DESCRIPTION OF SPECIAL PHOTOGRAPHY AND RADIOGRAPHIC STUDIES DONE JUNE 7, 1968, AT THE PHOTOGRAPHY DEPARTMENT, LOS ANGELES POLICE DEPARTMENT, AND AT THE GOOD SAMARITAN HOSPITAL.

Report of supplemental examinations done on the brain and various associated bony tissue obtained both at the time of surgery and at autopsy.

2:10 P.M. on June 7, 1968

The undersigned and Colonel Pierre A. Finck took the fixed and previously partly sectioned brain specimen, along with bone fragments submitted from the Surgical Pathology Department, Good Samaritan Hospital, and a segment of skull removed at autopsy (to include the surgical margins of the wound of entry to the head and a portion of the associated trajectory zone) to the Los Angeles Police Department Crime Laboratory by prior arrangement. It was recommended by the Director of the Scientific Investigation Division of the Los Angeles Police Department, Captain Martin, that the contemplated x-ray studies might be better accomplished at another facility. There was, however, at our disposal, the services of the Photographic Department of the Los Angeles Police Department and the following photographs were taken by James Watson, Senior Photographer, under our direction:

1. Segment of bone removed at autopsy from the right mastoid region, internal aspect, infra-red at a ratio of reproduction of 1:1 on the negative.

2. The external aspect of the above specimen, infrared technique.

3. External aspect of the above specimen; black and white; pan.

4. Internal aspect of the same; black and white; pan.

The foregoing photographs are all on 4 x 5 material and all bear the identification No. 68-5731, the autopsy number.

5. A 1:1 ratio photograph of various fragments of bone submitted from the Surgical Pathology Department of Good Samaritan Hospital under their number B-2411-68. Pan film; millimeter scale included in photograph.

6. An infra-red study of the same material in the same orientation and at the same scale.

The above negatives, having been exposed and developed and showing adequate representation of the fractures sought, were left for printing by the Los Angeles Police Department photo lab.

We left the Los Angeles Police Department Building at 4:10 P.M. to pursue the x-ray studies at The Good Samaritan Hospital, Department of Radiology. These were done in the company of and with the kind consultation of Drs. R. L. Scanlan and J. D. Camp. The x-ray technician for these studies was Mr. G. O. Drianis. We arrived at The Good Samaritan Hospital at 4:15 P.M. for these studies.

The first studies were of the brain slices re-assembled in the best approximation of their original anatomical positions and x-rayed with the cerebellum approximated in situ as well (two exposures, radiation entering at the vertex).

The thus assembled brain was then x-rayed in a similar manner; but with the cerebellum detached slightly along the mid-sagittal axis (four films).

The segment of skull excised at the time of autopsy and containing both the surgical defect and portions of the wound of entry to the head was then x-rayed with the specimen in as intimate contact with the film plane as possible and thus very nearly representative of a perpendicular view through the center of the surgical defect, but not the wound of entry. Two exposures of this aspect were made. The specimen was then rotated 90 degrees so as to provide a somewhat lateral view with reference to that portion of mastoid in the specimen. The specimen was supported for this study by a balsa wood block. Two exposures were made at varyingly perpendicular planes to the foregoing. The above-mentioned four exposures are all contained on one sheet of film.

Composite films embodying visible evidence of the gunshot wound to the head were then made, including that portion of dura in which the traumatic and surgical defect was present, a portion of posterior aspect of temporal lobe nearest the wound of entry, and the two portions of cerebellum as previously sectioned by the Neuropathologist. Four films of this configuration were taken to include some variety of roentengraphic technique in view of the considerable variation of geometry in the specimens studied. All of the foregoing described films bear the autopsy number 68-5731.

The next study was a series of two exposures on one sheet of film of the collection of bone fragments obtained at time of surgery (or a portion of these same). The fragments were oriented to emphasize two particular fragments, larger as it happened, which show on infra-red negatives some reaction in that spectrum. The two fragments are at the upper portion

of the x-ray field, the lower aspect being delineated by the number B-2411-68, Surgical Pathology accession number for this specimen at The Good Samaritan Hospital. Again a varying technique was used to afford a more meaningful interpretation of radio-dense areas.

Returning to the brain specimen proper, the re-assembled specimen was then arranged in a serial manner commencing from anterior and proceeding posteriorly with the arbitrary assignment of alphabetical designation of the slices which had been previously chosen by the Neuropathologist.

This first film includes arbitrary sections A, B and C. A letter R designates the right hand side of the array. The next film in this series includes arbitrary sections D and E. The next film includes arbitrary sections F, G and H, with the addition of a separate segment of cerebral cortex and associated hemorrhagic material known to have come from the region of the wound of entry to the head. The latter material bears the designation F-1. This series ends with section H which represents the terminus of the occipital lobes.

