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SUBJECT: Autopsy Report

25 October 1954

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TO: The Honorable John W. Allison
American Ambassador
Tokyo, Japan

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NAME: Akiichi Kuboyama.

STATUS: Japanese Fisherman - Radio Operator on Fishing Boat. (Radiation "Fall-Out" effects from American Hydrogen bomb tests.) 1 March 1954.

NAME OF HOSPITAL: First National Hospital of Tokyo, Japan.

PATIENT ENTERED HOSPITAL: March 1954

DIED: 23 September 1954 - approximately 1800 hours at First National Hospital.

AUTOPSY: 23 September 1954. Autopsy began at 2330 hours.

AGE: 40

SEX: Male

RACE: Japanese

COMMENTS ON CONDUCT OF AUTOPSY:

At about 2200 hours, 23 September 1954, I was called by Mr. Sedgewick, of the U. S. Embassy Staff. I was asked to observe the autopsy of one, identified as AKIICHI KUBOYAMA, Japanese, who allegedly died of latent effects from hydrogen bomb "fall-out" exposure.

My name had apparently been given to the Embassy as an individual acceptable to the Japanese to observe the post-mortem examination. Upon arriving at the Japanese Hospital I was met by Dr. Masao Suzuki, Prof - Emeritus - Medicine, Tokyo University and also the Director of the

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merges. Here I met many of the most prominent pathologists in Tokyo to all of whom I am personally known.

During the performance of the autopsy I was afforded all the professional courtesies that could be expected and had the full assurance that nothing was withheld from me. Inability to fully understand and read Japanese made the clinical recital of the medical record of little value. It was shown to me in its entirety and some of the high lights are as follows:

The patient was hospitalized in March 1954 for medical observation following radiation exposure to "fall-out" from hydrogen bomb exploded at Bikini Atoll in March 1954. It was stated that the patient was seen by Japanese physicians on 16 March 1954 after returning to port. He had suffered nausea, vomiting and anorexia. He had developed pigmentations of exposed body surfaces, ulceration and superficial skin sloughs where clothing constrictions were apparent such as inside of boots, around the waist and around the neck. Ulceration was also present in the outer ear. Ulcers were noted on the back of the head and the hair was falling out. While in the hospital, it is stated that the patient complained of weakness, could not eat, or if food was consumed he became nauseated. At this time the patient was diagnosed as having radiation sickness. Petechia and mucous membrane hemorrhages were noted. On the 24th (?) of March 1954, the patient had a RBC count of approximately 3.5 million. The peripheral WBC was approximately 9,100 and the bone marrow was stated to have been 19,000 cells. Platelets were reported to be 43,000.

Within a week the RBC had decreased to approximately 3 million cells, the white blood cells revealed a relative agranulocytosis and was only 1,900 of which 11 per cent represented nucleated red cells. Platelets were reduced to about 30,000 (est.).

The patient was treated with transfusions of whole fresh blood and plasma. He received daily blood transfusions for 6 consecutive days then daily transfusions of plasma with five more units of whole blood during a period of almost 6 weeks. The RBC rose to about 4.5 million and stabilized. The WBC rose gradually to 5,000 to 6,000 and stabilized until 10 - 14 days prior to his demise.

83 days after receiving the first transfusion of whole blood, the patient became jaundiced. This became progressively and gradually worse. The patient became ill again, which is after a period of 45 days when he was practically symptom free. The terminal 14 days of life was characterized by periods of coma elevated temperature, elevated WBC (PMN's - approximately 15,000).

In general symptoms were consistent with uraemic coma. The patient developed pulmonary edema, pyramonia, heart failure and died.

The past history and family history was not certain to me, but probably indicated that the patient had had two previous episodes of yellow jaundice several years ago. He had two brothers that died (one older and one younger than this patient) with yellow jaundice.

The patient's immediate family was at present in good health.

THE DESCRIPTIVE PROFILE

GENERAL: The body was that of a middle aged Japanese that weighed approximately 130 lbs and the estimated height was approximately 5 feet 5 inches. There was a marked yellow jaundiced coloration over all of the cutaneous surfaces of the body. The body appeared to be well developed and in a fair state of nutrition. There was edema of the extremities and dependent positions of the body. The body showed no signs of rigor mortis. There was dependent lividity. Several scars were noted over the body.

HEAD: The hair was approximately 3 to 5 inches long and showed areas of alopecia in the posterior occipital area. There was also slight scarring of the skin in this area. The neck was supple. There appeared to be no enlarged lymph nodes. The trachea was in mid-line. There was no thyroid enlargement.

CHEST: Nothing unusual was noted on the thorax. There was dullness to percussion of both lung areas indicating the presence of fluids.

ABDOMEN: The abdomen was distended. No masses could be palpated. Around the mid-abdominal region there was evidence of healed soars with variation in the skin color.

