Ancillary Tests in Forensic Pathology

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Objectives

• To learn what is done as a common practice in forensic pathology
• Normal findings on some tests
Typical Ancillary Tests

• Vitreous analysis
• DNA testing
• Microbiology
• Toxicology
• Diatom testing
• Other biochemical testing
Vitreous Analysis

• A sample of fluid collected from the eye
• Tests:
  – Na
  – K
  – Cl
  – Urea
  – Cr
  – Ketones
  – glucose
VA

- Glucose 0.5 mmol/L
- Urea 5.1 mmol/L
- Creatinine 42 umol/L
- Sodium 137 mmol/L
- Potassium 13.1 mmol/L
- Chloride 118 mmol/L
- Ketones Negative

**Interpretation**: No significant abnormalities
• Found dead in bed:
  • Glucose  34 mmol/L
  • Potassium  13 mmol/L
  • Sodium 116 mmol/L
  • Chloride  99 mmol/L
  • Ketones +4
  • Creatinine  21 umol/L
  • Urea 8 mmol/L

Diagnosis: Diabetic ketoacidosis.

Now we have added Bhydroxy butyrate to the test platform
Consider:
- Na 102 mmol/L
- K 20 mmol/L
- Cl 69 mmol/L
- Ketones negative

Interpretation:
- Decomposition

- Cr 33 umol/L
- UN 12 mmol/L
• Na 156 mmol/L
• K 13.4 mmol/L
• Cl 142 mmol/L
• Cr 21 umol/L
• Urea 49 mmol/L
• Ketones Negative
• Interpretation: Dehydration pattern
DNA

- Mito DNA vs nuclear DNA
- Paternity testing
- Sexual activity kit
- Fingernail clippings and trace evidence
Microbiology

• Sudden death with evidence of infection
• Blood cultures, tissue culture, urine
  • Staph aureus
  • Invasive grp A strep
  • Occasional g neg
  • Important org. like meningiococcus
  • Legionella in urine
Microbiology

• Challenges of interpretation: contamination, post mortem growth of organisms, previous antibiotic treatment, anaerobes
Virology

- NP swabs for respiratory pathogens
  - Influenza A and B
  - Parainfluenza 1, 2 and 3
  - Metapneumovirus
  - Adenovirus
  - CMV
  - Herpes
  - RSV
  - Enterovirus
Virology cont’d

• If we do blood for virology: normally the laboratory wants acute and convalescent sera to test: problem!

• We may ask for IgM for mumps, rubella, measles, parvovirus so please do not ask for convalescent samples

• HIV, Hep C and Hep B

• PEP for HIV
Virology

• Occasionally see other viruses like West Nile or encephalitis from various pathogens – typically suspected and verified with immunohistochemistry of tissue and occasionally in blood
Toxicology

- Alcohols: ethanol, isopropanol, methanol
- Ethylene glycol
- Drugs of abuse: stimulants (cocaine and meth, etc) and depressants (morphine, heroin, hydromorphone, hydrocodone, oxycodone etc)
- Drugs of therapeutic significance: base drugs (hundreds) but special attention with antidepressants, centrally active drugs, drugs used for epilepsy and methadone
- Benzodiazepines: immunoassays
- ASA and Acetominophen
- THC
Designer Drugs

- Synthetic cannibinoids
- Hormones: anabolic steroids, insulin, GH
- Methamphetamine type stimulant drugs:
  - Adam, Eve, etc
Drownings

- Ethanol
- Drugs of abuse
- Benzos
- Diatom testing: no longer performed
- Strontium testing
- Magnesium
- Calcium
Environmental

- CO
- CN
- H2S
- Natural gas
- Vitiated atmosphere
Questions