The next film is a composite of arbitrary section F, its accompanying fragment F-1, and separated views of cerebellum. Alignment of these specimens on the film is such that the mid-sagittal plane passes perpendicular to the film; the separate fragment of cerebrum and the associated hemorrhagic material are comparably distant from the midline; and the ventral portion of the cerebellum (including the pons) are similarly aligned. The remaining portion of cerebellum is then placed to the left of the ventral portion but along the same axis of lateral displacement.

The next film includes the foregoing configuration and adds the portion of dura which was originally fixed in formalin with the brain and which includes the traumatic and surgical defect.

The last film in this series is an array of the wounds of entry and exit. An "entry" column is arranged on the left of the film and the "exit" column on the right. Numbers appearing beside specimen images correspond to the assignment of gunshot wound numbers indicated in the autopsy protocol. Entry No. 1 is a view in which the superior portion of the image represents merely the integumental free surface and the remainder represents subcutaneous tissue. The specimen designated to include Entry No. 2 and Entry No. 3 is oriented on the film such that the radiation enters at the free surface of the skin. Orientation of this specimen takes into account the previously placed (at time of autopsy) suture nearest Entry No. 2. A faint image of this identifying suture is seen in this radiograph. Exit No. 2 is taken with the same orientation as the tissue including Entries 2 and 3.

Technical data for radiographs of wounds of entry and exit: 90 KV, 100 MA and 1/2 second exposure. The film suggested by Drs. Scanlan and Camp and used for these studies was Eastman Industrial type, affording superior contrast and resolution.

The above studies having been completed and all films processed and dried, the undersigned left The Hospital of The Good Samaritan at 7:25 P.M., to take the above items to the Hall of Justice. Colonel Finck had previously left the hospital (at 7:00 P.M.) for the purpose of returning the brain and other specimens (excluding the tissues containing wounds of entry and exit) to the Office of The Chief Medical Examiner-Coroner for further evaluation by the Neuropathologist. The undersigned returned the gunshot wound specimens to the office, along with the above described films.

TTN:JEH:etf

76R290A - Tox 4 - Cdb 8-67

REPORT OF CHEMICAL ANALYSIS

COUNTY OF LOS ANGELES MEDICAL EXAMINER-CORONER
Toxicology Laboratory
Hall of Justice
Los Angeles, California

File No. 68-5731

Name of Deceased: Senator Robert F. Kennedy | Lab. No. 6-161

Date Submitted: June 6, 1968 Time: 8 A.M.

Autopsy Surgeon: T. T. Noguchi, M.D.

Material Submitted:

Blood X	Liver X	Stomach
Brain	Lung X	Lavage
Femur	Spleen	Urine
Kidney	Sternum	Gall bladder
Drugs	Chemicals	

Test Desired: General Toxicological Analysis

Laboratory Findings:

A general toxicological analysis was performed on blood, liver and lungs. Nothing significant could be detected.

Examined By: R. C. Gupta, Ph.D. Head Toxicologist. Date: June 14, 1968

REPORT OF MICROBIOLOGICAL ANALYSIS
CHIEF MEDICAL EXAMINER-CORONER'S OFFICE

Bacteriology Laboratory
Hall of Justice
Los Angeles, California

File No. 68-5731

Name of Deceased Robert F. Kennedy

Date Submitted June 6, 1968

Autopsy Surgeon Thomas T. Noguchi, M.D.

Material Submitted Blood for ABO and Rh Typing.

Laboratory Findings: BLOOD: Group A1 Rh positive.

Roderick I. Luke

Examined By Roderick I. Luke Date June 12, 1968

GENERAL MICROSCOPIC DESCRIPTION

CARDIOVASCULAR SYSTEM

HEART (Sections 72-12 A, B and C; 72-13 A, B and C; 72-14 A, B and C; 72-15 A, B and C; 72-16 A, B and C; 72-17 A, B and C; 72-18 A, B and C; 72-19 A, B and C; 72-23 A, B and C.)

Epicardial surfaces show flat sparse mesothelium. The epicardial fat is of normal amount. In a few areas there is the usual degree of insinuation of epicardial fat cells in the outermost myocardium extending between isolated fibers and bundles of fibers. All sections show regular myocardial fibers with central nuclei which are of consistent and regular size. Tinctorial characteristics are uniform with the usual degree of eosinophilia. Within the myocardial interstitium is a minimal amount of edema, usually located adjacent to small vascular channels. No myocardial necrosis, fiber fragmentation, or inflammatory infiltrate is observed. No microscopic intramyocardial hemorrhage can be identified. The endocardial surfaces show an intact endothelium. The usual complement of fibrous connective tissue is present subjacent to the endothelium. Small tributaries of the coronary arterial tree included in the sections of heart show no intrinsic disease. No thrombi or emboli are identified.

