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TWO CASES OF GIANT PARATHYROID ADENOMA IN ATOMIC BOMB SURVIVORS

原爆被爆者にみられた巨大上皮小体腺腫の2例

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SUMMARY

In a study of parathyroid tumor among autopsy cases at RERF in Hiroshima, 16 cases of parathyroid adenoma were detected among 4,136 autopsies during 1961-77. Of these, two cases were giant adenoma (5 cm in diameter) accompanied by hyperparathyroidism. Both cases were atomic bomb survivors from Hiroshima. One was exposed to 55 rad at age 51 and died at age 71, and the other was exposed to 28 rad at age 45 and died at age 71. These two cases will be reported together with a review of the literature on parathyroid tumors developed following irradiation on the head and neck.

INTRODUCTION

In 1975, Rosen et al[1] reported a case of parathyroid adenoma, complicated with hyperparathyroidism, which developed in a 57-year-old male who had received X-irradiation of the head and neck for the treatment of facial hirsutism 40 years ago. Others[2-5] have also reported primary hyperparathyroidism or parathyroid adenoma after irradiation of the head and neck. A-bomb survivors in Hiroshima and Nagasaki show a high frequency of cancer in the head and

要 約

広島放影研における剖検例から上皮小体腫瘍の調査を行ったところ，1961～77年の間に剖検された4,136例の中に16例の上皮小体腺腫が見いだされた．そのうちの2例は巨大腺腫（直径5cm）であり，上皮小体機能亢進症を伴っていた．双方ともに広島の原爆被爆者である．1例は51歳のとき55 radの線量を受け71歳で死亡し，他の1例は45歳のときに28 radの線量に被曝しており71歳で死亡した．頭頚部への放射線照射後に発生した上皮小体腫瘍の文献的考察を加えてこの2例を報告する．

緒 言

1975年，Rosenら[1]は40年前に顔面多毛症の治療のために頭頚部にX線照射を受けた57歳の男性に発生した上皮小体機能亢進症を伴う上皮小体腺腫の1例を報告した．以来，頭頚部への放射線照射後に発生したと思われる原発性上皮小体機能亢進症，あるいは上皮小体腺腫の報告がみられるようになった．[2-5] 広島及び長崎の原爆被爆者には白血病，乳癌及び

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neck area, thyroid cancer, and salivary gland tumors, as well as a high incidence of leukemia, breast cancer, and lung cancer.[6-15] Therefore tumors of the parathyroid gland, one of the endocrine glands in the head and neck area, have also attracted much interest. Thus, using RERF autopsy cases in Hiroshima a study of the parathyroid tumors was conducted. Among 4,136 autopsies during 1961-77, 79 cases were diagnosed as having parathyroid diseases (tumor, hyperplasia, and cyst), of which 16 were confirmed as parathyroid adenoma. Two of these cases were giant adenoma (5 cm in diameter) and were A-bomb survivors. These two cases will be reported here.

Case Report

Case 1 (MF [redacted], Autopsy [redacted]) Female. Born February 1894, aged 51 at the time of the bomb (ATB).

Exposure History. Exposed inside a Japanese-type house at 1,400 m from the hypocenter in Hiroshima with an estimated tentative 1965 radiation dose (T65D), 55 rad.[16] No acute radiation symptoms were reported.

Clinical History. No detailed clinical history available. Patient was treated for multiple arthritis from December 1964 at age 70 until death in September 1965 at age 71.

Major Autopsy Findings. Gross findings. Autopsied 19 hours after death. Superficial observation showed marked emaciation and strong deformity of the chest due to fracture of the ribs (Figure 1). Irregular depression and chondrogenic nodular nests were observed in many ribs. Marked deformity and fractures were observed in bilateral femurs, tibias, and fibulas (Figure 2) and vertebrae. A hyperdermic mass was palpable at the left anterior neck, but cervical lymph nodes were not. The mass was located superior to the left lobe of the thyroid (5 × 5 cm and 35 g). It had a fibrous capsule and slightly adhered to the left lobe of the thyroid. The surface of the mass was nodular, and the cut surface was grayish white and slightly soft, and hemorrhage and necrotic foci were scattered (Figure 3). No swelling was observed in the cervical lymph node.

