

A microscopic view of a blood smear showing various types of white blood cells, including neutrophils, lymphocytes, and monocytes, stained with a blue dye. The cells are scattered across the field of view, with some showing distinct nuclei and others appearing more irregular in shape.

# Poisoned Blood

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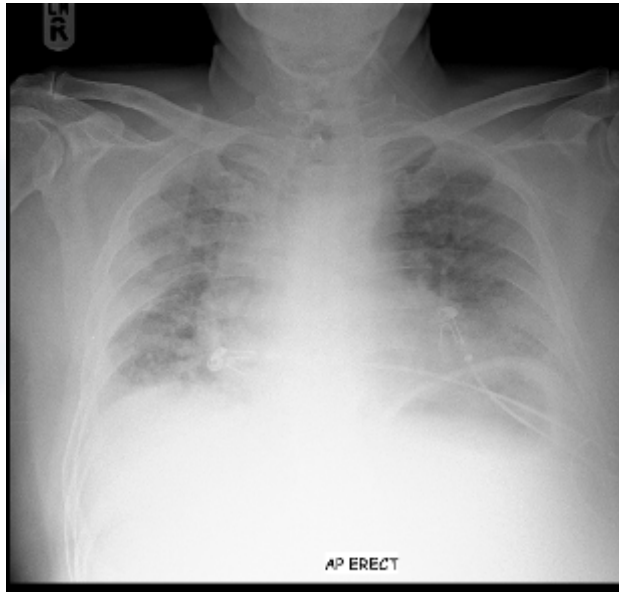
ESIM 2010

# Case Vignette

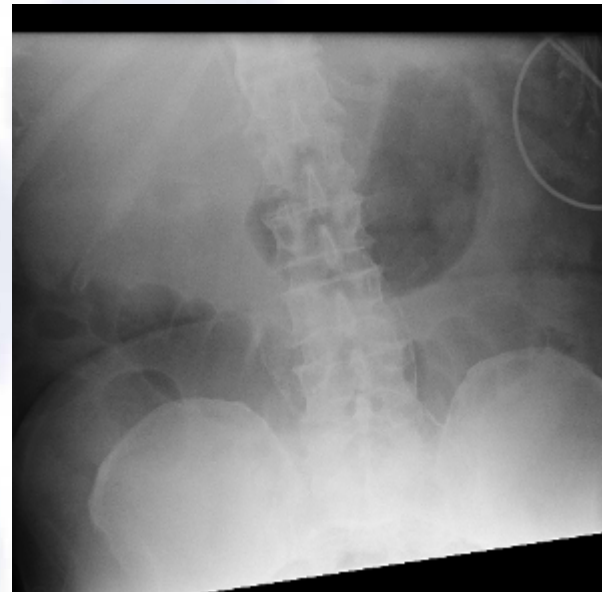
- 85 year old male, no past medical history, no drugs except PPI
- Presents to A&E with a 2 day history of vomiting, abdominal pain and cough; vague history as patient confused
- T 40.1°C, RR 32, HR 118, BP 154/98, SpO<sub>2</sub> 93% on 15l O<sub>2</sub>
- Bilateral crackles on auscultation of chest
- Diffuse abdominal tenderness but no peritonism

# Investigations

- Chest Xray:



- Abdominal Xray:



- Biochemistry grossly haemolysed
- Biochemistry grossly haemolysed again (x3)
- Full blood count: Hb 12.1 g/dl, WBC 6.6, plt 112. Film awaited.
- Arterial blood gas: pH 7.17, pCO<sub>2</sub> 4.1 kPa, pO<sub>2</sub> 7.2 kPa, HCO<sub>3</sub> 10

