

Autopsy number: 13-181
Date of autopsy: October 14, 2013 at 5:00 p.m.
Date of death: October 13, 2013 at 5:10 p.m.

CHARLES DAVID RICH
2830 Fox Mountain Drive
Spring, Texas 77386

FINAL DIAGNOSES

Respiratory System:

Cytomegalovirus (CMV) pneumonitis (bronchopneumonia) with diffuse alveolar damage and hyaline membranes, right and left lobes, lungs (see comments).

Centrilobular emphysema, right and left upper lobes, lungs.

Acute congestion and edema (combined weight 3490 grams), right and left lobes, lungs [normal range 685-1050 grams].

Serous effusion (approximately 150 ml), right pleural cavity.

Serous effusion (approximately 150 ml), left pleural cavity.

Gastrointestinal System:

CMV colitis with inflammatory lesion (up to 1.4 cm), ileocecal valve, cecum.

Adenomatous polyp (up to 3.0 cm), ileum.

Diffuse thickening, wall, esophagus.

Cardiovascular System:

Mild atherosclerotic plaque, aorta.

Hypertrophy (1.9 cm thickness), left ventricle, heart.

Hypertrophy (0.7 cm thickness), right ventricle, heart.

Hematopoietic System:

Epithelial cyst (up to 1.4 cm), spleen.

Hepatic and Biliary System:

Bile duct adenoma, liver.

Chronic passive congestion, liver.

Cholesterolosis, mucosa, gallbladder.

Other:

Localized recent thrombi, mesentery.

(Continued next page)

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FINAL DIAGNOSES

(Continued)

Comments:

1. The lungs and cecum had numerous enlarged cells with cytopathic viral effects consisting of large oval intranuclear inclusions (Cowdry type A inclusions). These are called owl eye nuclei by some authorities and are considered the diagnostic hallmark of active CMV infection. Cytomegalovirus is one of the most common viruses infecting immunocompromised patients.
2. Foamy exudates were present within the alveoli of the lungs, therefore special stains for fungal and pneumocystis microorganisms will be performed. A separate supplemental report outlining these results will be issued.

OPINION

Based on the anatomical findings at the autopsy, reasonable medical probability, and investigational information available at this time, it is my opinion the decedent, **CHARLES DAVID RICH**, died as a result of multiple pulmonary conditions including CMV bronchopneumonia, centrilobular emphysema, and diffuse alveolar damage (Adult Respiratory Distress Syndrome). His death was further complicated by CMV colitis.

Jessie Adame, M.D.
Pathologist
January 7, 2014

ja:sla

HISTORY

According to the family and records from Cypress Fairbanks Medical Center Hospital, the decedent was a 45-year-old Caucasian male who was admitted to the hospital on October 1, 2013 with abdominal pain and diarrhea and reportedly with a history of Crohn's disease. He was HIV positive and had a low CD4 count. A CT of the chest on admission revealed ground glass opacities, bi-basal traction bronchiectasis and cysts predominantly in the upper lobes. CT of the abdomen and pelvis revealed minimal Crohn's disease. His sputum grew pseudomonas. Evaluation for pulmonary embolism was negative. CT of the chest at that time also revealed increased ground glass densities seen diffusely throughout the lungs with a background of pulmonary fibrosis and cystic changes predominantly distributed in the upper lobes of the lungs. He was also noted to have diffuse thickening of the esophagus. His primary problems while in the hospital involved acute hypoxic respiratory failure, increased ground glass opacities on CT of the chest with a background of pulmonary fibrosis and cysts predominantly distributed in the upper zones, pseudomonas lung infection with underlying traction bronchiectasis, interstitial lung disease due to inhalation of drugs, Crohn's disease and nutritional issues. He died at 5:10 p.m., Sunday, October 13, 2013.

The decedent is received with multiple documents including written consent for autopsy signed by the decedent's wife, Lisa H. Dugger. The autopsy is arranged by Ms. Dugger directly with Autopsy and Pathology Services, P.A. with the assistance of personnel from Cypress Fairbanks Medical Center Hospital. The postmortem examination is conducted in an autopsy suite within the morgue of Arlington National Funeral Home, Houston, Texas by Jessie Adame, M.D. It is started at 5:00 p.m., Monday, October 14, 2013. Assisting with the autopsy is L.R. Stewart.