AORTA (Sections 72-28 A, B and C)

The section is that of a complete circumferential segment of aorta. It includes intima, media and a generous portion of adventitia. The endothelial surface is intact. In a few random areas, minimally increased amounts of fibrous tissue can be noted beneath the endothelium. A few minute pools of mucopolysaccharide material are seen in the deep intima and inner most media. Only rare isolated foam cells can be seen immediately subjacent to the endothelium. The pattern of the elastic plates of the media is normally preserved. The adventitia consists of the usual loose collagenous connective tissue. The vasa vasorum extending from the adventitia into aortic wall are of normal caliber. No inflammatory infiltrate is identified in any layer of the aortic wall.

INFERIOR VENA CAVA (Sections 72-29 A, B and C)

The structure of the full thickness of vein wall is preserved. The endothelial surface is intact. The usual complement of subendothelial fibrous tissue is present which appears to be loosely arrayed bundles of collagen. The media of the vein shows the usual bundles of smooth muscle separated by collagen bundles. The smooth muscle gradually thins out as it approaches the adventitia which is composed of loose areolar connective tissue.

A few small nerve trunks and blood vessels in the adventitia are unremarkable.

CORONARY ARTERIES (Sections 72-23 A, B and C; 72-24 A, B and C; 72-25 A, B and C represent gross sections of branches of the coronary tree. Sections 72-26 A, B and C; 72-27 A, B and C represent longitudinal sections of coronary arteries.)

Cross-sectioned vessels show intact endothelial surfaces. No cross-sectioned branches show significant luminal compromise. There is a slight increase in fibrous tissue deposition immediately subjacent to the intima, blending with the muscular media. Rare isolated foam cells can be identified. No sharply defined plaques are observed. In a few areas, loose fibrillar appearing pink-staining material is noted in the subintimal connective tissue adjacent to the muscular media and is surrounded by small aggregates of fibroblasts, foam cells and rare lymphocytes.

The longitudinally sectioned arterial branches show no additional alterations beyond those previously described in the cross-sectioned segments.

RESPIRATORY SYSTEM

TRACHEA (Sections 72-4 A, B and C; 72-5 A, B and C; 72-6 A, B and C)

Sections of trachea include epithelium, cartilagenous rings and peritracheal connective tissue. There is focal denudation of the surface epithelium. In other areas the normal columnar epithelium is intact. Some evidence of early regeneration of denuded epithelium is noted. The tracheal basement membrane is irregularly thickened and eosinophilic. Immediately subjacent to it are aggregates of lymphocytes in a slightly edematous subepithelial stroma. Most of the tracheal mucous glands appear intact. A few of their ducts contain inspissated secretions. In one block (72-6 A, B and C) neutrophilic leukocytes are noted aggregating beneath the basement membrane. There is stromal hemorrhage adjacent to the neutrophils. In another section (72-5 A, B and C) necrosis of the epithelial and subepithelial tissue down to the level of perichondrium is noted. The areas of necrosis are manifested by loss of nuclei with persistent nuclear dust, smudging of blood vessels, and some extravasation of blood. The necrosis also involves mucous glands. At the junction of the vital and necrotic tracheal mucosa, neutrophilic leukocytes are gathered. The tracheal cartilagenous rings are viable. In all sections, some central cartilagenous calcification is noted. Some extravasation of blood into the peritracheal connective tissue is seen.

LUNGS (Sections 72-7 A, B and C; 72-8 A, B and C; 72-9 A, B and C; 72-10 A, B and C; 72-11 A, B and C)

Sections of pulmonary parenchyma are essentially similar to one another. All show moderate engorgement of the arterial bed with red blood cells as well as congestion of the alveolar capillary bed. In addition, precipitated proteinaceous edema fluid can be seen in many microscopic fields, located within alveolar spaces as well as within the perivascular and peribronchial interstitial tissue. Anthracotic pigment aggregates are sparse and collected in subpleural foci associated with slight fibrous tissue proliferation and lymphocytic aggregates. Other small aggregates of anthracotic pigment can be seen in perivascular and peribronchial location. Terminal bronchioles, respiratory bronchioles, and many alveolar ducts contain neutrophilic exudate. In some small respiratory passageways plugging by neutrophilic cells can be seen, while in other areas the aggregation is loose. In the areas of intra-alveolar neutrophilic exudation diapedesis of neutrophils through alveolar capillaries can be observed. In areas of the neutrophilic collections, fibrin mesh-works are noted. In a few alveolar spaces, fibrinous material appears compressed against the lining, but hyaline membrane formation is not a prominent feature in any of the sections examined. Larger bronchi, small bronchi and bronchioles of various caliber show prominent folding of their mucosal surfaces and some post mortem denudation of epithelium. In the areas of pulmonary parenchyma not involved with the pneumonitic process, slight hyperexpansion of alveolar ducts and alveolar spaces is noted. Several small pulmonary arterial branches contain thrombo-embolic material filling the lumen. No organization is observed. Search of vessels in the described sections reveals no obvious embolic central nervous system tissue.

