A006 - POLYCYTHAEMIA (ERYTHROCYTOSIS) IN ADULT PATIENTS

What is polycythaemia?

Polycythaemia (or erythrocytosis) means too many red cells in the blood. It may be divided into 'true' (or absolute) erythrocytosis due to an increase in red cells, or an 'apparent' erythrocytosis, when red cell numbers are normal but are instead more concentrated due to less plasma.

Absolute erythrocytosis is categorised into primary or secondary according to whether the abnormality arises from the haemopoietic stem cell in the marrow (primary, i.e. polycythaemia rubra vera) or is due to overstimulation of a normal marrow stem cell to produce red cells (secondary, i.e. increased erythropoietin production).

Secondary erythrocytosis is much more common than primary polycythaemia.

Table 1. Causes of erythrocytosis

Primary	Secondary
Acquired (uncommon) Polycythaemia vera	Acquired (COMMON) *Hypoxia driven* *Central hypoxic process* Chronic lung disease Right-to-left cardiopulmonary vascular shunts Carbon monoxide poisoning Smoker's erythrocytosis Hypoxic states (sleep apnoea/altitude/obesity hypoventilation) *Local renal hypoxia* Renal artery stenosis End-stage renal disease Hydronephrosis Renal cysts (polycystic kidney disease) *Pathological EPO production* Tumours Hepatocellular carcinoma Renal cell cancer Cerebellar haemangioblastoma Parathyroid carcinoma/adenoma Uterine leiomyoma Pheochromocytoma Meningioma *Drug-associated* Erythropoietin Use of androgen preparations Diuretics Alcohol excess Postrenal transplant erythrocytosis

Congenital (rare) *EPO receptor mutations*	Congenital (rare) *Defects in oxygen sensing pathway* Chuvash erythrocytosis (VHL mutation) Mutations in EGLN1 or EPAS1 *Left shift of Hb-oxygen dissociation curve* High oxygen-affinity haemoglobin 2,3-BPG deficiency (BPGM mutations)
Idiopathic erythrocytosis	

What is persistent erythrocytosis?

Raised haematocrit >0.52 males, >0.48 females for >2 months

What are the next steps for patients with persistent erythrocytosis?

Exclude likely secondary causes with full history/examination including:

Hypoxia driven

- chronic lung disease
- smoker's erythrocytosis
- hypoventilation syndromes including sleep apnoea and obesity
- right to left cardiopulmonary vascular shunts

Medications e.g. diuretics, testosterone, other anabolic steroids

If no secondary cause identified, check for family history of raised Hb, further investigations:

- FBC, differential & blood film
- U&E, LFT
- Ferritin/iron studies – do NOT replace iron if Hb normal
- JAK2 mutation (requested through ICE)

When should I seek further advice or refer to haematology?

- patients who are JAK2 positive
- patients who are JAK2 negative with a very high haematocrit (males >0.6, females >0.56)
- a persistently raised haematocrit and a history of arterial or venous thrombosis
- a persistently raised haematocrit and no secondary cause identified
- a persistently raised haematocrit associated with other FBC abnormalities (thrombocytosis, leucocytosis - but note smokers often have a raised white cell count)

What further investigations are recommended for patients not referred to haematology?

- oxygen saturation
- chest x-ray
- abdominal ultrasound to look for renal / liver pathology

What follow up is required for patients for whom no cause has been found and who have not been referred to Haematology?

- if no cause for erythrocytosis has been identified, it may be prudent to recheck the patient's FBC every 4 to 6 months to ensure they are not developing a myeloproliferative disorder

Note iron deficiency may mask a rising Hb (but do NOT offer iron replacement)

What other advice should I give?

- patients should be asked to return for FBC if they develop thrombotic (e.g. TIAs) or haemorrhagic symptoms, or significant weight loss or left upper quadrant discomfort.
- lifestyle should be reviewed and additional risk factors for arterial/venous thrombosis should be addressed.

References

BSH Guidelines 2018

https://onlinelibrary.wiley.com/doi/full/10.1111/bjh.15648