CLOTHING

The decedent is clothed in a blue print hospital gown.

EVIDENCE OF ACUTE MEDICAL INTERVENTION

The right and left sides of the abdomen have electrocardiogram pads. The left wrist has a medical identification band bearing the name "Rich, Charles." The right upper arm has a double port intravascular power injectable cutaneous catheter (PICC line) which is secured in place with a clear and white dressing. The left great toe has a medical identification tag bearing the name "Rich, Charles."

IDENTIFICATION

The decedent is identified by a funeral director's band located on the left ankle bearing the name "Charles Rich." The decedent is also identified by the medical identification tag located on the left great toe and the medical identification band located on the left wrist (see above). In addition, the decedent has a faint dark blue tattoo located on the left lower leg depicting illegible letters and measuring 4.5 x 1.0 cm. It is not entirely clear if this is a true tattoo or a possible irregularity.

EXTERNAL EXAMINATION

The decedent is a well developed, slightly thin, Caucasian male measuring 186.0 cm (73.2 inches) and weighing an estimated 175 to 200 pounds. The decedent has not been embalmed. The upper and lower extremities, neck, and jaw have 1 to 2+ rigor mortis. The posterior aspects of the body have partially fixed livor mortis. Pressure blanching corresponds to the position of the decedent on the table.

The skin has its usual elasticity. The decedent has no signs of dehydration. The decedent has no evidence of trauma or violence. The superficial lymph nodes are not enlarged.

The head is symmetrical and has 32.0 cm dark brown hair. The hair is of moderate fullness with focal graying. The hair growth pattern exhibits bi-temporal recession. The head has no evidence of trauma. The upper and lower eyelids are free of gross lesions. The conjunctivae and sclerae are non-icteric and have no petechiae or congestion. The sclerocorneal junctions have no arcus senilis. The irides are gray. The pupils are dilated to approximately 0.6 cm and are equally round. The corneas are clear. The ears have no discharge. The earlobes are not pierced. The nares have no discharge. The septum is slightly deviated to the left. Palpation of the nasal bone reveals no fractures. The teeth are natural and are in good condition. Focal hemorrhage is noted along the upper gums. The mucosal and cutaneous surfaces of the lips and gums are otherwise free of gross lesions. The decedent has a moustache and beard of light to medium fullness. The beard extends to the neck.

The neck is symmetrical. The trachea and larynx are palpable along the midline and are mobile. The thorax is symmetrical. The breasts are those of a normal adult male. The abdomen is relatively flat. The umbilicus has its usual configuration. The abdomen has no scars, palpable masses or marks of trauma or violence.

The external genitalia are those of a normal adult male with short foreskin. The testicles are palpable within the scrotal sac and bear no masses. The genitalia have no discharge or marks of trauma or violence.

The upper extremities are grossly symmetrical. The right upper arm has moderate edema. The right antecubital fossa is severely edematous and has a single puncture wound. The elbow region is severely edematous. The right forearm has moderate edema and multiple hypopigmented scar-like lesions scattered throughout its surface. The wrist has recent puncture wounds. The dorsum of the right hand has recent puncture wounds. The right hand is moderately swollen and edematous. The fingers are moderately edematous. The fingernails are short to medium length. The fingertips are unremarkable. The right hand has no jewelry.

The mid lateral left upper arm has a smallpox vaccination scar. The left antecubital fossa has faint recent puncture wounds with mild edema. The left forearm has numerous white hypopigmented scar-like skin lesions scattered throughout. The dorsum of the left hand has recent puncture wounds. The left hand has mild edema. The fingers are mildly edematous. The fingernails are short to medium length. The fingertips are unremarkable. The left hand has no jewelry.

The lower extremities are grossly symmetrical. The right upper leg, knee, and lower leg are free of gross lesions. The right ankle is not edematous. The right foot is unremarkable.

The lateral left upper leg has stretch-stria marks. The left knee has several hypopigmented scars of variable size and shape. The left lower leg is intact. The left ankle is not edematous. The left foot is unremarkable.

The back and perineum have no significant anatomical changes, other than dependent lividity. The left lower back, located approximately to the left of midline in the lower thoracic lumbar region, has a tag-like skin lesion measuring up to 0.8 cm. The anus is unremarkable.

