out, save systolic murmur over aortic area. Action regular. Aortic second accentuation.

Pulse. — Regular, fair volume and tension.

Liver. — Dullness from fifth rib, edge palpable just below costal margin in nipple line. Surface smooth. No nodules felt.

Spleen. — Not felt.

Abdomen. — Markedly scaphoid. Superficial tissue very lax. Tympanitic. No tenderness or spasm.

Genitalia. — Apparently normal.

Extremities. — Reflexes present and equal. No edema. Tibia slightly rough.

Skin. — Dry, numerous pigmental, papillary, pea-sized growths on trunk and extremities.

The day after entrance patient's temperature rose to 101.8°, but soon became normal and then subnormal.

He was somewhat stupid, but roused to answer questions. Had some diarrhea. Had some cystitis.

Four days later it was noted that he had grown more feeble since entrance. Was rapidly emaciating and was not entirely conscious. Respiration very rapid. Failed more rapidly to-day than before. Pulse failed and he died at 7 P.M.

We were fortunate in obtaining an autopsy, including removal of the left eye, section of which showed carcinoma of choroid. The autopsy was performed by Dr. E. E. Southard, whose report follows. Dr. E. E. Jack of Boston reported a case of double metastatic carcinoma of the choroid, at the thirty-eighth annual meeting of the American Ophthalmic Society, which was published in the transactions. The following summary of reported cases is from Dr. Jack's report: Up to that time, including his own, there had been twenty-nine cases reported — "twenty-three females and five males, one clinical history unrecorded. Of these nine have been double and all but one in females. In the twenty-three females the primary tumor was in the breast in twenty-one, in the lungs and pleura in one and in the thyroid in one. In the five males, stomach in three, breast in one and lung in one." The case reported here adds another to the list of males and the first one with the primary tumor in the prostate. Another unusual feature was the occurrence of acute glaucoma.

A CASE OF CARCINOMA WITH SECONDARY NODULE IN THE EYE.¹

BY E. E. SOUTHARD, M.D., BOSTON,

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The present report follows a clinical report by Dr. Allen Greenwood, to whom I am obliged for a number of suggestions. To Dr. F. B. Mallory, during whose service I made the autopsy, I am indebted for aid in the report.

(a) AUTOPSY FINDINGS: GROSS.

The examination was made twenty hours after death.

External examination shows an elderly man of fairly strong build and good musculature. Nutrition poor. Abdomen scaphoid. Moderate sclerosis of peripheral arteries. Pupils equal, 5 mm. wide. The only external sign of tumor is

a mass, egg-size, immovable, under skin of left axilla.

Internal examination of trunk shows in —

Bony thorax. — Two tumor masses. (a) A low mound-like prominence at back of sternum, involving lower end of body and the xiphoid attachment, 5 by 1.5 cm., well encapsulated, of rather firm consistence, of a mottled pink and gray color with miliary china-white masses starting from cut surface. (b) A mass, orange-size, obliterating a portion of pleural cavity at left apex, replacing a portion of third and fourth ribs and continuous with mass palpable in axilla. No evidence of encapsulation. Substance injected, darker in color than sternal mass, but of same consistence.

Abdominal walls, retracted, with thin layer of fat.

Pleural cavities. — Numerous fairly firm old adhesions over all, but thicker and firmer at summits of the many subpleural tumor masses and inseparable at the left apex.

Pericardial cavity. — Moderate amount of amber fluid. Membrane normal save for grayish-black mass, 3 by 2 by 1 cm., bulging into and covered by parietal serosa in uppermost portion of sac, well encapsulated in front by mediastinal connective tissue.

Peritoneal cavity. — Serosa mainly unaltered. Fibrous adhesions overlies many coin-sized and umbilicated tumor masses in liver. A smooth fibrous band striking across space behind bladder, bowstring fashion, shows in the middle a dark gray tumor mass, pea-size. Bladder, moderately distended, rides high in pelvis. Reduction impossible, on account of tumor in prostate and on account of the firm union of bladder wall with symphysis pubis by a flattened tumor mass, 2 cm. thick, accurately fitting but not invading the two structures.

Heart. — Weight 350 gm. Epicardium thinly underlaid with fat. Muscle of good consistence. Left ventricle 1.5 cm. thick at a point 2 cm. below aortic valve; right ventricle 0.5 cm. thick at a point 2 cm. below pulmonary valve. Fibrillae contain no fat. Endocardium chiefly normal; the mitral valve curtain shows a few slight yellowish mounds of sclerosis. The valves measure: tricuspid, 13.5 cm.; pulmonary, 7.5 cm.; mitral, 11 cm.; aortic 8 cm. Chambers contain crural clots.

Lungs. — Right weighs 1,050 gm., left weighs 910 gm. Both lungs exhibit everywhere nodules, sometimes ill-defined, sometimes globular and from a few millimeters up to several centimeters in diameter, often of an ash-gray color with black vascular points, sometimes darker and of a reddish tint. The surface is emphysematous and retracted, according to the site of underlying nodules, in areas 2 to 3 cm. across. Section surface firm and almost dry. Two thirds to three quarters of air space is replaced with tumor. Peribronchial lymph nodes enlarged to size of fist, but the nodal composition is preserved; from the cut surfaces start white miliary masses on slight pressure. Pigment-bearing tis-

¹ From the Pathological Laboratory of the Boston City Hospital.

sue skirts the periphery of some of the enlarged nodules.

