

The Coroners Act - Province of Ontario Report of Post Mortem Examination

9812799

- 1. (1) Made upon the body of **Lisa Shore** at The Hospital for Sick Children in the City of Toronto in the Province of Ontario, on the 22nd day of October 1998, 5 hours after death.
- (2) Place of death: Hospital for Sick Children, Toronto, Ontario.
- (3) Time examination commenced: 12:45 hours.
- (4) Required by Coroner, Dr. M. Reingold

2. IDENTIFICATION:

The body was identified to me by Hospital ID band lying on shrouds ("1631889"), ID bracelet around left wrist ("98125439 Lisa Shore") in the presence of D. Perrin.

3. (1) EXTERNAL EXAMINATION:

Description of the body.

- Crown-heel length: 139 cm (25 to 50 percentile for age).
- Head circumference: 55 cm (between +1 and +2 SD above mean).
- Chest circumference: 71.6 cm.
- Abdominal circumference: 66 cm.
- Weight: Not weighed (nutritional status normal).
- Sex: Female
- Temperature:
- Apparent age: Appropriate for 11 years.
- Hair: Light brown/blonde, medium to long.
- Eyes: No scleral or conjunctival petechiae; irides blue-grey.
- Pupils: Equally dilated, 0.9 cm diameter.
- Ears: Normal; single-ring ear rings both sides.
- How nourished: Normally well-nourished; normal hydration.
- Skin: No rashes or anomalies (see #2 below).
- Rigor Mortis: Early rigor mortis of extremities and jaw.
- Post Mortem staining: Mottling of face and posterior surfaces.
- Decomposition: Nil.
- Clothing and effects: Body received in a hospital bed accompanied by an IV pole supporting IV drug delivery pumps and IV fluid bags; body unclothed, covered by blue and white hospital sheets; 2 rolled white towels and a pillow present; both ears have a single ear ring.

APPROVED FOR PAYMENT
MAR 1999
ACCOUNT RECEIVED

(2) EXTERNAL MARKS:

- 1) faint brown bruise anterior upper right foreleg, 2 cm diameter
 - 2) faint brown bruise anterior upper left foreleg, 1.5 cm
 - 3) brown bruise medial right antecubital fossa
 - 4) striae medial right antecubital fossa
- No other nontherapeutic marks.

Therapeutic marks and interventions:

- a) nasogastric tube, right nostril, draining bloody fluid
- b) orotracheal tube (terminates in trachea just above carina)
- c) paddle marks central upper chest
- d) old healed scar right lower quadrant, 4.5 cm
- e) intravascular catheter, dorsum of left hand, splinted and bandaged, not attached to IV bag
- f) intravascular catheter, dorsum of right hand, splinted and bandaged, attached to 0.9% NaCl bag (340 mls remaining) and burette (67 mls)

W.J.L. M.D., C.C.F.P.
REGIONAL CORONER
MAR 16 1999

11 (1)

- g) intravascular catheter, right inguinal region, bandaged, attached to 0.9% NaCl bag (100 mls) and burette (108 mls)
- h) intravascular puncture sites: left antecubital fossa, dorsum right foot, dorsum and lateral left foot

The IV drug administration apparatus includes:

- i) Graseby 3300 PCA Pump, serial number 001873, hospital ID T2739; containing syringe with 37 ml colourless clear fluid; syringe joinge by "Y" connection tubing to 0.9% NaCl bag (380 mls) with attached burette (36 mls); complete with round pendulum
- ii) IVAC 560 Pump, serial and identification numbers 56M-36595, 212644-8614, L1011, 560 MEE

4. INTERNAL EXAMINATION:

Note: The examination was modified to comply as much as possible with the requirements of Jewish custom, with the agreement of Coroner Reingold. Organs were dissected and sampled for microscopy, microbiology, and toxicology as deemed necessary, but were otherwise immediately returned to the body. Body fluids were collected and kept with the body. The procedure was attended by the Jewish Chaplain, Gittie Edery. The body was taken directly from the autopsy suite by funeral personnel at the completion of the procedure after release by the Coroner, at 15:55 on October 22, 1998.