Histological findings. The mass of the left anterior neck had a fibrous capsule and contained

肺癌等の発生率が高いが，頭頚部腫瘍，甲状腺癌並びに唾液腺腫瘍も高率であることが報告されている．[6-15] したがって頭頚部における内分泌臓器の一つである上皮小体の腫瘍発生に関しても関心がもたれる．そこで我々は広島放影研における剖検例から，上皮小体腫瘍の調査を行った．1961年から1977年までに剖検された4,136例中，何らかの上皮小体疾患の診断（腫瘍，過形成及び嚢腫）のなされたものは79例で，そのうち16例の上皮小体腺腫が確認された．そのうちの2例は巨大腺腫（直径5㎝）であり，原爆被爆者であった．この2例をここに報告する．

症例報告

症例1（基本名簿番号[redacted]，剖検番号[redacted]）女性，1894年2月生まれ．被爆時年齢51歳．

被爆歴．広島の爆心地から1,400ｍの地点，日本家屋内で被爆し，1965年暫定推定線量（T65D）は55radであった．[16] 急性放射線症状はなかった．

臨床病歴．詳細な病歴は得られなかったが，1964年12月，70歳のときから1965年9月，71歳の死亡時まで多発性関節炎の治療を受けていた．

主要剖検所見．肉眼所見：剖検は死後19時間で行った．外表所見はるいそうが顕著であり，胸部は肋骨の骨折のために強く変形し（図1），肋骨の多くには不整の陥凹及び軟骨形成性の小結節巣を認めた．両側の大腿骨，脛骨，腓骨（図2）及び脊椎にも高度の変形及び骨折を認めた．左前頚部皮下には腫瘤を触知したが，頚部リンパ節は触知しなかった．腫瘤は甲状腺左葉の上部にあった（5×5㎝で35g）．線維性被膜をもち，甲状腺左葉と軽度に癒着していた．腫瘤の表面は結節状で，割面の性状は灰白色，硬度はやや軟，出血及び壊死巣は散在していた（図3）．なお，頚部リンパ節の腫脹は認めなかった．

組織所見：左前頚部腫瘤は線維性被膜をもち，大小の充実性胞巣を形成しつつ増殖する腫瘍細胞を

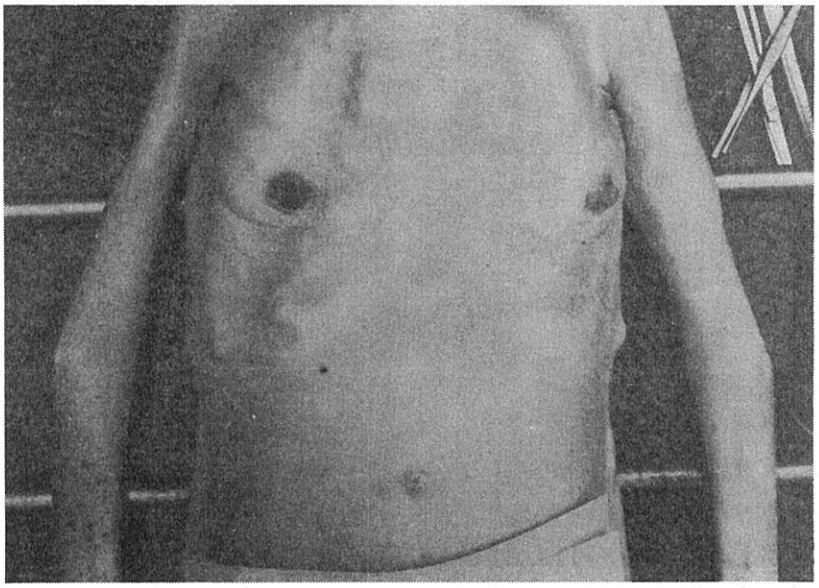

Figure 1. Case 1. Thorax at autopsy. Ribs show multiple fractures, and the thorax is remarkably deformed.