INTERNAL EXAMINATION

Peritoneal Cavity

A "Y" shaped thoracoabdominal incision is utilized. The adipose tissue in the midline of the abdominal wall is orange-yellow and measures up to 3.0 cm. The musculature is well developed. The peritoneal surfaces are smooth and glistening. The peritoneal cavity has no unusual accumulation of fluid. The omentum is delicate. The mesenteric and retroperitoneal lymph nodes are not enlarged. The lower margin of the liver is below the costal margin in the right midclavicular line. The appendix is stubby, but in a medial position and has no evidence of inflammation.

Mediastinum

The skin and subcutaneous tissue of the chest are reflected upward in the usual manner. The thymus consists predominately of yellow adipose tissue and is free of gross lesions. The mediastinal structures are in their usual positions and are free of masses. The anterior rib cage has no evidence of trauma.

Pleural Cavities

The surfaces are smooth and glistening. The visceral and the parietal pleural surfaces are free of fibrous adhesions. The rib cage and the domes of the diaphragm are free of fibrous plaque. The right and left pleural cavities each contain approximately 150 ml of straw colored fluid.

Pericardial Cavity

The pericardial sac is intact. The surfaces are smooth and glistening. The great vessels are not anomalous. The tributaries of the coronary sinus have their usual configuration.

Heart

The heart has its usual configuration. It weighs 390 grams. The epicardium is smooth and has no petechiae. The right atrium and auricle are empty. The endocardium is smooth. The coronary sinus is patent. The tricuspid valve measures 12.1 cm. The valve leaflets and chordae tendineae are thin and delicate. The papillary muscles and trabeculae carneae have their usual configuration.

The wall of the right ventricle measures 0.7 cm (measured 1.0 below the level of the pulmonary valve). The right ventricular wall is thickened. The pulmonary valve measures 7.6 cm. The valve cusps are thin and delicate. The ductus arteriosus is closed.

The left atrium and auricle are empty. The foramen ovale is closed. The mitral valve measures 11.1 cm. The valve leaflets and chordae tendineae are thin and delicate. The papillary muscles and trabeculae carneae have their usual configuration.

The wall of the left ventricle measures 1.9 cm (measured 1.0 cm below the level of the mitral valve). The left ventricular wall is concentrically thickened. Multiple sections reveal a tan myocardium which is free of fibrosis, acute inflammatory changes, and necrosis. The left ventricular cavity is free of subendocardial hemorrhage.

The aortic valve measures 7.0 cm. The valve cusps are thin and delicate. The coronary ostia are in their usual locations and are patent. The coronary arteries have a right dominant distribution and are generally soft and pliable. The coronary arteries are free of plaque and have no areas of stenosis or occlusion.

Lungs

The lungs have a pink-red-black, solid appearance. The right lung weighs 1,840 grams. The left lung weighs 1,650 grams. The surfaces are smooth, glistening, and have moderate anthracotic mottling. The visceral and the parietal pleural surfaces are free of fibrous adhesions. The interlobar fissures are well developed. The lung parenchyma is red-tan, rubbery and has a prominent "cobweb" appearance along the right upper and left upper lobes. In addition, the right upper lobe has a prominent cyst measuring up to 6.0 cm. The lung parenchyma diffusely has tan, prominent consolidation involving all lobes. In addition, the lung parenchyma has

a meaty consistency. The bronchioles have their usual configuration. The right and left pulmonary arteries and segmental branches are free of thromboemboli. The tracheobronchial tree and larynx are lined by a smooth, gray-pink mucosa which is free of foreign material.

Neck

The hyoid bone is intact. The epiglottis has its usual configuration. The vocal cords are free of gross lesions. The mucosa of the pyriform fossae is free of hemorrhage. The thyroid gland weighs 20 grams and has its usual configuration.

Spleen

The spleen weighs 280 grams. It has its usual configuration. The surface is gray-purple and wrinkled. Cut sections reveal that the capsule is of even width. On cut section, a localized cyst is noted near the hilar region measuring 1.4 x 1.0 x 1.0 cm. The cyst has a smooth lining with no solid or papillary areas. The connective tissue elements and splenic corpuscles are discernible. The pulp is dark red.

