‘Autopsy Technique’

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Outline

1. Purpose of perinatal autopsy
2. Guidelines & protocols
3. Autopsy techniques
1. NATURAL DISEASES

2. ACCIDENTAL DEATH

3. ABANDONED FETUS

4. NON-ACCIDENTAL INJURIES
Purpose of perinatal autopsy

Determine cause of death & extent of disease process
- clinical autopsy

Investigation of possible neonaticide
- section 309A of Penal Code
- forensic autopsy
Guidelines, Protocols, Reports

MINIMUM STANDARDS

QUALITY AUTOPSY

VALUE OF DEATH INVESTIGATION
Perinatal Autopsy

WHAT DO YOU NEED?

INFORMATION

EQUIPMENTS

ANCILLARY INVESTIGATIONS
Designated trolley
Pre-autopsy x-ray
Investigation of neonaticide
‘abandoned baby’

- Identification of mother
- Age of gestation
- Viability
- Live birth
- Cause of death
## MORPHOMETRIC INDICES AND ORGAN WEIGHTS

<table>
<thead>
<tr>
<th></th>
<th>Observed in the present baby</th>
<th>Expected for (\ldots/40) weeks</th>
<th>Expected for foot length (\ldots/40) weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>External parameters</strong></td>
<td></td>
<td></td>
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<tr>
<td>Body weight (g)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Foot length (cm)</td>
<td></td>
<td></td>
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<tr>
<td>Crown-rump length (cm)</td>
<td></td>
<td></td>
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<tr>
<td>Crown-heel length (cm)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Chest circumference (cm)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Abdominal circumference (cm)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Head circumference (cm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Organs &amp; placenta</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brain (g)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Thymus (g)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Heart (g)</td>
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<td></td>
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<tr>
<td>Lungs (g)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Liver (g)</td>
<td></td>
<td></td>
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<tr>
<td>Spleen (g)</td>
<td></td>
<td></td>
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<tr>
<td>Pancreas (g)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kidneys (g)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adrenals (g)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placenta (g)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Percentile &amp; ratio</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placenta percentile</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brain/liver weight ratio</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lung/body weight ratio</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Fetal-Placental weight ratio</td>
<td></td>
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<tr>
<td>Fetal-Placental weight centile</td>
<td></td>
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</tr>
</tbody>
</table>
Dysmorphisms

1. Inner canthal distance
2. Outer canthal distance
3. Interpupillary distance
4. Philtrum length
• Ear position
• Patency of nasal passage
• Digit & crease
• Genitalia, anus & spine
Why examine placenta?

A variety of placental conditions may result in stillbirth of otherwise completely normal fetuses.
The incision

Measurement of subcutaneous fat thickness
Sampling of skin for fibroblast culture
Detection of occult injuries
Good preservation
Opening of thoracic cavity

Signs of congenital or infectious disease.
Assessment of lung for presence of air
Thoracic cavity

Sampling for microbiology tests
Sterile techniques
Heart examination \textit{in-situ}

Orientation & dimension
Atrioventricular connection
Morphology of chambers & great vessels
Sequential segmental analysis
Occult Injuries

Complete dissection of the posterior trunk to detect subcutaneous or intramuscular hemorrhage from trauma
Sampling for histology

Adequate preservation
Frozen section with oil-red O staining
Special stains
Extra tissues
Ancillary investigations

Toxicology & DNA profiling
Metabolic & Genetic
Microbiology
Estimation age of gestation

Ossification centre
Weight & parameters
Gross & histology of organs
Investigation of neonaticide ‘abandoned baby’

- Identification of mother
- Age of gestation
- Viability
- Live birth
- Cause of death
Stillborn or born alive?