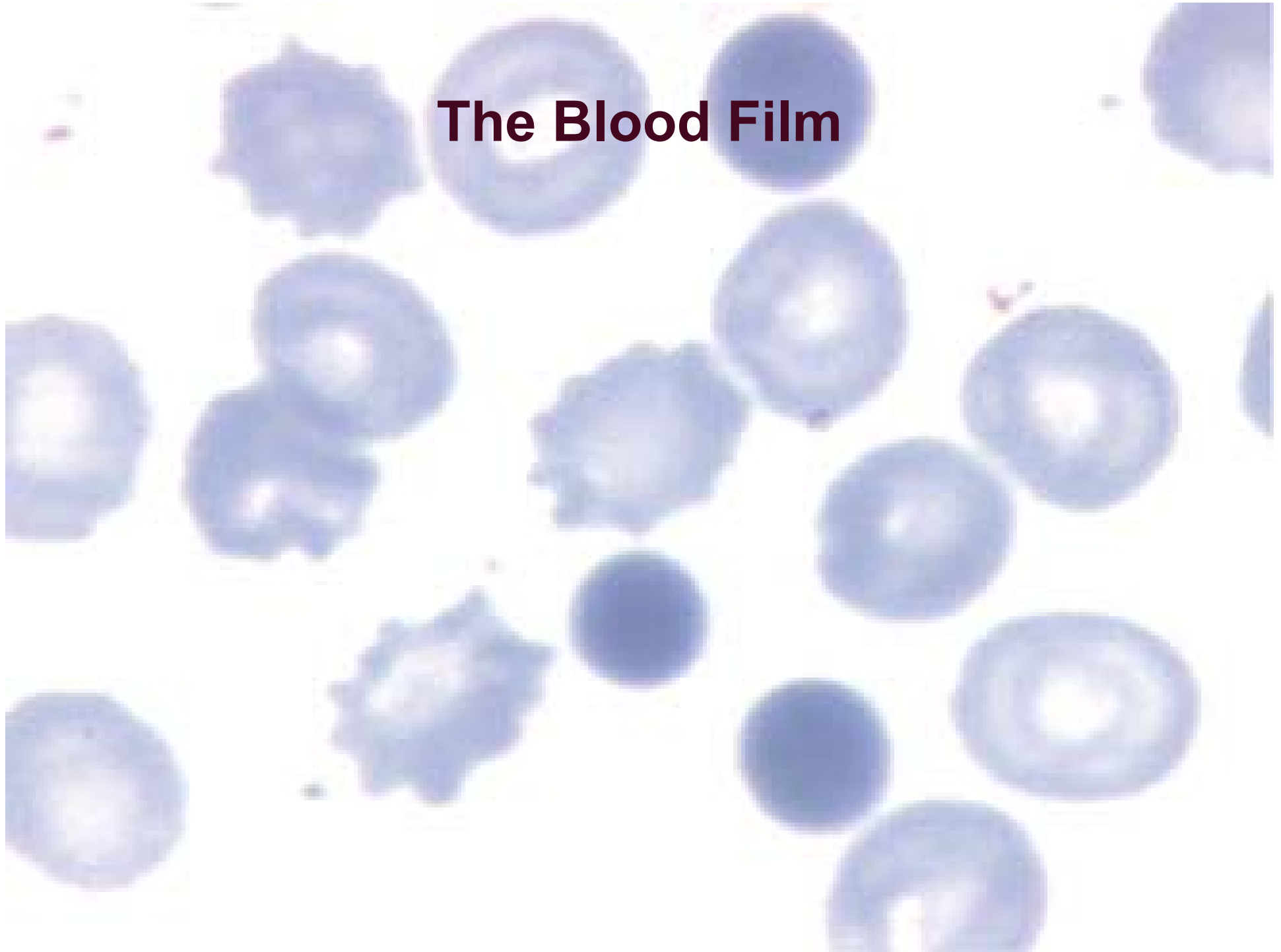
# Differential Diagnoses?

- Severe Sepsis (?chest or intra-abdominal) with ARDS
- ?Acute cardiogenic pulmonary oedema less likely
- ?*In vitro* haemolysis or intravascular haemolysis
- ?Disseminated intravascular Coagulation due to sepsis
- ?Other cause of intravascular haemolysis

# Management and Progress

- Broad spectrum antibiotics to cover sepsis of unknown focus (Cefuroxime, Clarithromycin and Gentamicin) after cultures
- Referred to Intensive Care for respiratory support
- Cardio-respiratory arrest (PEA)
- CPR, intubated, Adrenaline and Calcium Chloride given
- No return of cardiac output
- Resuscitative efforts abandoned after 25 minutes

# The Blood Film



# Causes of Haemolysis

<i>Type</i>	<i>Etiology</i>	<i>Associations</i>	<i>Diagnosis</i>
<b>Acquired*</b>			
Immune-mediated	Antibodies to red blood cell surface antigens	Idiopathic, malignancy, drugs, autoimmune disorders, infections, transfusions	Spherocytes and positive DAT
Microangiopathic	Mechanical disruption of red blood cell in circulation	TTP, HUS, DIC, pre-eclampsia, eclampsia, malignant hypertension, prosthetic valves	Schistocytes
Infection	Malaria, babesiosis, Clostridium infections		Cultures, thick and thin blood smears, serologies
<b>Hereditary†</b>			
Enzymopathies	G6PD deficiency	Infections, drugs, ingestion of fava beans	Low G6PD activity measurement
Membranopathies	Hereditary spherocytosis		Spherocytes, family history, negative DAT
Hemoglobinopathies	Thalassemia and sickle cell disease		Hemoglobin electrophoresis, genetic studies

# Phone Call from Microbiology...

- *Clostridium perfringens* bacteraemia confirmed on blood culture
- Gram positive bacillus, ubiquitous distribution including gut flora, associated with upper GI sepsis e.g. gall bladder empyema
- $\alpha$ -toxin (phospholipase C) degrades RBC membranes, causing massive haemolysis, and increases vascular permeability
- Post mortem report: widespread intense haemoglobin staining of intima of major arteries, presumed septicaemia

# Learning Points

- *Clostridium perfringens* septicaemia – rare but serious cause of fever with haemolysis
- Not all 'odd' results are artefact – the blood may be haemolysing inside the patient after all!
- Remember peripheral blood film may give important clues to aid diagnosis

# References

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