(1) Chest

Diaphragm: 180 grams; congested.
Pleural cavities: Congested serosal surfaces; approximately 10 mls serous fluid bilateral.
Pericardium: Congested epicardium; moist cavity but no collectible fluid.
Mediastinum: Normal organ orientation; congested viscera.

(2) Face and Neck

Mouth: Pale lips, mildly cyanosed; frenula normal; anterior teeth normal.
Nose: Normal; both choanae patent.
Pharynx: Normal.
Tongue: Normal.
Hyoid Bone: Intact, normal; no soft tissue hemorrhage in neck.
Thymus: 61.8 grams (expected for age 29.5 g); congested, large; no petechiae.
Thyroid: 8.6 grams (8.7 g); normal.

(3) Respiratory System:

Larynx: Normal calibre; frothy luminal fluid
Trachea: Normal calibre; frothy luminal fluid
Bronchi: Normal branching pattern and calibre; frothy sanguinous fluid.
Pulmonary Pleura: Deep congestion of posterior pleural surfaces; scattered few petechiae posterior of both lungs
Pulmonary Vessels: Engorged; main and lobar branch pulmonary arteries opened - thromboemboli not present.
Right Lung: 447.9 grams (combined expected weight 571.2 g); 3 lobes; marked congestion and edema in all lobes; no areas of consolidation; no focal lesions.
Left Lung: 352.0 grams; 2 lobes; marked congestion and edema of both lobes; no areas of consolidation; no focal lesions.

(4) Circulatory System:

Heart: 174.9 grams (154±23 g); normal position, size, and shape.
Auricles: Intact atrial septum.
Ventricles: Normal morphology and chamber size; right ventricle 0.3 cm thick (0.3±0.1 cm), left 1.1 cm thick (1.0±0.2 cm).

Tricuspid Valve: 10.2 cm circumference (9.5±0.9 cm); normal.
Pulmonary Valve: 6.0 cm (5.2±0.5 cm); normal.
Aortic Valve: 5.1 cm (5.1±0.8 cm); normal.
Mitral Valve: 8.2 cm (7.6±0.8 cm); normal.
Myocardium: Normal endocardium and cut surfaces of myocardium; no scars or obvious necrosis.
Coronary vessels: Normal right and left coronary artery ostia; normal unobstructed proximal epicardial courses; left coronary artery dominant.
Aorta and large vessels: Normal left aortic arch and major branches; abdominal aorta normal; normal venae cavae; left ligamentum arteriosus.
Character of Blood in heart and vessels: Liquid.

(5) **Gastro-Intestinal System:**

Esophagus: Congested mucosa in lower third, otherwise normal.
Stomach and Contents: Partially digested food, brown granular, approximately 100 ml; normal mucosa.
Intestine and Appendix: Adhesions in right lower quadrant, mild, at appendectomy site; normal bowel rotation; duodenum, small bowel, and colon have normal mucosa; formed stool throughout colon.
Liver: 1231 grams (880 g); normal position and shape; smooth capsular surface; homogenous moderately congested parenchyma without focal lesion.
Gall Bladder: Normal; red-brown bile; extrahepatic bile ducts demonstrated patent by gall bladder compression.
Spleen: 182.2 grams (85 g); normal position and shape; large, firm; white pulp prominent; no parenchymal lesions.
Pancreas: 68.2 grams (29.3 g); normal.
Mesenteric Lymph nodes: Normal for age.