INGUINAL REGION: Lymph nodes were not appreciably enlarged. There were no soars.

GENITOURINARY TRACT: There was scarring on the shaft of the penis probably representing healed chancre.

EXTREMITIES: There appeared to be variation in color of the skin over the wrist, the palm surfaces of the hand and dorsum of the feet.

INTERNAL EXAMINE: The prosector made a primary mid-line incision from the mentus of the chin line to the symphysis pubis. Muscles were well developed and of a yellow-pink color. Upon incising the body cavities, all were filled with a yellow fluid. Each thoracic cavity contained approximately 500 to 700 ccs of yellow colored fluid. The pleural cavity contained approximately 3,000 ccs of ascitic fluid. This was also heavily bile colored. The abdominal wall was thin. The omentum had adhesions in the right lower

quadrant. No other abdominal adhesions were apparent. The viscera were in their normal position. Intra-abdominal and mesenteric lymph nodes were prominent. The diaphragm was elevated on both sides due to the marked ascites. The pleural cavities showed distended lungs. These were purplish-pink in color. The pericardial sack was distended with yellow fluid. The pericardium showed an area of localized ecchymosis. Mediastinum was apparently normal. The thyroid was removed intact and weighed 16 grams. Grossly it appeared to be somewhat atrophic. The parathyroid glands were not identified. The larynx and pharyngeal mouth structures revealed no significant abnormalities.

LUNGS: The right lung weighed approximately 1,000 grams and the left lung weighed approximately 800 grams. Both lungs were somewhat rubbery in consistency. The pleural surface showed numerous adhesions. The cut surface of each lung revealed marked edema and areas of suppurative, conformation. Lymph nodes in the hilum were enlarged. The bronchi contained thick tenacious mucus.

HEART: The heart weighed approximately 300 grams. It appeared to be distended and the muscular walls were flabby. The epicardial surface showed a small area of ecchymosis. The endocardial surface also showed areas of sub-endocardial hemorrhage. No thrombi was present within the heart chambers. The valves and the chambers of the heart showed no other significant abnormalities. The coronary vessels were patent.

ARTERIAL VESSELS: The aorta revealed no significant gross abnormalities. Peripheral vessels showed small ring hemorrhages.

SPLEEN: The spleen was small. The estimated weight was approximately 100 grams. It was soft in consistency however the pulp was firm and dry. The malpighian corpuscles were prominent.

LIVER: The liver was atrophic and showed evidence of early cirrhosis. The capsule showed areas of scarring and hepatic lobular outline. The liver was greenish-yellow in color. The cut surface showed an atrophic degenerating liver. Hemorrhages were apparent on the cut surface. The liver was mottled.

GALLBLADDER: The gallbladder contained 30 ccs of dark green viscid bile. Pressure on bladder showed that the bile ducts into the gut were patent.

PANCREAS: The pancreas were very firm in consistency and it weighed approximately 140 grams. On the surface of the pancreas were small areas that looked like necrotic degeneration of fat. The lobular markings of the pancreas were prominent. There was some congestion of the pancreas. There was suspected pancreatitis.

ADRENALS: Adrenals were of approximate normal size and revealed no significant abnormalities.

ESOPHAGUS AND INTESTINAL TRACT: The esophagus had intact mucous membrane and showed no significant abnormalities. The stomach mucous membranes and areas of superficial hemorrhagic ulceration which appeared to be of an apical (terminal) type. There were several areas in the intestine showing sub-mucosal and sub-peritoneal hemorrhage. No other significant abnormalities were present in the intestinal tract.

GLANDS AND LYMPHATIC: Both kidneys were enlarged. The capsule was tense and the kidney bulged when the capsule was incised. Estimated weight of each kidney was approximately 250 grams. The capsule strips with relative difficulty. The kidneys were both swollen and spongy and light in color. Cortical surface was prominent. There was striation of the pyramids due to distorted vessels. The pelvis and ureters of the kidneys showed no significant abnormality.

SEMINAL VESICLES: Seminal vesicles showed no significant abnormalities.

PROSTATE: The gland was small and had a boggy consistency.

TESTICLES: Both testicles were small and appeared to be atrophic.

SKIN: There were areas of lighter colored skin surrounded by darker areas around the ears and the back of the neck. The scalp was incised and stripped from the calvarium. The top of the skull was removed which showed a yellowish colored dura. There appeared to be cerebral congestion. The dural sinuses were patent. The meninges were intact with no gross inflammation. There was yellowish spinal fluid. The brain was incised but showed no significant abnormalities.

SPINAL CORD: There were no significant gross abnormalities.

EXTERNAL NOSE, MOUTH, E.P., ORIFICES OF SKULL AND EYES: All showed yellow coloration but no other significant abnormalities.