LUNGS (Sections L20-1 A, B and C; L20-2 A, B and C; L20-3 A, B and C; L20-4 A, B and C; L20-5 A, B and C; L20-6 A, B and C; L20-7 A, B and C; L20-8 A, B and C; L20-9 A, B and C; L20-10 A, B and C; L20-11 A, B and C; L20-12 A, B and C; L20-13 A, B and C; L20-14 A, B and C; L20-15 A, B and C; L20-16 A, B and C; L20-17 A, B and C; L20-18 A, B and C; L20-19 A, B and C; L20-20 A, B and C)

Multiple sections of pulmonary parenchyma reveal varying amounts of red cell congestion of the capillary bed, exudation of neutrophilic leukocytes and proteinaceous material into scattered alveolar spaces, and precipitated edema fluid in other alveolar spaces. The changes are patchy. In some sections, there is collapse of individual pulmonary lobules. In other sections, small bronchi and bronchioles show post-mortem autolytic sloughing of the epithelium. Neutrophilic leukocytic aggregates are also seen in some bronchioles. In other fields, randomly scattered in the sections examined, hyperinflation of alveolar

spaces can be recognized. In section L20-2 A, B and C, two small vascular channels contain aggregates of fibrillar to spongy, pale-pink staining material in which ghosted nuclear structure can be identified. This material suggests embolic autolyzed central nervous system tissue. Special stains for myelin will be prepared.

HEMIC AND LYMPHATIC SYSTEM

LYMPH NODES (Sections 72-35 A, B and C; 72-36 A, B, and C)

Two lymph nodes are represented in these sections. Slides 72-35 A, B and C show a node structure embedded in considerable fibro-adipose tissue. Within the fibro-adipose tissue, are several myelineated nerve structures. The lymph node itself shows a well-formed capsule. The subcapsular sinusoids are open. The lymph node cortex shows small reactive follicles. In the medullary portion of the node are aggregates of macrophages obscured by black pigment. The lymph channels in the medullary portions of the nodes are unremarkable. The lymph node represented on section 72-36 A, B and C demonstrates an intact capsule with small amounts of adjacent areolar tissue and a few tags of smooth muscle. In this node the subcapsular sinusoids are also open and lined by normal littoral cells. The node cortex has small, rather symmetrically distributed lymphoid follicles with visible reactive centers. Within the medullary portion of the node is a large amount of black pigment consistent with carbon incorporated into macrophages. The medullary lymphoid sinusoids are unremarkable. The reticuloendothelial cells lining the sinusoids are not unduly prominent.

SPLEEN (Sections 72-30 A, B and C)

The splenic capsule is intact and of normal thickness. The trabecular framework of the splenic parenchyma is unchanged from normal. Malpighian follicles are normally arrayed along the central arterioles. No significant reactive centers are identified. Some of the central arterioles show a mild to moderate degree of hyalinosis. Throughout the splenic section, red pulp sinusoids are engorged with red cells. The cell population of the red pulp is normal. No evidence of extramedullary hematopoiesis is seen. There is no acute splenitis.

BONE MARROW (Sections 72-31 A, B and C)

Section of marrow includes the enclosing cortical compact and medullary cancellous bone. The adjacent periosteum is of the usual thickness and composed of dense bundles of collagen and small numbers of fibroblasts. The bony cortex shows the usual lamellar pattern. The cancellous bone trabeculae are of the usual configuration. The marrow within the medullary space is cellular and is approximately 20 percent fat. The cellular

maturation of all lines is orderly. Megakaryocytes are present. The myeloid to erythroid ratio is approximately 2.5 to 1, suggesting an early hyperplasia of the erythroid line. There is prominent activity of the normoblastic series in the marrow.

THYMUS (Sections 72-57 A, B and C; 72-58 A, B and C)

All sections show residual thymic elements embedded in lobulated fat containing several small blood vessels. The thymic lobules show nodular peripheral aggregates of mature lymphoid thymic cells. The medullary portions of the thymus are looser but are composed of lymphoid cells in a delicate reticular stroma. Hassell's corpuscles are prominent in all sections. Many show prominent cystic change and the cystic areas are filled with flakes of keratin-like material and epithelial cells with occasional formation of epithelial pearls. Amorphous flocculent pink-staining material surrounds the recognizible ghosted areas. There is no evidence of reactive lymphoid follicular activity within the thymus.