(6) **Genito-Urinary System:**

Adrenals: Both are normal in position, shape, and size.
Right 2.4 grams (combined expected weight 7.0 g); normal cortex and medulla.
Left 3.0 grams; normal.
Urinary Bladder: Moderately distended with yellow-slightly opaque urine, approximately 50 mls; mild reddening of mucosa at trigone.
Kidney and ureters: Normal position and shape; ureters normal.
Right: 91.4 grams (combined expected weight 163 g); moderate cortical and medullary congestion, otherwise normal.
Left: 94.2 grams; moderate cortical and medullary congestion, otherwise normal.
Urethra: Not examined.
Vagina and Vulva: Normal peripubertal.
Ovaries and Fallopian Tubes: Normal peripubertal; few cystic follicles.
Uterus: Normal peripubertal size; hemorrhagic endometrium in fundus.

(7) **Head, Skull and Osseous System:**

Scalp: Normal.
Meninges and Blood vessels: Mild congestion; no hemorrhage.
Skull: Normal calvarium.
Middle ears and Sinuses: Not opened.
Remainder of Osseous System: Ribs are normal; extremity bones not examined.

(8) **Nervous System:**

The brain in the fresh state weighed 1500.4 grams (the normal for age is 1247 grams). There is mild cerebral edema with suggestion of slight cerebellar tonsillar, uncal, and third nerve grooving. Ventricles are slightly small. No cortical, white matter, brain stem or spinal cord lesions are seen.

Summary of Neuropathologic Examination (Dr. L. E. Becker): no neuropathologic diagnosis.

5. MICROSCOPIC AND LABORATORY FINDINGS:

Respiratory System (RUL-6; RML-7; RLL-8; LUL-9; LLL-10; trachea, larynx-19):

There is moderate lymphocytic epithelial and subepithelial inflammation in the epiglottis, larynx, and upper trachea. No viral inclusions are seen. There is no accompanying acute inflammation or ulceration, although the epithelium is sloughed from autolysis in areas. Both lungs have moderate congestion and edema with focal intra-alveolar hemorrhage. The changes are more intense in the left lung, where there is also very focal slight acute pneumonia. Pulmonary vessels and bronchioles are normal. Bronchiole-associated lymphoid tissue is mildly prominent. Alveolar septa are normal.

Cardiovascular System (RV-11; LV-12,13; AVN-14,15):

A few scattered foci of contraction band degeneration are present in both ventricles. Rare interstitial lymphocytes are noted but there are no aggregates of lymphocytes and no associated myocyte necrosis. Intramyocardial arteries are normal. There is no scarring or evidence of remote ischemic injury.

Digestive System (liver-3; pancreas-4; GE junction, stomach, GD junction-17; small bowel, colon-18):

There is mild microvesiculation of hepatocytes, mainly periportal. Scattered lymphocytic infiltrates are present in some portal tracts. The pancreas is normal.

There is mild esophagitis consistent with gastroesophageal reflux injury. Mild focal lymphocytic inflammation is present in the gastric body and antrum. No structures suggestive of *H. pylori* are seen. The luminal organs otherwise show mucosal autolysis.

Urinary System (kidneys-1,2; bladder-20):

The kidneys are congested but otherwise normal. The bladder is normal.

Reproductive System (ovaries-22; uterus-21):

There are several cystic ovarian follicles. No corpora lutea are seen. The uterus is normal, with inactive endometrium.

Endocrine System (adrenals-1,2; thyroid-5; pituitary-23):

The adrenals have good cortical cytoplasmic fat content and are normal. The thyroid and pituitary are normal.

Hematopoietic/Lymphoid System (thymus-5; spleen-4; lymph nodes-16; bone marrow-24):

The thymus is congested. There are no petechiae and no stress involutinal changes. The spleen is congested. White pulp has normal distribution but secondary follicles are not prominent. Several have hyalinosis of central vessels. Germinal follicles in mesenteric lymph nodes are also mildly involuted. Bone marrow shows normocellular trilinear hematopoiesis.

Musculoskeletal System (diaphragm-16; skeletal muscle-23; ribs-24):

The diaphragm and psoas muscles are normal. Endochondral bone growth and bone trabeculae are normal.