Spleen. — Weight 130 gm. Uneiform projection below 4 cm. in diameter. Capsule blue. Section surface beefy red and slightly pulpy. Trabeculae evident. Malpighian bodies as gray points. Gastrointestinal tract normal except for nodule described above.

Pancreas normal.

Liver. — Weight 1,860 gm. Substance of a slightly yellowish brown riddled with opaque yellowish-white nodules, varying from pea- to walnut-size, globular within, superficially low and often umbilicated. Substance of the usual liver firmness; nodules somewhat firmer, in comparatively few cases centrally yellower and of softer consistence. Nodules show no trace of capsulation. The largest nodules occur toward and upon the under surface.

Gall bladder. — Bile dark. Two mulberry calculi, about 1.5 cm. in diameter.

Kidneys. — Weight 240 gm. (right 95, left 145). Strip with moderate difficulty. Interstitial pitting narrow but of fine mesh. Left kidney shows at upper pole an egg-sized, thin-walled cyst containing clear fluid. Fresh specimen shows no intra-epithelial fat.

Adrenals. — Left shows irregular distribution of medullary substance — a species of separate adrenal lying imbedded but not encapsulated in the cortex at the inferior pole.

Bladder. — Mucosa blackish, perhaps thickened, but not invaded by neoplasm.

Prostate. — If there is any normal prostate tissue, it is now indistinguishable from a firm egg-sized mass, through which probe cannot be passed or urine forced. Space between bladder and symphysis completely filled by the growth which rises just above the level of symphysis. The tissue is gray with a few vascular points and milky whitish masses popping from section-surface. Upon the left iliac rim over iliac bifurcation is a boat-shaped mass of tissue resembling the prostate growth. Seminal vesicles and ejaculatory ducts not made out.

Aorta. — Moderate patchy sclerosis.

Organs of neck. — Trachea reddened.

Brain. — Weight 1,360 gm. Dura tense. Right side darker than left. Sinuses contain cruor clot. Dura peels with difficulty from right side. Pia of upper surface of frontal lobe replaced with a reddish-gray firm growth, 1.5 to 2 cm. thick; growth very vascular, in places hemorrhagic. The right frontoparietal region is overlaid with hemorrhage in which there may be organization or a thin layer of neoplasm. Convolutions of left side flattened, of right side marked with digitations radiating roughly from a point in the longitudinal fissure 5 cm. from anterior pole.

Eye. — The tumor occupies a spherical sector on the temporal side of the globe of the left eye. The tumor is composed of two lobes, fused at the base, and is 20 mm. by 6 mm. at the greatest width, advancing to a point 4 mm. back of the ora serrata and failing to involve the nerve head by 2 mm. The sclera is of the usual thickness on

all sides and is not involved. The choroid coat merges indistinguishably into the tumor; the pigment cannot be told in color from rather wide darkened areas in the tumor considered at time of autopsy as hemorrhagic in origin.

(b) MICROSCOPIC FINDINGS.

Following are the microscopic findings in the main organs:

Heart. — Perinuclear pigmentation of a few fibers.

Lungs. — Pleura injected. Small interstitial collections of pigment. Capillaries everywhere deeply injected. Considerable diapedesis into many air spaces. Pigment-bearing macrophages in many air spaces. Neoplasm prominent, confined in plane of section to certain acini. The tumor spreads from space to space in continuous masses, coarsely and smoothly lobulated by the intact septa. The tumor is here and there constricted by the re-entrant septa, so that the cells become elongated and compressed. The cells are in the main oval; their outlines are indistinct except at the free border of the tumor. The nuclei are quite regularly oval or a trifle acuminate, vesicular and provided with one or more deeply staining round or oval nodes suspended at some distance from nuclear membrane by numerous chromatic threads. The nuclei often lie free in rounded spaces in the cytoplasm. At some foci the tumor breaks up into more deeply eosinophilic masses with dead-black nuclear remnants.

Spleen. — Trabeculae and reticulum increased in amount. Capillaries packed with blood corpuscles. Phagocytes containing masses of blood corpuscles, often fused together and colored a deep brown, are prominent, apt to occur in groups, often in the adventitia of the vessels of the Malpighian bodies. Similar pigmentary masses occur in the capsule. The vessels of the Malpighian bodies frequently show hyaline changes in media.

The tumor masses are rounded and lobulated, preferring to spread through the pulp, sparing both trabeculae and Malpighian bodies. The cells resemble those described with the lung. Masses of acidophilic debris are common inside certain lobules. Mitoses frequent.

Liver. — Section of liver with small tumor nodules.

Perilobular tissues in the main normal. A certain number of branches of portal vein are dilated by masses of cells occasionally in mitosis. A slight degree of lymphoid infiltration around the vessels containing tumor.

Capillaries filled with blood. Parenchymal cells granular and centrally or diffusely pigmented.

