27 year old female ~26/40 gestation
Presented to a hospital with a headache and was discharged shortly after (no bloods collected); smoked cannabis later on
The following day, complained of being ill with breathlessness, difficulty walking
Witnessed collapse with seizure at home, thence unresponsive
Died enroute to hospital
Transferred to Newcastle for autopsy
POST MORTEM FINDINGS

- Autopsy performed 5 days after death
- CT scan unremarkable apart from pregnancy
- External examination
  - No suspicious marks or scars
  - No rash
  - No palatal or serosal petechiae
  - No decomposition
CT Scan
INTERNAL EXAMINATION

- ‘flame’ like endocardial haemorrhages in the left ventricular outflow tract
- Non-specific sign of shock
HEART

- 75% atherosclerotic narrowing of left anterior descending coronary artery
**OTHER FINDINGS**

- Oedematous and congested brain with normal meninges
- Oedematous lungs
- Normal adrenal glands
- Male foetus in utero with growth parameters appropriate for gestational age.
MICROSCOPY - HEART
MICROSCOPY - LUNGS
Overall features suggestive of DIC (disseminated intravascular coagulopathy)
No evidence of amniotic fluid embolism, pulmonary thromboembolism, pregnancy induced hypertension, or chorioamnionitis
ANCILLARY TESTS

- **Microbiology**
  - *Heart Blood Culture*: *Neisseria meningitidis* and *Streptococcus salivarius* isolated within 1 day
  - *Vitreous humour and Blood* PCR confirmed *Neisseria meningitidis*
  - Serotyping identified *Neisseria meningitidis* serotype W135

  [Streptococcus likely contaminant]
ANCILLARY TESTS

- Vitreous Humour Biochemistry
  - Renal failure (Urea 12.7mmol/L and Creatinine 167umol/L)
- Blood C-reactive protein and procalcitonin
  - Not suitable for analysis due to haemolysis
- Toxicology
  - Cannabinoids, paracetamol and metoclopramide identified
CAUSE OF DEATH

- *Neisseria meningitidis* septicaemia (serotype W135)
- Features of shock, DIC and renal failure
- Public health notified and prophylactic antibiotics given to close contacts of the deceased
Value is debated in the literature

Limited utility due to difficulty avoiding contamination and the effect of post mortem changes to the body

Challenges in interpretation of results

Diagnosis of sepsis at post mortem is difficult
  - Limited diagnostic features
**Neisseria meningitidis**

- *Neisseria meningitidis* is a gram negative diplococcus which has a polysaccharide capsule that protects it from phagocytosis and bacteriolysis.
- Meningococcal sepsis carries an overall mortality rate of 15-20% with most deaths occurring within the first 24 hours before treatment has been administered.
- Skin rash and/or mucosal petechiae take at least 12 hours to appear following onset of illness.
In the clinical setting the definitive diagnosis is of secondary importance to the commencement of antibiotic treatment.

After death, a timely definitive diagnosis is essential to ensure:
- Notification to public health
- Administration of prophylactic antibiotics to close contacts
Post mortem identification of *Neisseria meningitidis* from normally sterile site usually represents true infection, especially when other tissue pathology correlates are present.

- Swabs and cultures may not be available due to decomposition.
- Refrigeration reduces viability of the organism.
- PCR testing has increased sensitivity.
Clinical history

Autopsy findings

Detecting *Neisseria meningitidis* in the cerebrospinal fluid, blood by culture or PCR

Subcutaneous swabs from skin rash are used ante mortem [no longer - owing to the sensitivity of blood PCR tests]

Throat detection may be non-specific due to asymptomatic carriage of *Neisseria meningitidis* in 10-15% of adults
First ever reported case to demonstrate
  - PCR positive *Neisseria meningitidis* in both **blood** and **vitreous humour**
VITREOUS HUMOUR USE IN POST MORTEM

- Less subject to *post mortem* biochemical changes than blood
- Mainly used for biochemical testing
  - Renal failure
  - Ketosis (diabetic, alcoholic, starvation, hypothermia)
  - Dehydration, water intoxication
  - Immersion related deaths
- Use for microbiology is not well documented
Was this death preventable?
Was the pregnancy a factor in developing sepsis with *Neisseria meningitidis*?
Should we be using vitreous humor as a microbiology specimen more frequently?
THANK YOU.