Liver, Gallbladder & Biliary Ducts

The liver has its usual configuration. It weighs 1,780 grams. The surface is smooth and dark brown-red. The liver edges are sharp and well defined. The cut surface of the liver parenchyma is free of gross lesions. The intrahepatic blood vessels and bile ducts have their usual configuration. The gallbladder contains approximately 40 ml of green bile. The serosal surface is smooth and glistening. The wall measures 0.1 to 0.2 cm. The mucosa is light green-orange, velvety and has multiple yellow speckled areas. The gallbladder has no stones. The extrahepatic biliary ducts are patent. The hepatic hilar lymph nodes are not enlarged.

Pancreas

The pancreas has its usual configuration. It weighs approximately 200 grams. It has a tan, lobular appearance on external and on cut surfaces. The ducts have no calcification or stenosis.

Gastrointestinal Tract

The mucosa of the esophagus has its usual longitudinal folds and is free of ulceration and induration. The esophageal wall has diffuse thickening. No distinct mass is identified. The mucosa of the stomach has its usual rugal pattern and is free of ulceration and induration. The stomach lumen contains approximately 30 ml of green-black fluid mixed with bits of food material. The contents of the duodenum are not bile stained. The duodenum has no ulcers. The ampulla of Vater has its usual configuration. The mucosa and the wall of the small intestine are intact, except at the ileum. Noted 84.5 cm proximal to the ileocecal valve is a small intestinal polyp measuring 3.0 x 2.0 x 0.6 cm. The mucosal lining of this polyp is hemorrhagic and somewhat eroded. The colon and rectum contain fecal material. Their mucosa is intact, except at the ileocecal valve a round ulcerated lesion measuring 1.4 x 1.4 x 0.3 cm is noted. The lesion involves the mucosa as well as portions of the serosa which is adhered to the adjacent peritoneal lining. On the mucosal side the area is brown, slightly thickened, and slightly hemorrhagic. The wall at this site is intact. The colon has no diverticula, polyps, or masses.

Adrenals

The right adrenal gland weighs 7 grams. The left adrenal gland weighs 7 grams. The cortices measure 0.1 to 0.2 cm. Medullary tissue is inconspicuous.

Kidneys

The right kidney weighs 190 grams. The left kidney weighs 210 grams. The capsules strip with ease revealing a smooth pale tan-red surface. Cut sections reveal no gross lesions. The cortex and medulla have their usual thickness. The vessels have their usual configuration. The lining of the calyces and pelves is smooth and pale gray. The ureters are not dilated or obstructed. They have the usual anatomic distribution.

Urinary Bladder

The urinary bladder has its usual configuration. The urinary bladder contains no urine. The mucosa is intact. The ureteral orifices are in their usual positions and are patent.

Genital Organs

The prostate and seminal vesicles have their usual configuration and are free of gross lesions. The testicles are not removed for examination.

Aorta and Arteries

The intima of the aorta has mild streaky plaque. The aorta has a normal course through the thoracic and abdominal cavities. The major tributaries are patent. The major arteries have their usual configuration.

Veins

The inferior vena cava is thin walled and patent. The major branches have their usual configuration.

Skeletal System

The atlanto-occipital articulation is stable. The cervical vertebrae are stable. The thoracic and lumbar vertebrae are not fractured. The pelvis has its usual configuration. The bones of the thoracic cage are not fractured. The long bones of the extremities have no palpable fractures. Postmortem radiographs are not obtained.

Skull

The scalp is reflected anteriorly and posteriorly and has no subgaleal hemorrhage. The calvarium has no trauma and has its usual thickness. The base of the skull has no fractures. The dural sinuses are patent. The subdural and epidural spaces are free of hemorrhage. The petrous portions of the temporal bones are free of hemorrhage.

Brain

The brain is examined in the fresh state and weighs 1,640 grams. Its overall configuration is intact. The cerebral hemispheres are symmetrical. The gyri and sulci are of normal size, shape and distribution. The leptomeninges are thin, delicate and transparent. The subarachnoid space is free of hemorrhage and exudate. The midline structures (cingulate gyri, unci, mamillary bodies and

brainstem) are not herniated or deviated. The cerebellar tonsils are not increased in prominence and are not herniated. The cranial nerves, examined in situ, are free of gross lesions. The external brain surface has no congenital malformations or contusions.

The pituitary gland has its usual configuration and is not enlarged. The convexity dura, falx cerebri, tentorium cerebelli and their contained dural sinuses are free of gross lesions.

The vessels of the circle of Willis have a "classic" configuration and are free of aneurysms. The vessels are free of plaque.