Laboratory Investigations:

- I. Microbiology:
 - A. Bacteriology:
 1. blood (34220754): no growth
- II. Post Mortem Chemistry
 - A. Vitreous: urea 4.1 mmol/L; glucose 3.2 mmol/L; sodium 143 mmol/L; potassium 6.8 mmol/L; chloride 121 mmol/L.
- II. Toxicology (report received March 12, 1999):

- A. blood (1T50438):
 - 1. morphine: 105 ng/mL (368 nmol?)
 - 2. gabapentin: 1.1 mg/100mL (64.2µmol/L)
 - 3. amitriptyline: traces
 - 4. nortriptyline: 0.01 mg/100 mL (0.4 µmol/L)
 - 5. no other significant findings by a drug screening procedure
- B. syringe (1T50430):
 - 1. morphine: detected
- C. right hand infusion set (1T50434):
 - 1. no significant findings
- D. pump infusion set (1T50433):
 - 1. no significant findings
- E. right inguinal infusion set (1T50431):
 - 1. no significant findings
- F. specimens received but not examined:
 - 1. urine x2 (1T50471, 1T50469)
 - 2. blood (1T50437)
 - 3. bile (1T50470)
 - 4. stomach contents (1T50436)
 - 5. liver (1T50435)

6. X-RAY FINDINGS (IN BRIEF):

No postmortem X-rays performed.

7. SUMMARY OF ABNORMAL FINDINGS:

- I. Pulmonary congestion and edema, moderate
- II. Cerebral edema, mild, with:
 - A. no other neuropathologic diagnosis
- III. Toxicologic studies, with:
 - A. blood concentration of morphine (105 ng/mL) within therapeutic range
 - B. blood concentration of gabapentin (1.1 mg/100mL) in excess of therapeutic range
 - C. blood concentration of carbamazepine (0.39 mg/100mL) below therapeutic range
 - D. blood concentrations of amitriptyline (traces) and nortriptyline (0.01 mg/100 mL) within therapeutic range
 - E. no other significant findings by drug screening procedure
- IV. Manifestations of mild intercurrent viral infection, with:
 - A. lymphocytic laryngotracheitis, moderate
 - B. lymphocytic triaditis of liver, mild
 - C. sparse myocardial lymphocytes without myocyte necrosis
- V. Acute pneumonia, focal, slight
- VI. Esophagitis consistent with gastroesophageal reflux injury, mild
- VII. Chronic antral gastritis, mild
- VIII. Status post appendectomy, remote, with:
 - A. peritoneal adhesions, right lower quadrant, mild

COMMENTS:

An anatomic cause of death is not identified at autopsy examination. Detailed toxicologic analyses of blood and solutions from the infusion apparatus did not disclose drug concentrations that could be reasonably implicated as cause for this child's death. In particular, the blood morphine concentration was within the reported therapeutic range for patients taking the drug for management of chronic pain. The gabapentin concentration was well in excess of the reported therapeutic range, however, serious toxicity is not identified with blood concentrations even 5 times higher than found in this child. The child had evidence of an underlying viral infection, with lymphocytic infiltrates in the upper respiratory tract, liver, and sparsely in the heart, but this is also not sufficient to satisfactorily explain the sudden death.

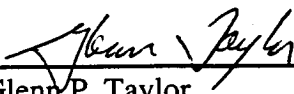
8. CAUSE OF DEATH:

I hereby certify that I have examined this body, have opened and examined the above noted cavities and organs as indicated, and that in my opinion the cause of death was:

No anatomic or toxicologic cause of death identified.

March 15, 1999

Date



Glenn P. Taylor
Pathologist MD FRCPC

Address:
Department of Pathology
The Hospital for Sick Children
555 University Avenue
Toronto, Ontario M5G 1X8

9. SUPPLEMENTAL:

CLINICAL SUMMARY:

Information from Coroner's warrant and HSC Health Record.