GASTROINTESTINAL SYSTEM

ESOPHAGUS (Sections 72-37 A, B and C)

The section is that of a complete cross-sectional representation of esophagus. Outer adventitial fibro fatty tissue tags are present. The circular and longitudinal muscles, bundles and associated nerve filaments and ganglia are normally distributed. The submucosa consists of rather loose areolar connective tissue. The muscularis mucosae is prominent but not abnormally thickened. The submucosa contains small clusters of lymphocytic cells near blood vessels. The esophageal squamous epithelium is intact and shows normal maturation from basal layer to the lumen. The section appears to represent mid-esophagus as no outer skeletal muscle attachments or submucosal gland structures are identified.

TONGUE (Sections 72-1 A, B and C)

This section includes a generous strip of lingual mucosa, subepithelial tissue and a prominent mass of lingual skeletal muscle. The epithelial surface shows numerous filiform papillations. The tips of the papillae are covered with slightly hypercornified squamous epithelium. The epithelial maturation appears orderly. Numerous bacterial colonies are present in the exfoliating squamous cellular debris. Colonies appear to be predominantly coccal. The lingual musculature is entirely within normal limits. There is no evidence of inflammation.

STOMACH (Sections 72-38 A, B and C; 72-39 A, B and C; 72-40 A, B and C)

All sections reveal similar features. The gastric serosa and muscularis are unremarkable. The gastric mucosal folds are prominent. The epithelium is moderately well preserved. Some superficial autolytic loss of the columnar surface epithelium adjacent to the gastric pits is noted. Between some mucosal folds are aggregates of entrapped mucus, containing exfoliated surface cells. The capillary bed of the mucosa appears engorged. Surrounding the necks of the gastric glands are rather prominent aggregates of plasma cells and occasional lymphocytes. In a few areas these cellular aggregates extend through the full thickness of mucosa and form small mononuclear aggregates at the junction of mucosa and muscularis mucosae. A distinctive feature observed in all sections is prominence of the parietal cell population of the gastric glands, with relative reduction in the zymogen cell population. The muscularis mucosae is of normal thickness. Submucosal tissues are of loose areolar type and contain engorged thin-walled blood vessels.

PANCREAS (Sections 72-41 A, B and C)

The sections are similar to one another. All show well preserved lobular pancreatic tissue. The vascular bed is mildly to moderately congested. Occasional fat cells are present within the lobules themselves, but there is no fat in the interstitial tissue. Several interlobular ducts and some intralobular ductal elements contain inspissated proteinaceous pink-staining material. The epithelium within most ducts is well preserved. Only rare pancreatic acini show ectasia. There is no interstitial inflammatory reaction identified. The islets of Langerhans appear normally distributed through the lobular parenchyma and show no evidence of hyalinization. There is no evidence of arteriolar sclerosis.

LIVER (Sections 72-42 A, B and C)

All sections are similar. The liver lobular architecture is well preserved. The portal triads contain no inflammatory cell infiltrate. The portal vein tributaries, hepatic artery tributaries and bile ducts are unremarkable. The central veins show mild to moderate engorgement by red blood cells. Some congestive changes in the innermost pericentral sinusoids are also observed. The liver cells are arranged in plates of single cell thickness. There is minimal edema of the spaces of Disse. The cells of von Kupfer are normally distributed. There is no evidence of cholestasis. The pericentral liver cells contain the usual complement of lipochrome pigments.

GALLBLADDER (Sections 72-43 A, B and C)

A section of gallbladder shows extensive autolytic changes involving the mucosa, with all the cells apparently ghosted and anucleated. The gallbladder muscular coat is unremarkable. The liver bed of the gallbladder is included in the section and shows unremarkable liver cells at their junction with the pericholecystic connective tissue.

UROGENITAL SYSTEM

KIDNEYS (Sections 72-44 A, B and C; 72-45 A, B and C; 72-46 A, B and C; 72-47 A, B and C; 72-48 A, B and C; 72-49 A, B and C; 72-50 A, B and C; 72-51 A, B and C)

Sections of kidney show moderately well preserved tubular elements and intact glomeruli. Most of the interstitial renal vascular bed is engorged with red blood cells. The glomerular capillary bed shows red blood cell engorgement. There is no evidence of renal tubular necrosis. In some sections, proximal tubular epithelium shows a slightly vacuolated to ground glass appearance suggestive of a minimal osmotic nephropathy. Only rare glomeruli in multiple sections examined show ischemic obsolescence. In general, small arteries of arcuate to interlobar size show slight intimal fibrous thickening. No significant arteriolar hyalinization is found.

Sections taken from blocks 72-44 and 72-45 include an adenomatous nodule within the outer cortex. This nodule appears well encapsulated by dense hyalinized fibrous tissue. A few central fibrous trabeculae course across the nodule. The nodule is composed of sheets, cords and tubules of small cuboidal to columnar cells, occasionally arranged as papillary fronds. The cells have sparse pale pink vacuolated to finely granular cytoplasm and large oval to rounded basophilic nuclei.