- Food in stomach.
- Injuries
- Vital reaction of umbilical cord
- Air in lungs
Air in lungs

• Gross appearance of lungs
• Floatation test
• Histology of lungs
Floatation Test

• The hypothesis - lungs from a neonate who has breathed will be expanded and filled with air and therefore will float in water
• ‘Routine test’
• ‘Suggestive pointer’
• The method
  – Lungs and heart
  – With liver in decomposed body
  – GI tract (estimates of survival)
Postmortem CT

- Differentiation between live birth and stillbirth
- Differentiation between complete aeration of lungs and partial artificially aerated lungs as a result of resuscitation attempts.
- Detect the presence or absence of putrefactive gases within the vascular system.
- Estimation age of gestation.

Guddat et al 2013
Sieswerda-Hoogendoorn et al 2013
Causes of Stillbirth in Turku, Finland, 2001–2011

Tanita Lehtonen¹, Tuomas Markkula¹, Pasi Soidinsalo¹, Saara Otonkoski², and Jukka Laine¹
Armani-Ebstein lesion, ketoacidosis and starvation in a child

C. M. Milroy · J. L. Parai
Isolated Ventricular Noncompaction Cardiomyopathy Presenting as Fetal Hydrops at 24 Weeks Gestation: A Genomic Analysis

Jane E Armes, Lisa Squires, Rohan Lourie, Mark Williams, Renee Gallagher, Gareth Price, Andrew Stubbs, Sigrid MA Swagemakers, Peter J van der Spek, James Harraway, Joseph Thomas, and Deon J Venter
### Table III: Case fatality rate (CFR) of paediatric inpatients with community acquired bacteraemia according to bacterial isolates at the Selayang Hospital (2001-2011)

<table>
<thead>
<tr>
<th>Organisms</th>
<th>Total(N)</th>
<th>Died(n)</th>
<th>CFR(n/N%)</th>
<th>Fisher's Exact Test</th>
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</thead>
<tbody>
<tr>
<td>Staphylococcus aureus</td>
<td>38</td>
<td>1</td>
<td>2.6</td>
<td>0.325</td>
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<tr>
<td>Nontyphoidal Salmonella</td>
<td>34</td>
<td>0</td>
<td>0.0</td>
<td>1.000</td>
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<tr>
<td>Streptococcus pneumoniae</td>
<td>28</td>
<td>1</td>
<td>3.6</td>
<td>0.481</td>
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<tr>
<td>Escherichia coli</td>
<td>14</td>
<td>0</td>
<td>0.0</td>
<td>1.000</td>
</tr>
<tr>
<td>Group B Streptococcus</td>
<td>11</td>
<td>3</td>
<td>27.3</td>
<td>0.051</td>
</tr>
<tr>
<td>Klebsiella pneumoniae</td>
<td>10</td>
<td>2</td>
<td>20.0</td>
<td>0.194</td>
</tr>
<tr>
<td>Streptococcus pyogenes</td>
<td>8</td>
<td>0</td>
<td>0.0</td>
<td>1.000</td>
</tr>
<tr>
<td>Haemophilus influenzae</td>
<td>8</td>
<td>0</td>
<td>0.0</td>
<td>1.000</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>5</td>
<td>3</td>
<td>60.0</td>
<td>0.004</td>
</tr>
<tr>
<td>Salmonella typhi</td>
<td>5</td>
<td>1</td>
<td>20.0</td>
<td>0.406</td>
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<tr>
<td>Other Streptococcus spp</td>
<td>17</td>
<td>1</td>
<td>5.9</td>
<td>1.000</td>
</tr>
<tr>
<td>Other Pseudomonas spp</td>
<td>12</td>
<td>2</td>
<td>16.7</td>
<td>0.258</td>
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<tr>
<td>Other organisms</td>
<td>29</td>
<td>4</td>
<td>13.1</td>
<td>0.270</td>
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<tr>
<td>Total</td>
<td>219</td>
<td>18</td>
<td>8.2</td>
<td></td>
</tr>
</tbody>
</table>
Section 318 Penal Code

• Concealment of birth by secret disposal of dead body.
• Could be of an aborted fetus or stillbirth of higher gestation.
• Identification of mother the utmost importance.