This 10 years 11 months old girl was admitted to HSC Emergency Department at 21:51 on October 20, 1998 for severe right leg pain. The leg pain related to a nondisplaced spiral fracture of the right tibia suffered on February 11, 1998. The sequelae of that was a complex pain syndrome for which Lisa had several hospital visits and admissions. The first post-fracture hospital visit was February 13, 1998 when she presented to HSC ER with severe right leg pain. The pain was relieved by splitting the cast. The cast was replaced at HSC Orthopedic Clinic on February 17, 1998. She was admitted to HSC on February 24, 1998 for management of increasing right leg pain. This included a continuous lumbar epidural insertion of analgesic. She was discharged that admission on March 6, 1998, but returned with severe pain on March 15, 1998. Discharge for that admission was on March 25, 1998. During these two hospitalizations Lisa had assessment by the Pain Management Program and Psychiatry. An assessment by the Toronto Hospital Comprehensive Pain Program on March 30, 1998 concluded that Lisa had nonphysiologic pain. Her pain continued and parents took her to Children's Hospital in Boston for further evaluation and management. She was evaluated there by the Pain Treatment Service on May 13, 1998. A diagnosis of reflex sympathetic dystrophy was made (complex regional pain syndrome type I) and she was subsequently admitted to hospital in Boston on May 18. During that admission she received a right lower extremity intravenous regional sympathetic block. She was discharged, with prescription for gabapentin 300 mg tid and amitriptyline 50 mg qhs, on May 22, 1998. A letter from the Behavioural Medicine Clinic of Children's Hospital in Boston noted Lisa's "medical and physical therapy examinations were consistent with a diagnosis of RSD and her psychiatric evaluation was benign."

In HSC ER on October 21, 1998 Lisa was seen by the Pain Management Team. She was given morphine (2 mg at 23:50 and 2 mg at 00:40, October 22). An IV line was placed and a PCA device attached. The device was loaded with 50 mg morphine in 50 ml saline and set to give 1.5 ml boluses with a lockout interval of 6 minutes and total dose 20 mg in 2 hours. Lisa was transferred to HSC Ward 5A from ER at 01:45 October 22, 1998. On arrival at the ward she was noted to be in no obvious pain. Her vital signs were HR 72, RR 16, and BP 90/60. She settled to sleep as soon as she was put on the bed. Mother stayed overnight at her bedside. At 02:50 her respiratory rate dropped to 8 to 10. The Pain Management on call person was contacted by the nurse, who was advised to remove the analgesic delivery button from Lisa. This was done. It was noted, however that Lisa slept through the night, except for when she was aroused to have vital signs taken. She apparently did not use the PCA device during her night on the ward. At 04:15 she was again noted to have a respiratory rate of 10 but at 04:20 the rate had increased to 16. Her respiratory rate recorded at 06:00 was 14. The Orthopedics team found Lisa vital signs absent during their morning rounds at 07:15. Full resuscitation commenced but no cardiac output resulted after 30 minutes and the resuscitation was stopped.

Past medical history includes a tonsillectomy and adenoidectomy in April 1992 and emergency appendectomy in September 1997.


Glenn P. Taylor, MD, FRCPC



Office of the Chief Coroner

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Bureau du coroner en chef

Warrant for Post Mortem Examination Mandat d'autopsie

Form 6
Formule 6

ML-261/98.

To: (R.G. Taylor)
À l'attention de: "pathologist on call"

a legally qualified medical practitioner.
médecin dûment qualifié.