No mitotic activity is recognized within the nodule. No insinuation into blood vessels or the surrounding renal parenchyma is observed. There is scarring with associated tubular atrophy and some glomerular distortion and compression in the cortex immediately adjacent to the nodule.

Sections from blocks 72-46, 72-47, and 72-48 include the grossly described renal cyst. The cyst wall is composed of hyalinized fibrous connective tissue. The lining consists of sparse cuboidal cells. The renal parenchyma immediately adjacent to the cyst wall shows a generous rim of atrophic cortical and medullary tubules, compressed and distorted glomeruli, clusters of hyalinized glomeruli, and a minimal lymphocytic infiltration. These changes are consistent with pressure atrophy. Some small blood vessels in this area immediately adjacent to the cyst show prominent fibrosis.

Sections of the kidney including the papillae as they enter the calyces show normal endothelial lining the calyces and a normal fibrous and muscular calyceal wall. The tip of a papilla is covered with unremarkable cuboidal epithelium. The collecting tubules appear unremarkable except for a rare focus of calcium salt deposition in their basement membranes.

BLADDER NECK - PROSTATE (Sections 72-52 A, B and C; 72-53 A, B and C; 72-54 A, B and C)

Sections examined from block 72-52 include bladder with bladder neck and prostatic junction. The bladder wall musculature is unremarkable. The blood vessels immediately subjacent to the bladder epithelium are markedly congested with red cells. There is some loss of the transitional epithelium. In its place neutrophilic leukocytes and occasional mononuclear cells are clustered. The sub-epithelial tissue extending into the muscularis shows moderate edema and associated chronic inflammation. In the prostatic uretheral portion of the specimen, there is also sub-epithelial edema and mild inflammation. The prostatic glands at the junction of bladder neck and prostate show normal papillary epithelium of columnar type, with basally located nuclei. No atypical features are identified. Sections from blocks 72-53 and 72-54 show only prostatic elements. The fibro-muscular stroma is unremarkable. The glands are arranged in their normal manner. The epithelium is intact. A few small ductules contain neutrophilic leukocytes and proteinaceous debris and are surrounded by mononuclear cells and rare neutrophils. Other glandular elements contain inspissated proteinaceous material, rare corpora amylacea, and a few small calcific spheryles.

TESTIS (Sections 72-55 A, B and C)

Sections are essentially similar to one another. The tunica albuginea is thick and composed of laminated collagen bundles. A few minute ductular epithelial rests lined by cuboidal columnar cells and containing inspissated pink-staining material are seen within the tunica albuginea. The testicular parenchyma shows the usual tubular pattern. There is mild interstitial edema. Interstitial cells are arranged in small and large clusters. Many show golden pigment within their eosinophilic cytoplasm and a few contain crystalloids of Reinecke. The parenchymal tubules show mild basement membrane thickening. Most tubules show orderly spermatogenesis extending through spermatozoa formation. Only rare tubules appear to show absence of spermatozoa formation and in these, spermatids can be identified.

ENDOCRINE SYSTEM

THYROID (Section 72-56 A, B and C)

The thyroid follicles show mild to moderate variation in size.

Most contain rather abundant colloid. There is peripheral scalloping of colloid in a few follicles. The thyroid epithelium is generally low and cuboidal. A rare thyroid follicle shows squamous metaplasia. There is no evidence of interstitial inflammation, edema or fibrosis. Intrathyroid blood vessels are unremarkable.

PITUITARY (Sections 72-59 A, B and C; 72-60 A, B and C; 72-61 A, B and C; 72-62 A, B and C; 72-63 A, B and C; 72-64 A, B and C)

Multiple sections of the pituitary includes anterior, intermediate and posterior portions. The connective tissue capsule around the pituitary shows focal extravasation of blood. There is no hemorrhage within the substance of the pituitary, however. The anterior lobe contains the usual complement of cells of eosinophilic, basophilic and chromophobic types. The eosinophils show the usual nodular aggregation along the anterior pole. There is no evidence of necrosis of pituitary cells. Within the pars intermedia a few colloid filled cystic structures lined by attenuated cuboidal epithelium are seen. The posterior lobe has the typical neural appearance and is unremarkable.

ADRENALS (Sections 72-65 A, B and C; 72-66 A, B and C; 72-67 A, B and C; 72-68 A, B and C)

All sections of adrenal are essentially similar. All show a connective tissue capsule composed of dense hyalinized fibrous tissue containing fibroblasts. This capsule has a sharp junction with the surrounding periadrenal fat. Some of the periadrenal fat is of the fetal type such as is frequently seen in this region. A few small arterioles in the adrenal capsule and perirenal fat show minimal hyalinization of their walls. No extracapsular cortical nodules are identified. A few intra-capsular microscopic aggregates of adrenal cortical cells are seen. The adrenal cortex shows well demarcated zonation. The glomerulosa is well formed and easily demarcated from the fasciculata. There is no significant nodularity identified within the cortex. The cells of the fasciculata have pale pink cytoplasm which is granular to finely vacuolated. The vascular bed appears mildlycongested in the reticularis; in some sections it is moderately to markedly congested as it approaches the medulla. The reticularis shows cells having rather dense eosinophilic cytoplasm. There is the usual interdigitation of reticularis with the adrenal medulla. The medullary cellular elements are well-preserved. The usual thick walled venous channels are seen within the medulla.