図1. 症例1. 剖検時の胸部. 肋骨の多発性骨折を認め, 胸郭は著しく変形している.

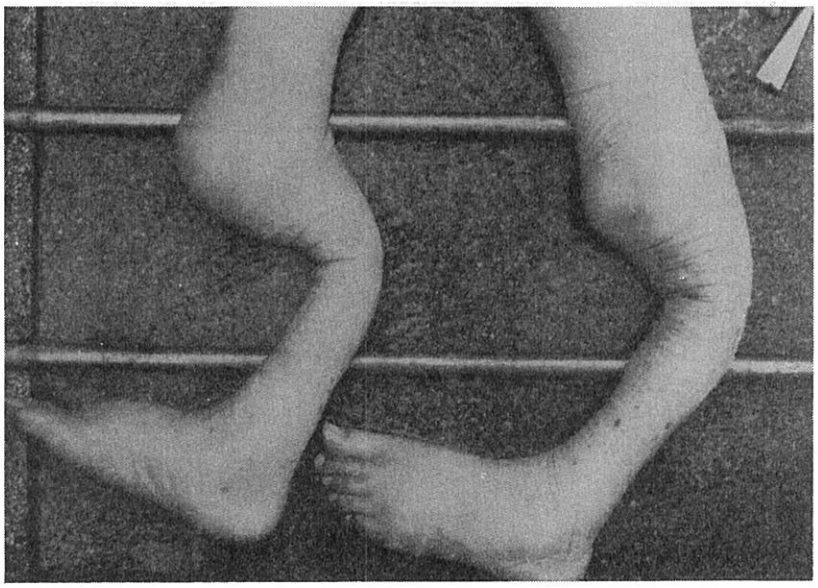

Figure 2. Case 1. Bilateral lower extremities at autopsy. Fracture and severe deformity are observed in the femurs, tibias, and fibulas.

図2. 症例1. 剖検時の両側下肢. 大腿骨, 脛骨, 腓骨の骨折及び高度の変形を認める.

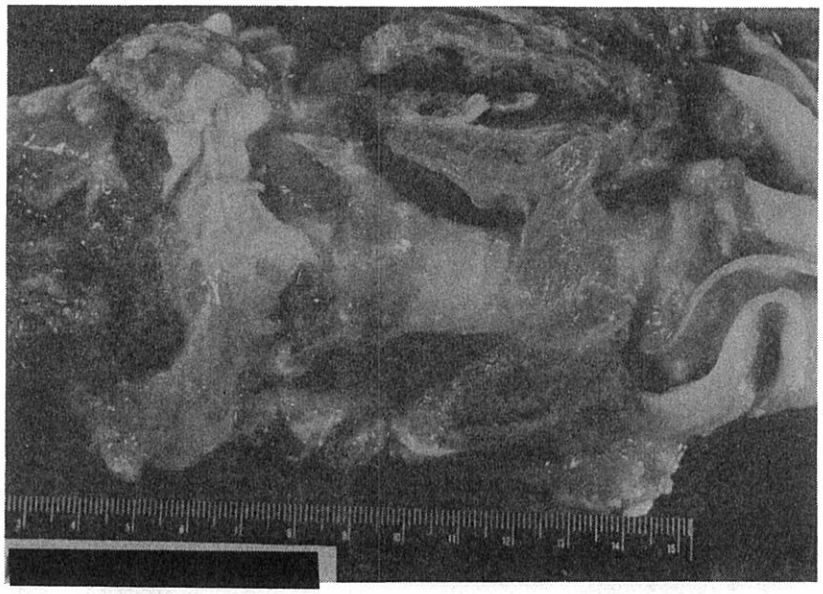

Figure 3. Case 1. Tumors of thyroid and parathyroid. Tumors are located behind the left lobe of the thyroid and proliferate displacing the thyroid anteriorly.