Serial sections of the cerebral hemispheres reveal a distinct demarcation between the gray and white matter. The cortex is of average and uniform thickness throughout. The convolutional and central white matter are intact and are free of gross lesions. The various nuclear components of the basal ganglia are distinctly demarcated from each other and are free of gross lesions. The ventricles have a normal size and shape and are lined by a smooth, glistening ependyma. The choroid plexi in the lateral and third ventricles are free of gross lesions. The cerebrum has no hemorrhage, antemortem necrosis, calcifications, neoplasia, or congenital malformations.

Sections of the brainstem reveal that the aqueduct of Sylvius and fourth ventricle are patent, of normal size and lined by a smooth, glistening ependyma. The substantia nigra is normally pigmented. The usual fern-like pattern is seen on cut surface of the vermis cerebelli. The outlines of the dentate nuclei are distinct. The cerebellum is free of gross lesions.

MICROSCOPIC SECTIONS

The following sections are obtained for microscopic examination. The histopathologic findings are incorporated into the final diagnoses.

Right upper lobe, lung (Block 1).
Right kidney (Block 1).
Right middle lobe, lung (Block 2).
Left kidney (Block 2).
Right lower lobe, lung (Block 3).
Liver (Block 3).
Left upper lobe, lung (Block 4).
Spleen (Block 4).
Left lower lobe, lung (Block 5).
Mesentery (Block 5).
Anterior wall left ventricle, heart (Block 6).
Posterior wall left ventricle, heart (Block 6).
Right ventricle (Block 6).
Small intestinal polyp (Block 7).
Cecum (ileocecal valve lesion) (Blocks 8 and 9).
Thyroid gland (Block 10).
Esophagus (Block 10).
Right upper lobe lung (Block 11).

Cassette color: Gray

PHOTOGRAPHS

As a routine part of the postmortem examination photographs are obtained. These are a permanent part of the postmortem examination and are available for review or duplication as needed.

ADDITIONAL STUDIES OR TESTS

Often additional studies or tests may be later requested to add information to that obtained through the postmortem examination. Saved for a limited time in a freezer are specimens that may be needed for future testing. In this case the freezer specimens consist of:

Blood.
Head hair.
Vitreous humor.
Liver.
Bile.

Representative sections of tissues are retained in a formalin filled container.

All frozen and formalin preserved specimens are discarded six months following the date of the postmortem examination unless we receive a written request to hold them longer.

With written request, specimens may be retained for up to two years following the date of postmortem examination. However, specimens will be discarded after the two year period unless other arrangements are made. Storage fees beyond the two year provision will apply.

AUTOPSY AND PATHOLOGY SERVICES, P.A.

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Autopsy number: 13-181

Date of autopsy: October 14, 2013 at 5:00 p.m.

Date of death: October 13, 2013 at 5:10 p.m.

CHARLES DAVID RICH

[deleted]

Spring, Texas 77386

SUPPLEMENTAL FINAL DIAGNOSES

Respiratory System:

Pneumocystis pneumonia, right and left lobes, lungs (see comments).

Cytomegalovirus (CMV) pneumonitis (bronchopneumonia) with diffuse alveolar damage and hyaline membranes, right and left lobes, lungs (see comments).

Centrilobular emphysema, right and left upper lobes, lungs.

Acute congestion and edema (combined weight 3490 grams), right and left lobes, lungs [normal range 685-1050 grams].

Serous effusion (approximately 150 ml), right pleural cavity.

Serous effusion (approximately 150 ml), left pleural cavity.

Comments:

- I. Foamy exudates were present within the alveoli of the lungs, therefore a special stain (GMS) for fungal and pneumocystis microorganisms was performed on block #1. The special stain confirmed the presence of multiple cup and/or boat shaped fungal cysts located within foamy amorphous material within the alveolar spaces which were characteristic of *Pneumocystis jirovecii* microorganisms. These microorganisms were formerly known as *Pneumocystis carinii*.
- II. The lungs and cecum had numerous enlarged cells with cytopathic viral effects consisting of large oval intranuclear inclusions (Cowdry type A inclusions). These are called owl eye nuclei by some authorities and are considered the diagnostic hallmark of active CMV infection. Cytomegalovirus is one of the most common viruses infecting immunocompromised patients.

Jessie Adame, M.D. Pathologist February 11, 2014 sla