PERIPHERAL NERVOUS SYSTEM

PERIPHERAL NERVE (Sections 72-72 A, B and C)

Peripheral mylineated nerve including its epineural connective

tissue shows well formed axonal structures with the usual complement of Schwann cell nuclei distributed in a normal manner. No diagnostic changes are recognized.

MISCELLANEOUS

Slides labeled 72-2 and 72-3 A, B and C are sections of pieces of gelfoam covered peripherally with blood clot, and showing early migration of neutrophilic leukocytes into the more peripheral interstices.

Slides labeled 72-32, 72-33, and 72-34 A, B and C and 72-22 A, B and C are all pieces of blood clot; no lamination or organization is present; and the material appears to be of either agonal or post-mortem origin.

Slides labeled 72-21 A, B and C and 72-20 A, B and C show pieces of gelfoam infiltrated with red cells, neutrophils and lymphocytes. Fibrin and red cells are at the periphery.

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SURGICAL PATHOLOGY SLIDES FOR REVIEW

Microscopic review of surgical tissue sections from The Hospital of The Good Samaritan, received in this office on June 7, 1968. Sections are labeled B2411-68, and consist of three slides.

One section shows skin and subcutaneous fat. Only a small area of surface epithelium is present. Several pilosebaceous structures and scattered sweat glands are noted. Collagen of the dermis shows fragmentation and coagulation, and some coagulation of epidermis is also present. Extravasation of blood into the dermis is widespread, and early neutrophilic migration out of capillaries into dermis and subcutaneous fat is recognized. Scattered fragments of bone dust are spread through the disrupted dermis. Aggregates of fine brown granular material can be observed near and in the most disrupted dermal tissue. These are consistent with grains of gunpowder.

Another tissue section reveals small pieces of disrupted edematous cerebellar cortex without reaction or hemorrhage. Purkinje cells show variable degrees of distortion and nuclear pyknosis. Small pieces of bone are also present on the slide as are irregular pieces of blood clot and fibrin mesh with entrapped leukocytes.

The third slide is a section of a piece of gelfoam to which are adherant a piece of blood clot, a few bony spicules and sparse pieces of brain tissue. Some minute strips of tissue consistent with leptomeninges are also noted.

TTN:VJR:etf

CLINICO-PATHOLOGICAL CORRELATION OF SYSTEMIC AUTOPSY FINDINGS

INTRODUCTORY COMMENT:

The gross and microscopic findings obtained from the postmortem examination of the decedent have been correlated with information available from the clinical records of The Hospital of The Good Samaritan. Each organ system is reviewed, noting all changes and how these changes were manifested clinically. In addition, effects of therapy and the effects of the agonal events upon the gross and histopatholoigcal findings are described.

CARDIOVASCULAR SYSTEM:

The structure of the cardiovascular system appears to be within normal limits for the age of the decedent. There is no morphologic evidence of sustained hypertension, as the heart weight is normal and the myocardial thickness is also within the range of normal. No valvular deformities or abnormal intracardiac shunts are found to account for the systolic murmur reported in the clinical notes. No vegetations or antemortem marantic thrombi are seen grossly or microscopically. No myocardial necrosis of the type occasionally noted following the treatment of shock with vasopressors is identified in multiple sections. The coronary arteries reveal no evidence of significant luminal compromise by atherosclerosis. The minimal amount of interstitial edema within the myocardium is considered to be of agonal origin. The aorta and the venae cavae are within normal limits. No antemortem thrombus is recognized in the inferior vena cava in the region of the central venous catheter. The splenic vascular bed shows an amount of arteriolar hyalinosis normally seen in individuals of the stated age. Minimal fibrous thickening of the intima of intermediate sized renal arteries is also consistent with the age of the individual. The slight amount of hyalinosis of occasional periadrenal arterioles is also considered to be within normal limits.

RESPIRATORY SYSTEM:

The gross and microscopic changes described in the trachea are those usually found in comatose individuals in whom tracheostomy has been performed. The patchy denudation and regeneration of surface epithelium frquently accompanies measures utilized to keep the airway open. The are described in the microscopic notes as showing mucosal necrosis and acute inflammation is typical for the site of a tracheostomy tube. Such a lesion can show complete regeneration of epithelium folliwing removal of the tracheostomy tube. The degree of calcification of tracheal cartilage rings is usual for the age of the decedent.

