HAEMATOLOGY CASE STUDIES – SICKLE CELL TRAIT ADULT

Here are a series of diagnostic case studies comparing normal neonate and adult haematology results to that of someone with sickle cell. These cases can be used as a discussion point for students studying medical or biomedical sciences.

These resources have been provided by the Leicester Royal Infirmary Department of Pathology, with special thanks going to Keith Chambers.

**Blood Smear**

**IEF** (isoelectric focusing)

**HPLC** (High performance liquid chromatography)

**Solubility Test**

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http://www.sicklecellanaemia.org/teaching-resources/resources/scooter44-63/scooter44.html

NOTE It is unclear whether this image is from a patient with sickle cell trait but the literature suggests that abnormal red blood cells can be observed and may therefore be useful as part of the diagnosis. (Wilson C, Hopkins PL, Cabello-Inchausti B, Melnick SJ and Robinson MJ 2000, Laboratory Medicine, Volume 31, Number 8: Available: http://labmed.ascpjournals.org/content/31/8/445.full.pdf)

LEFT – IEF for patient with sickle cell trait. RIGHT – IEF for patient with homozygous SS.

The IEF shows the presence of both HbA and HbS in the unknown sample compared to the full range of A, F, S and C controls.
Features of this HLPC trace include the presence of haemoglobins A, S, A$_2$ and F.

HbS = 35.1%.
HbA = 50%.
The sickle cell solubility test will appear positive (cloudy, right test tube) in a HbAS.

The sickle cell solubility test (Microgen Bioproduct S Tests) is a rapid procedure that identifies the presence of HbS, but it does not distinguish between combinations, i.e. AS, SS or SC.

The test is based on the solubility of Hb which varies depending on the presence of HbS. The test becomes cloudy at levels of HbS greater than 20%, but the level of cloudiness is no indicator of AS or SS since the carrier HbAS levels could be as high as 35-40%.

*Caution. There may be false readings if someone with SS has had a recent blood transfusion, so the test might appear falsely normal and clear. A holistic view of the patient history would be taken into consideration. Also in neonates where HbS is not yet formed and HbF predominates, the test will be negative.

Conclusion of confirmatory test is of a sickle cell carrier if the screening test indicates the presence HbA plus HbS in the proportions expected in an individual with beta chain variant carrier status, or no co-inherited thalassaemia.