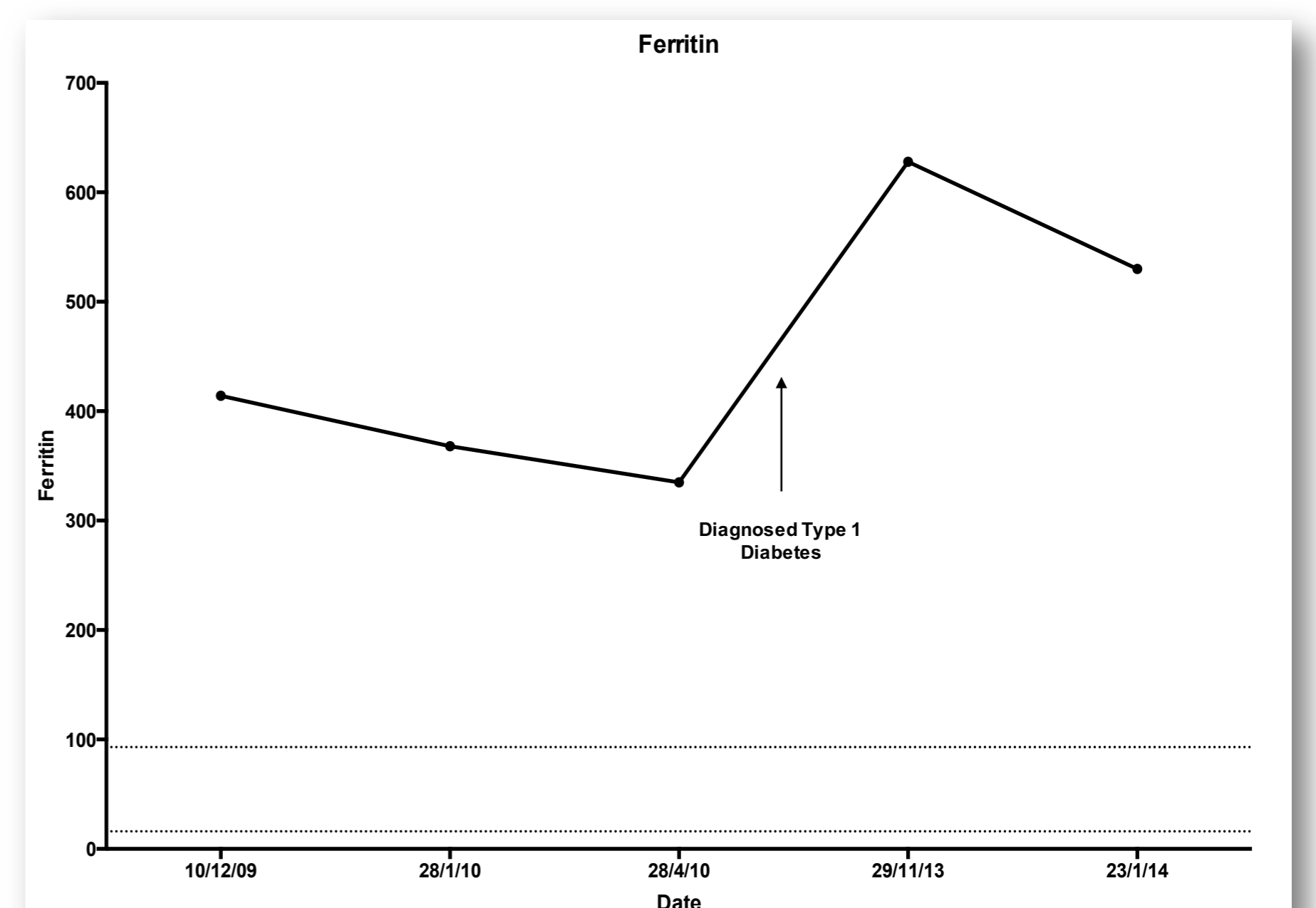


Figure 2—Patient A's Ferritin level trend over time.