The pulmonary alterations are those usually encountered in the comatose individual. Mild intra-alveolar and interstitial edema frequently appears during the agonal period of life. Some pooling of secretions in the dependent portions of the lungs and the accumulation of the edema fluid in the hypostatic areas have given rise to a mild bronchopneumonic process. No evidence of abscess formation is noted microscopically, and the bronchopneumonic process appears to be early, showing no evidence of organization. No microscopic evidence of oxygen toxicity is noted. The pulmonary septal cells are unremarkable. The thromboemboli described microscopically are small and infrequent in these sections. These thromboemboli appear to be of recent origin and are not associated with infarction. Material suggestive of necrotic central nervous system tissue is identified in two arterial branches. Such pulmonary embolization of central nervous system tissue is not infrequent in craniocerebral trauma in which large vascular channels have become disrupted.

HEMOLYMPHATIC SYSTEM:

The lymph nodes examined microscopically are within normal limits. The spleen demonstrates red pulp congestion such as is usually seen as an agonal event. There is no manifestation of systemic sepsis. The bone marrow reveals a slight erythroid hyperplasia, this change reflecting an early response to a major blood loss. The thymus demonstrates the usual residual atrophic lobules. Many small cystic structures derived from Hassall's corpuscles are found throughout the medullary portion. Such cystic changes are not clinically significant.

GASTROINTESTINAL SYSTEM:

The bacterial colonies identified in the hypercornified lingual epithelium are frequently seen on the tongue of an unconscious individual where there is no mechanical effect of chewing or swallowing to cleanse the surface of the tongue. No inflammatory changes are identified in the tongue.

The esophagus shows no evidence of mucosal erosion or ulceration and there is no evidence of esophagitis.

The stomach shows no evidence of mucosal erosion or ulceration frequently associated with central nervous system disorders. The minimal amount of superficial autolysis of the epithelium is consistent with the post mortem interval from pronouncement of death until autopsy. Of interest is the prominence of parietal cells in the gastric glands. The plasmacytic and lymphocytic aggregates within the lamina propria suggest a slight chronic gastritis.

No specific lesions are identified in the entire gastrointestinal tract.

PANCREAS:

The pancreas shows no gross or microscopic alteration of any significance.

The central venous congestion observed within sections of liver is a usual agonal event. No liver cell necrosis is observed and the liver is devoid of inflammatory disease. There is no demonstrable evidence of toxicity of any therapeutic agent in the material examined.

UROGENITAL SYSTEM:

The left kidney contains a solitary renal cortical adenoma and a renal cortical cyst. The adenoma is well circumscribed, small, and composes of benign renal tubular epithelial cells. Lesions of this type are extremely common findings in postmortem examination and are of no clinical significance. The solitary renal cortical cyst is of no clinical significance. The slight amount of compression atrophy of renal parenchyma adjacent to both the adenoma and the cyst is so minimal as to not compromise renal function.

There is no evidence of renal tubular necrosis morphologically demonstrable in right or left kidney. The minimal vacuolar change described in some of the proximal tubular epithelium is a frequent finding associated with mannitol infusion. Such changes are reversible. There is no evidence of infection involving the renal pelves or calyces or parenchyma. The vascular congestion described is considered of agonal origin.

The slight amount of calcification around basement membrane around collecting tubules identified in the renal papillae is of obscure origin. Such calcification can be seen in individuals suggesting large amounts of milk or alkali or vitamin D. It is of no clinical significance.

The mild edema, congestion and slight acute and chronic inflammation of the bladder neck is consistent with the presence of an indwelling catheter. The changes are mild. No ulceration of bladder mucosa is recognized. The small collections of acute inflammatory cells within the prostatic periuretheral glands are also consistent with the presence of an indwelling catheter. There is no evidence of hyperplasia of prostatic glands. The small calcific spherules and corpora amylacea within the prostate are frequent normal findings.

The testicular tissue is completely within normal limits.

ENDOCRINE SYSTEM:

The thyroid gland and pituitary gland show no gross or microscopic alteration.

The adrenal glands are small but within normal limits. The cortices are thin, have normal zonation and show decreased lipid. The adrenals frequently show this pattern in healthy individuals dying acutely due to various causes. The Decadron therapy was of too short a course to have caused significant suppression and atrophy of the adrenal cortex.

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NOTE: In the preparation of these opinions and conclusions, a number of diagrams, x-rays, and photographs, together with their descriptive notes were utilized as work documents consistent with generally accepted medicolegal practice. In each instance, these items support the findings and conclusions contained herein. They are, however, not included as part of this report, pursuant to the provisions of Section 129 of the California Code of Civil Procedure.

TTN:etf

SIGNATURES

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