ပြည်ထောင်စုမြန်မာနိုင်ငံ၊ အထူးဒေသ(၁) ကျန်းမာရေးဌာန

缅甸联邦第一特区卫生部

The Union of Myanmar, SR(1) Department of Health

Acute intravascular haemolysis in G6PD deficiency

Standard Operating Procedure (SOP)

Contents

Acute intravascular haemolysis in G6PD deficiency

G6PD is involved in pentose phosphate shunt, generates NADP, NADPH and glutathione (for maintenance of Hb and RBC membrane integrity, and reverse oxidant damage to RBC membrane and RBC components).

G6PD deficiency is X-linked and clinically important cause of oxidant haemolysis.

- Two main forms of the enzyme: normal enzyme is G6PD-B, most prevalent form worldwide; 20% of Africans are type A. A and B differ by one aminoacid
- Mutant enzyme with normal activity is G6PD A (+), find only in Black individuals
- G6PD A (-) is main defect in African origin; 5 stability of enzyme in vivo,5-15% normal activity,400+ variants but only 2 are relevant
- Clinically-Type A (-) = Africans (10% enzyme activity) and Mediterranean (with 1-3% activity)

Features

- Haemolysis after exposure to oxidants or infection
- Chronic non-spherocytic haemolytic anaemia.
- Acute episodes of haemolysis with fava beans (termed favism)
- Methaemoglobinaemia
- Neonatal jaundice

Drug-induced Haemolysis in G6PD Deficiency

- Begins 1-3 days after ingestion of drug
- Anaemia most severe 7-10 days after ingestion
- Associated with low back and abdominal pain
- Urine becomes dark (black sometimes)
- Red cells develop Heinz body inclusions (cleared later by spleen)
- Haemolysis is typically self-limiting
- Implicated drugs (Shown in Table 8.3)
- But heterogeneous; variable sensitivity to drugs.
- Risk and severity are dose related.

Haemolysis due to Infection and Fever

- 1-2 days after onset of fever
- Mild anaemia develops
- commonly seen in pneumonic illnesses

Favism

- Hours/days after ingestion of fava beans (broad beans).
- Beans contain oxidants vicine and convicine, free radicals, oxidise glutathione.
- Urine becomes red or very dark.
- Shock may develop - ***may be fatal***

Neonatal Jaundice

- May develop kernicterus (possible permanent brain damage)
- Rare in A (-) variants

More common in Mediterranean and Chinese variants.

Table 7.1 Agents capable of inducing haemolysis in G6PD deficient

	Definite risks	Possible risk
Antimalarial drugs	• Primaquine • Pamaquine	• Chloroquine • *Quinine
Analgesic drugs	• Phenacetin	• Aspirin
Others	• Dapsone • Methylene blue • Nitrofurantoin • 4-quinolones (Ciprofloxacin) • Sulphonamides (e.g. cotrimoxazole) • Nalidixic acid	• Probenecid • Quinidine
		**Acceptable in acute malaria*

Laboratory Investigation

- In steady state (i.e. no haemolysis) the RBCs appear normal
- Heinz bodies in drug-induced haemolysis (methyl violet stain)
- Spherocytes and RBC fragments on blood film if severe haemolysis
- Increased reticulocytes
- Increased unconjugated bilirubin, LDH and urinary urobilinogen
- Decreased haptoglobins
- Direct antiglobulin test (DAT)- negative

Diagnosis

- Diagnosis is difficult during haemolytic episode since reticulocytes have increased levels of enzyme and mayget erroneously normal result; wait until steady state (~6 weeks after episode of haemolysis)
- Family studies are helpful

Management

- Avoid oxidant drugs - See BNF.
- Transfuse in severe haemolysis or symptomatic anaemia-
  - Hemoglobin (Hb) level below 7 g/dl
  - Persistent hemoglobinuria and Hb below 9 g/dl.
- IV fluids to maintain good urine output.
- +/-exchange transfusion in infants
- Splenectomy may be of value in severe recurrent haemolysis.
- Folic acid supplements
- Education of families and patients to prohibit (fava beans), durgs to avoid in G6PD deficiency

To repeat G6PD enzyme quantitative level when recover from acute hemolysis (usually 6-8 weeks)