図3．症例1．甲状腺及び上皮小体の腫瘍．腫瘍は甲状線左葉の後方にあり，甲状腺を前方に圧排しながら増殖している．

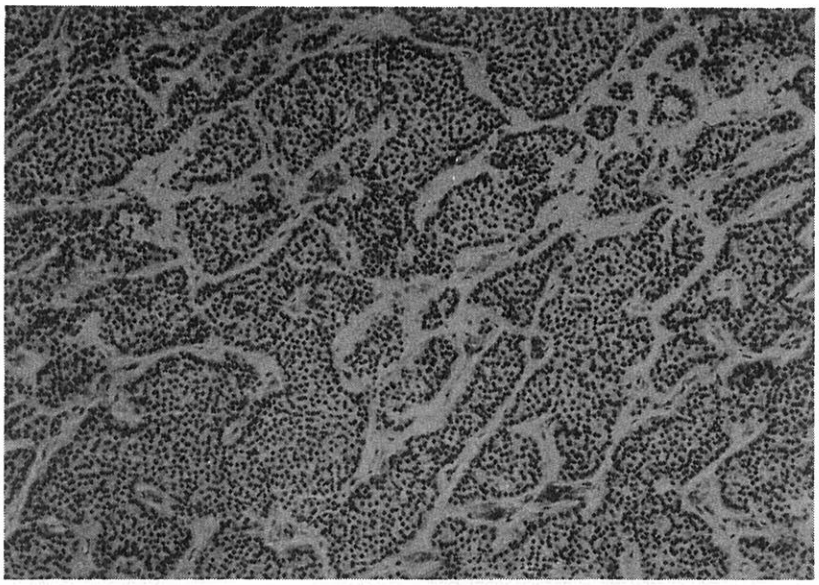

Figure 4. Case 1. Tumor tissue, low magnification, H & E stain. Tumor proliferates forming large and small solid nests.

図4．症例1．腫瘍組織，弱拡大，H. & E. 腫瘍は大小の充実性胞巣を形成しつつ増殖している．

tumor cells which had proliferated to form large and small solid nests. The stroma was composed of fine connective tissue and abundant capillary vessels (Figure 4). Tumor cells mainly consisted of polygonal or cylindrical cells having small elliptic nuclei showing granular chromatin arrangement and eosinophilic and microgranular cytoplasm; sometimes tumor cells with pale cytoplasm were scattered (Figure 5). Tumor cells showed weak atypia with few mitotic figures. Neither invasion of tumor tissue into blood vessels or infiltration into the capsule, nor metastasis to other organs or lymph nodes were seen.

In the bony tissue which showed fracture and deformity, severe atrophy of the trabeculae (Figure 6), and destruction, absorption, and fibrosis of the bone with proliferation of osteoclasts (Figure 7) were observed; hemorrhage, hemosiderin deposition, and chondrogenesis also were observed. Small foci of calcification were observed in the lung, stomach, renal pelvis, ureter, as well as in the mucous membrane and tunica muscularis propria of the urinary bladder. Small ulcer scars of several millimeters in diameter were observed in the anterior wall of the lesser curvature of the vestibular region of the stomach, and showed mucosa concentration. A leiomyoma (0.9 cm) was observed in the uterus, and the spleen was atrophied to 10 g with marked fibrosis. Germinal epithelium-invaginating cysts were observed in the ovaries, and atrophy was remarkable. Major autopsy diagnoses are as shown in Table 1. The direct cause of death was electrolyte imbalance attributable to hyperparathyroidism caused by parathyroid adenoma and complicated with cardiac insufficiency.

Case 2 (MF[redacted] Autopsy[redacted] Female. Born April 1900, aged 45 ATB.

Exposure History. Exposed in the corridor of a Japanese-type house at 1,440 m from the hypocenter in Hiroshima, with an estimated T65D of 28 rad. In addition to trauma, she experienced epilation and pharyngeal and laryngeal pains as acute radiation symptoms.