The tumor mass contains numerous mitoses. The individual cells resemble those described under lung; but they are grouped in smaller masses to suggest alveoli with a thin stroma. Toward periphery of nodule the thin stroma begins to contain remnants of liver epithelium. The tumor has a finely serrate edge: the tumor pre-

fers to invade capillaries or pericellular spaces. The portal canals are spared by the tumor and may be made out deep in the tumor mass with the portal veins containing tumor thrombi.

Kidney. — Islands of interstitial overgrowth with collections of lymphoid cells. Moderate diffuse interstitial overgrowth, well marked in pyramids. Arteriosclerosis with areas of fibrous overgrowth and atrophy of tubules in association with the vessel. The dilated tubules contain granular debris and ring-reticula. The epithelium is granular, the nuclei small and black or absent, the cell-borders indistinct. Glomeruli pervious.

Prostate. — The prostate tissue is ill-preserved: tumor masses, smooth, round and homogeneous in character of cells contained, lie imbedded in deep stroma.

Brain. — Section from frontal lobe with overlying tumor. Deep rounded masses of tumor cells set close with scarcely evident cell-borders interdigitate with deep trabeculae of fibrous tissue. Nearer the cortex the true pia comes more in evidence with collections of blood corpuscles, lymphoid cells and enormous numbers of pigment-bearing phagocytes. Extreme overgrowth of subpial glia.

Eye. — Section from eye shows a tumor growth resembling that overlying the brain. The papillary masses are not so thick as in the pial growth; they grow in places, characteristically in deep, slender, fjord-like clefts. Cells containing choroidal pigment are found in the slender connective tissue stalks several millimeters distant from the choroid.

There is little differentiation of cells within the masses. The cell-borders are usually indistinct; but show in places as rounded or polygonal cells occasionally drawn into processes. The nuclei are rounded or oval, have a distinct membrane and are supplied with very distinct, rather coarsely-meshed network with several large condensed masses of chromatin. The tumor shows in places fragmentation and degeneration, in other, sometimes closely adjacent, places, many karyokinetic figures.

(c) PATHOLOGICAL SUMMARY AND DISCUSSION.

Anatomically the case shows carcinoma of prostate with extension into retroperitoneal pelvic tissues; carcinoma of intestine, liver, spleen, lung, mediastinum, thoracic cage, pia mater, eye; general arteriosclerosis; chronic interstitial and arteriosclerotic kidney.

Histologically the carcinoma is fairly constantly composed of —

(a) Smooth masses of cells having indistinct borders and a cytoplasm containing clefts or vacuoles in which lie oval vesicular nuclei with prominent nucleoli.

(b) A stroma varying extremely in amount from organ to organ. The minor differences are partly ascribable to locus: thus the finely serrate border found in the liver depends upon the rapid growth of the tumor in the parenchyma of that organ; with this may be compared the smooth lobular

growth in the lung. The growths in the pia and in the eye must be grouped together from their tendency to the papillary form. The tendency to hemorrhage shown by the pial growth is remarkable and is probably due to local compression of the veins. Notable also is the choroidal pigment deep in the stroma of the nodule of the eye.

From anatomical and histological evidence alone, one would scarcely be warranted in assigning the prostate as the original focus of tumor formation. But the case as a whole — taken clinically as well as pathologically — seems to warrant interpretation as a case of carcinoma of prostate with multiple metastases.

MECHANICAL VIBRATION: ITS THEORY AND APPLICATION IN THE TREATMENT OF DISEASE.¹

BY MAURICE F. PILGRIM, A.B., M.D., NEW YORK.

Professor of Psychiatry in the New York School of Physical Therapeutics; First Vice-President of the American Electro-Therapeutic Association.

IN presenting briefly to you this evening the theory and application of mechanical vibration in the treatment of disease, I feel that I am not asking your attention to a new physical method of treatment so much as to the revival of an old but now greatly improved therapeutic agent.

Attempts in the treatment of disease by more or less crude and clumsy mechanical vibratory methods were made as far back as forty years ago. Little if any progress was made, however, and they received slight recognition from the profession at large. Two reasons were responsible for this: First, the treatment was applied more or less empirically and without much reference to any well-defined principles of physiology. Second, it began what little development it subsequently attained, at about the time electricity was beginning to come forward as a curative agent. Whatever virtue it may have possessed in these earlier years, was obscured by this agent, which, if not more capable therapeutically, was at least applied with more definiteness of purpose and a greater regard for those principles of physiology which then, as now, were believed to govern the functioning of the human body. But as electricity as a therapy advanced in popularity, curiously enough, it was found that vibration, mechanically produced, again came forward and was received with more professional favor. It was not surprising, therefore, that at the last International Congress of Electro-Therapeutists held in Paris in July and August of 1900 — the year of the French Exposition — six instruments were there exhibited, all designed to apply mechanically produced vibration to the body. As none of these instruments were the equal in the point of merit to several upon the market of this country to-day, I will not detain you by describing their several mechanical features further than to say that they were designed and introduced by

¹Read before the Medical Society of the Borough of the Bronx, New York, May 12, 1903.