BONE MARROW: The bone marrow in the ribs and vertebra was red and hemorrhagic and it appeared to be an active bone marrow. In the shaft of the femur the lower and central portion was yellow and fatty. The upper third of the femur showed a bone marrow that was rich and red in color.

EXTRA-ARTICULAR AND JOINTS: Several of the joints contained yellowish fluid. The bone and muscles were otherwise not significant.

NOTE: Numerous specimens were taken for bacteriology examinations. Portions of tissues were taken of practically every organ for chemical and isotope examination.

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REFERENCE TO OTHER SECTIONS:

COMMENT: On Friday, 22 October 1954, I visited the First National Hospital and Doctor Ohashi for the purpose of reviewing, microscopically, the slide preparations that he had made in this case. The microscopic slide preparations were reviewed with Doctor Ohashi and H. Shirato. Limitation of time did not permit a full or detailed study. The high lights are here recorded-

LUNGS: Both lungs showed diffuse pneumonia in some areas suppurative and confluent consolidation. There was marked pulmonary edema and in some areas in the alveoli were collections of heart failure cells. Hyphae of a fungus was present. This was thought to represent a post-mortem growth rather than a primary significant infection. The pneumonia was diffuse and appeared in all slide preparations of lung tissue. There was no evidence of tuberculous in the sections examined.

HEART: The heart microscopically showed atrophy and separation of muscle bundles. There were dilated capillaries between the muscle bundles. Section of the coronary arteries revealed no significant abnormalities.

SPLEEN: The spleen showed some atrophy. There was no evidence of active extra-medullary hematopoiesis. The spleen did not show a significant fibrosis.

LIVER: The capsule and sub-capsule areas of the liver showed marked fibrosis. The liver parenchyma reveals degeneration of great extent and that it is estimated that less than 25 per cent is functional. The liver showed no "fatty" metamorphosis. There were areas of diffuse inflammatory cells scattered throughout the parenchyma with a concentration in the central zones. Irregular hemorrhagic areas were seen throughout the liver. There was marked destruction of the parenchyma. There was reduplication of the small bile ductules and evidence of attempted regeneration of liver cells. There is obliteration of the normal lobular architecture and obstruction of many small intra-lobular bile canaliculi in which casts and plugs of bile were evident. The most severe of the degenerate changes were occurring in the central part of the liver lobule.

PANCREAS: The pancreas showed only small focal area of what is interpreted to be fat necrosis. Only marked congestion is noted.

GASTROINTESTINAL TRACT: There was surface ulceration of the gastric mucosa.

KIDNEYS: Both kidneys showed what is interpreted as a marked lower nephron nephrosis. Tubules were filled with bile pigmented and precipitated protein casts. There was numerous areas of cellular infiltrations. Some of the glomerular tufts showed an infiltration of inflammatory cells and adhesions to the Bowman's capsule.

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TESTICLES: Testicles showed marked atrophy. Leydig cells are few and small. There was no evidence of spermatogenesis.

PITUITARY GLAND: The gland showed marked congestion.

BONE MARROW: Peripheral blood and bone marrow smears prepared on the 30th day of hospitalization were examined. These smears revealed almost complete absence of the granular cells series of white blood cells. Nucleated RBC were present at this time in the peripheral blood. Blood smears taken at the time the patient became jaundiced showed granular cells and practically no nucleated red cells. Previous smears of the peripheral blood had showed 11 to 25 per cent of the identified cells as nucleated RBC. Preparations of both marrow and peripheral blood taken only a few days prior to demise showed a blood pattern, indicating bone marrow regeneration and active hematopoiesis.

PATHOLOGIC DIAGNOSIS:

CARDIOVASCULAR SYSTEM:

Flabby heart
Sub-endocardial petechia.

RESPIRATORY SYSTEM:

Confluent pneumonia with consolidation and suppuration
Bilateral pulmonary edema
Bilateral hydrothorax.

SPLEEN AND HEMATOPOIETIC TISSUES:

Active hematopoiesis (long bones)
Nucleated RBC in peripheral blood.

GASTROINTESTINAL SYSTEM:

Axonal gastric ulceration.
Ascites, peritoneal cavity.

LIVER AND BILIARY TRACT:

Sub-acute atrophy, secondary (possibly due to homologous serum jaundice).

PANCREAS:

Congestion
Focal area of fat necrosis.

SECONDARY SYSTEM:

Lower nephron nephrosis (Biliary)
Tubular casts
Focal inflammatory infiltration of cortex.

CENTRAL NERVOUS SYSTEM:

Cerebral congestion
Cerebral edema.

ENDOCRINE GLANDS:

Pituitary congestion
Testicular atrophy.

BONES AND JOINTS:

Hematopoiesis - long bones.

MISCELLANEOUS:

Jaundice - all organs
Healed areas of scarring feet & posterior neck
Alopecia areata.

JAMES L. HANSEN
Lt Colonel MC