Perimortem Samples From Patients With Suspected Metabolic Disease

Many inborn errors of metabolism present as acute and life-threatening illnesses with widespread systemic effects. There may not be time to establish a correct diagnosis before death but it is important, because of the genetic implications, that every effort is made to collect samples to permit accurate diagnosis.

Samples of blood and urine should always be collected, and if death occurred recently, skin, liver, and muscle biopsies (essential where disorders of the pyruvate complex, or mitochondrial respiratory chain are suspected) collected as soon as possible, preferably within 2 hours of death. Skin fibroblasts may be cultured from a skin biopsy for up to 6 hours post mortem, and fibroblasts from a tendo achilles biopsy possibly for as long as 2-4 days. The tissue samples may then be stored to be used later for specific studies if the autopsy, histology and fluid biochemistry establishes a sense of direction. Cerebrospinal fluid may be required in specific cases.

It is essential to contact the Laboratory to ensure that ante-mortem specimens already taken are not discarded.

Consent should be obtained, not only for the autopsy, but also for specifically metabolic specimens to be taken. If the case is to be a Coroner’s case, the Coroner must be notified before any specimens are taken.

A Clinical Biochemist is on call for any consultations relating to perimortem specimens, and can be contacted by calling Canterbury Health Laboratories (03) 364 0300. Out of hours, call Core Biochemistry (03) 364 0376, (80376 internally).

Procedure:

The body should be carefully examined first, and any marks, incisions, puncture sites or haematomas recorded, as well as the detail of the sampling procedure.

Urine 10 mL (min 2 mL)

- **The Vital Specimen** Consider bladder tap, or catheterisation; instil 20 mls saline and collect effluent for analysis if necessary.
- For amino and organic acid profile, acylglycines, orotic acid etc.
- Random sample, frozen or on ice. No added preservative.

Whole blood 10 mL

- **Another Critical Specimen** that may be collected from the heart. For DNA studies, EDTA (purple top). Can be stored at +4°C for 48 hours.
- Lithium heparin (green top) tube for cytogenetics and/or FISH analysis.

- Dried blood spots on 2 or 3 Guthrie cards (8-12 spots) – for acylcarnitine profile and sometimes for DNA PCR (as they can be easily stored and transported).

**Plasma** 3-4 mL (min 1 mL)

- For total and free acylcarnitine, quantitative amino acids, very long chain fatty acids etc. Lithium heparin (green top). Contact your laboratory as the plasma needs to be separated within 20 minutes, then frozen at -80°C

**Serum** 1 mL

- Free fatty acids – plain tube (red top).

**CSF** 1.0 mL (min 250 µL)

- Selected cases – for lactate and pyruvate; glycine, serine.
- Must be free of red cells
- Freeze and store at -80°C

**Muscle, skin and liver biopsies**

Can all be done via the same abdominal right upper quadrant incision.

Again note any marks on the skin in this region and note state of subcutaneous tissue – haemorrhage, pus etc. Wipe area with an alcohol swab. Make procedure sterile until skin biopsy is taken.

Make a 2-4cm incision below the right lower costal margin approximately 3-4cm lateral to centre where rectus abdominus muscle is. Palpate for liver and try to make incision superior to the edge.

**Skin** 3x2 mm diameter

- Full thickness sample
- Two thin ellipses of tissue from wound margin within 6 hours of death under STERILE CONDITIONS
- Place in RPMI tissue culture medium (medication fridge, drug room, labour ward) or sterile saline solution until RPMI medium available. Contact Cytogenetics for RPMI transport medium: Mon-Fri 7am-5:30pm Ext 80881. After hours and weekend – on call #027 279 7527.
- KEEP AT ROOM TEMPERATURE
- Send as soon as possible to the Cytogenetics Laboratory
**Liver**  Open Biopsy

- Obtained within 2 hours of death, and sooner if possible.
- Specimen obtained by needle biopsy perimortem, or direct removal of specimen of liver at open biopsy (preferable) immediately postmortem
- 2 x 0.5 cm cubes. Wrap individually in foil and roll to exclude air
- Place foil parcels in plastic tube (urine container can be used temporarily) and snap freeze in liquid nitrogen. (Specialist Biochemistry on-call: #0274 548 012).

**Muscle**  Open biopsy

- From abdominal muscle anterior to peritoneum, obtained within 2 hours of death and sooner if possible.
- Essential if a mitochondrial respiratory chain defect is suspected

**Enzymology**

- 2 x 0.5 cm cubes, manage as for liver biopsy.

**Histology, Histochemistry and Electron Microscopy**

- Requires 2 thin strips. Refer to specific instructions from pathologist (Dr L Hunter, Dept Pathology 80598; after hours contact the Operator).

**Photography & X-Rays**

- Can be done postmortem and are useful in selected cases.

*8th September 2004*