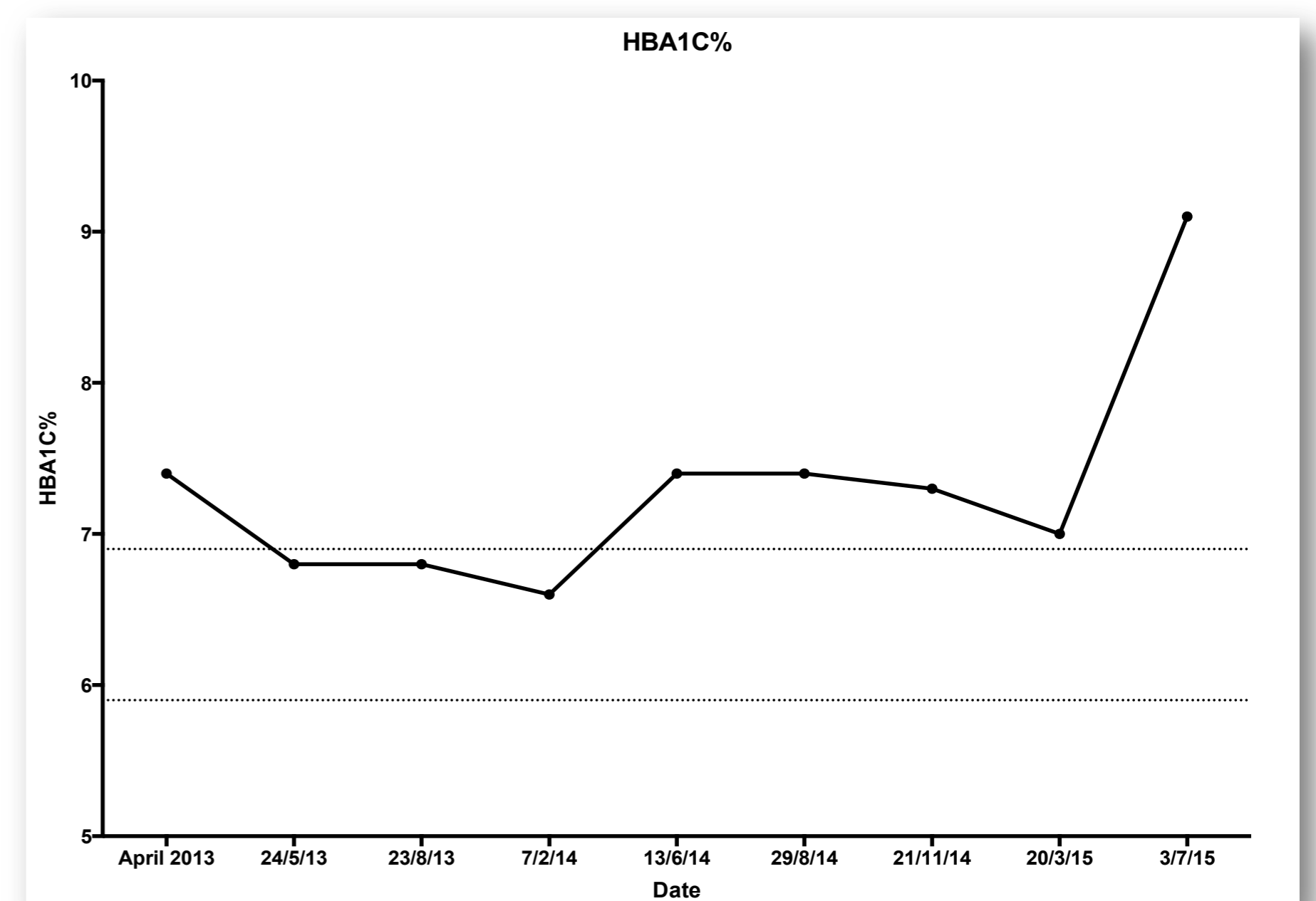


Figure 3—Patient A's HbA1C(%) trend over period of follow up post diagnosis