I direct that a post mortem examination be made by you on the body of:

Je vous ordonne de procéder à l'autopsie du corps de:

Lisa SHORE

and that the following special examinations or analyses be made by you and/or the Centre of Forensic Sciences:
et je vous ordonne/j'ordonne au Centre de criminalistique d'effectuer les analyses et les examens spéciaux suivants:

Toxicology / Toxicologie:

Blood for Ethyl alcohol
Sang - présence d'alcool éthylique

Other (specify):
Autre (préciser):

Urine for Ethyl alcohol
Urine - présence d'alcool éthylique

Amidriptyline
Morphine
Carbamazepine
Gabapentin
Tylenol #2

Other: / Autre:

Case History (including request for any specific evaluation at autopsy in addition to opinion re: Cause of Death):

Antécédents du cas: (Y compris toute demande d'évaluation particulière à l'autopsie en plus d'une opinion concernant la cause du décès):

Age / Âge

Date and Time of Death (may be estimate only) / Date et heure du décès (estimation acceptable)

10 | 22 Oct 98 (21:52)

- ID - on pt hospital booklet.
- complex pain syndrome
- on PCA pump w/ morphine
- found VSA on am records - failed resusc.

* Should do tox. on ETC blood for baseline + PCA pump.

Please telephone verbal report of findings, immediately following completion of gross examination, to me at:

Veillez me téléphoner pour me faire un rapport verbal de vos constatations immédiatement après l'examen macroscopique à:

378-8551

Office / Bureau

Other / Autre

I hereby authorize release of the remains immediately following completion of the gross examination.

Par la présente, j'autorise le transfert de la dépouille immédiatement après l'examen macroscopique.

Yes / Oui

No / Non

Dated this

22 day of

Oct

19

98 at

Toronto à

Fait le

DR. M.J. REINGOLD, CORONER
26 Grenville Street
Toronto, Ontario M7A 2G9

Coroner

Note: Section 28(2) Coroners Act R.S.O. 1980 provides as follows

The person who performs the post mortem examination shall forthwith report his findings in writing only to the coroner who issued the warrant, the Crown Attorney, the regional coroner and the Chief Coroner and the person who performs any other examination or analysis shall forthwith report his findings in writing only to the coroner who issued the warrant, the person who performed the post mortem examination, the Crown Attorney, the regional coroner and the Chief Coroner

Remarque: Le paragraphe 28(2) de la Loi sur les coroners, L.R.O. de 1980, stipule ce qui suit:

La personne qui procède à l'autopsie présente sans délai un rapport écrit de ses conclusions uniquement au coroner qui a décerné le mandat, au procureur de la Couronne, au coroner régional et au coroner en chef. La personne qui procède à un autre examen ou à une autre analyse présente sans délai un rapport écrit de ses conclusions uniquement à ces personnes et à la personne qui a procédé à l'autopsie.

ML-261/98

AGE: 11 years

CENTRAL NERVOUS SYSTEM

GROSS BRAIN:

The brain in the fresh state weighed 1,500.4 grams (normal for age is 1,320 grams). The dura is not preserved. The leptomeninges are thin and transparent. The vessels are in their usual position with no anomalies. The cranial nerves are normal.

The cerebral hemispheres are symmetrical. There is a tertiary gyral pattern and the insulae are closed. There are no herniations present. (1) cm coronal sections of the cerebral hemispheres reveal normal gyri, normal differentiation of cortex and white matter. The ventricular system and deep nuclei are normal. Transverse sections of brain stem, cerebellum and spinal cord are normal.

LEB/fp

November 27, 1998

MICROSCOPIC DESCRIPTION:

1. Spinal Cord - No abnormality.
2. Medulla - No abnormality.
3. Pons - No abnormality.
4. Midbrain - No abnormality.
5. Left Cerebellum - No abnormality.
6. Left Basal ganglia - No abnormality.
7. Right Frontal cortex - No abnormality.
8. Left Hippocampus - No abnormality.
9. Right Basal ganglia - No abnormality.
10. Left Occipital - No abnormality.
11. Hypothalamus - No abnormality.

CNS DIAGNOSIS:

No neuropathologic diagnosis

LEB/fp

November 27, 1998