

Low HbA1c result: lessons learnt in clinical practice

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Introduction:

Glycated Haemoglobin (HbA1c) is a well-established test in both primary and secondary care for monitoring diabetes control and has a significant impact on treatment decisions. Since 2011, it has been recommended by the World Health Organisation (WHO) for the diagnosis of diabetes mellitus.

Certain conditions or medications can falsely lower HbA1c, mainly by reducing the red cell life span ⁽¹⁾. Other mechanisms vary such as increased red cell destruction, altered haemoglobin, altered glycation, altered erythropoiesis. Examples include: haemolysis, haemoglobinopathies, acute blood loss, blood transfusion, drugs, hypertriglyceridaemia and chronic liver disease.

Method:

At Sheffield Teaching Hospitals, we assessed the number of HbA1c results below the reference range (19-47 mmol/mol) over a 12 month period (November 2017 to November 2018). HbA1c results that were below the reference range were recorded from the Apex laboratory system. The aim was to address the following questions:

1- How many patients had a newly diagnosed haemolytic or red cell disorder as a result of the low HbA1c?

2- How many patients had a known haemolytic/red cell disorder prior to testing and HbA1c was still used for diabetes screening or monitoring of Diabetes?

3- Can a specific low level of HbA1c be used as a predictor of haemolysis?

4- Were there any other identifiable causes for the low HbA1c result?

Results:

During the specified period, HbA1c results below the reference range were recorded from the Apex laboratory system. This identified 50 low HbA1c results for 42 patients, ranging from 4-19 mmol/mol

6 patients had a new diagnosis related to their low HbA1c. (Figure 1)

9 patients were already known to have haemolytic disorders and therefore should not have had HbA1c tested for diabetes monitoring

15 of the patients who had HbA1c used for diagnosis of diabetes mellitus had a glucose above 6 mmol/l and required further tests e.g. fasting glucose

Haemolysis was diagnosed at varying levels of less than 10 mmol/mol, but also as high as 18 mmol/mol.

Causes of low HbA1c

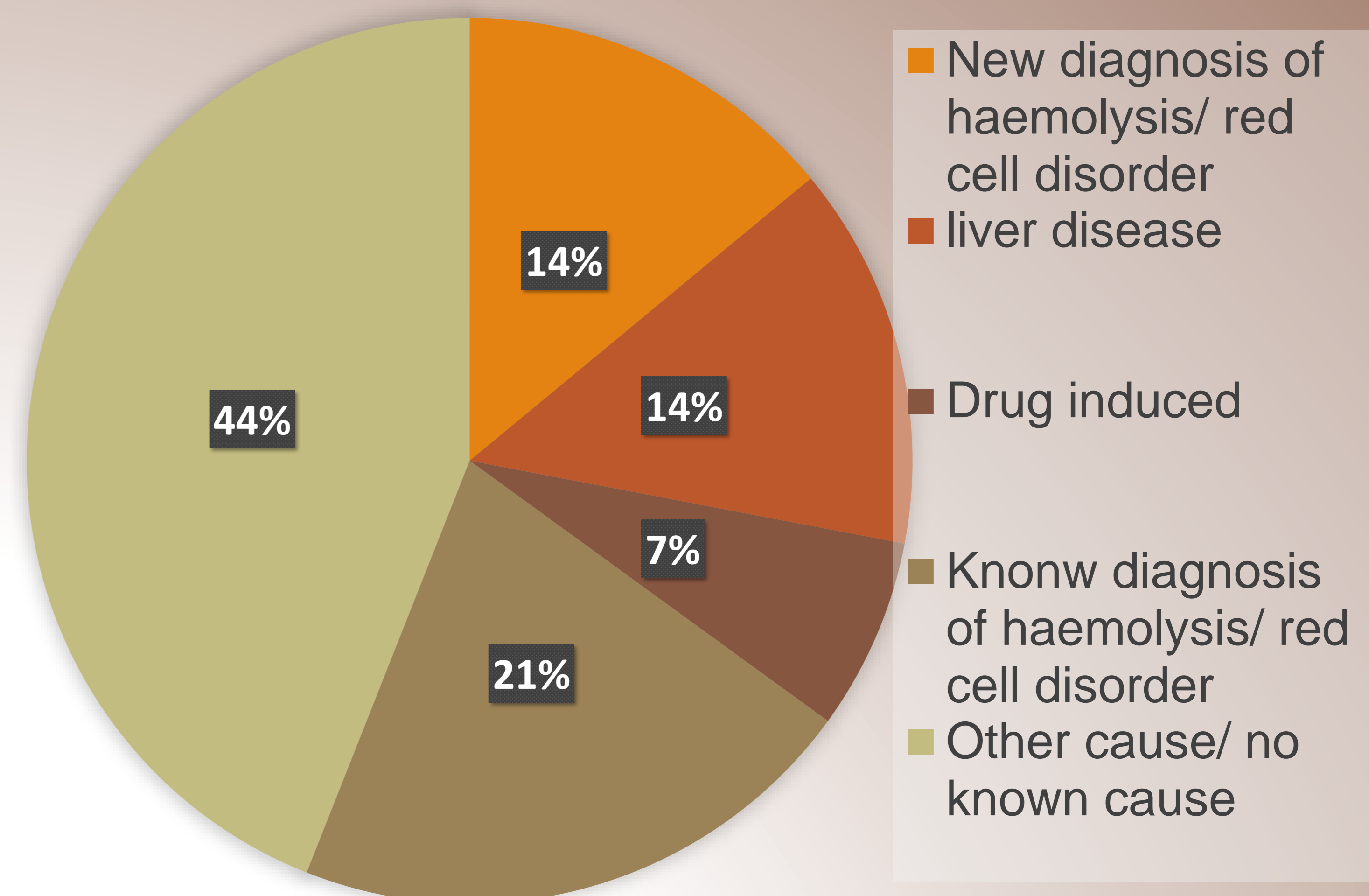


Figure 1

Lessons learnt:

- ✓ The need to consider haemolytic or red cell disorders in patients with unexplained low HbA1c
- ✓ The degree of low HbA1c doesn't appear to predict presence of haemolysis based on our small numbers.
- ✓ HbA1c is still being requested inappropriately for patients with known haemolytic/red cell disorders as a screening or monitoring test for diabetes. An alternative test should be used for these patients such as blood sugar monitoring or Fructosamine.
- ✓ A knowledge gap is demonstrated and requires education among junior doctors, general practitioners and clinical nurse specialists in both secondary and primary care on the potential significance of a low HbA1c result
- ✓ Laboratory prompts should be introduced routinely for low HbA1c results advising on the unreliability of the test for diabetes monitoring or screening in this situation and prompting consideration of haemolysis.
- ✓ This demonstrates the importance and value of Haematology liaison work and collaboration with other specialties such as the diabetes team/ general physicians and general practitioners.

Reference:

1 World Health Organization. Use of glycated haemoglobin (HbA1c) in the diagnosis of diabetes mellitus [Internet], 2011. Available from http://www.who.int/diabetes/publications/reporhba1c_2011.pdf. Accessed 8 May 2012