Family History. Mother died of stomach cancer at age 73.

Past Medical History. Not remarkable.

含み，間質は繊細な結合織及び豊富な毛細血管から成っていた（図４）．各腫瘍細胞は顆粒状のクロマチン配列を示す小型楕円核と，好酸性で細顆粒状の細胞質をもつ多角形あるいは円柱状の細胞が主体を占め，一部に細胞質の淡明な腫瘍細胞が混在していた（図５）．腫瘍細胞の異型性は乏しく，核分裂像はほとんどなかった．腫瘍組織の血管侵襲像や被膜内浸潤像，他の臓器及びリンパ節への転移像は認められなかった．

骨折及び変形を示す骨組織には骨梁の高度の萎縮（図６），破骨細胞の増生を伴う骨の破壊，吸収，線維化（図７）が見られ，出血，ヘモシデリン沈着，軟骨形成も認められた．肺，胃，腎盂，尿管，膀胱の粘膜及び固有筋層内には，小さな石灰沈着巣を認めた．胃には直径数mmの小さな潰瘍瘢痕を前庭部小湾後壁に認め，粘膜集中像が見られた．その他，子宮に平滑筋腫（0.9cm大）が認められ，脾は10ｇに萎縮し線維化が顕著であった．卵巣には胚上皮陥入嚢胞を認め，萎縮が顕著であった．主要剖検診断は表１のごとくであり，直接死因は上皮小体腺腫の上皮小体機能亢進症による電解質バランスの異常，及びそれに伴う心不全であった．

症例２（基本名簿番号[redacted]，剖検番号[redacted]）女性，1900年４月生まれ．被爆時年齢45歳．

被爆歴．広島の爆心地から1,440ｍの地点，日本家屋の廊下で被爆し，推定被曝線量（T65D）は28radであった．外傷のほか，急性放射線症状として脱毛，咽頭痛を認めた．

家族歴．母は73歳のとき胃癌で死亡．

既往歴．特記すべき事項なし．

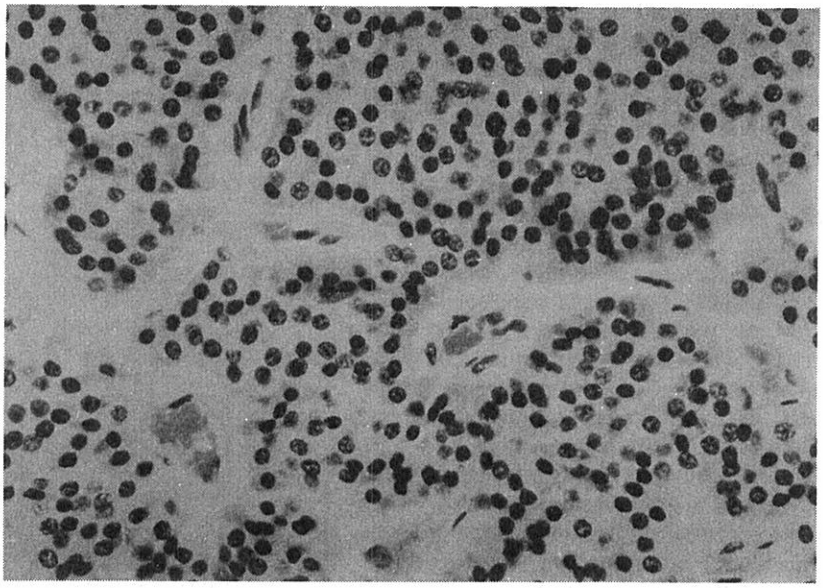

Figure 5. Case 1. Tumor tissue, high magnification, H & E stain. Most tumor cells have acidophilic and microgranular cytoplasm.

図5. 症例1. 腫瘍組織，強拡大，H. & E. 大部分の腫瘍細胞は好酸性で細顆粒状の細胞質をもつ.

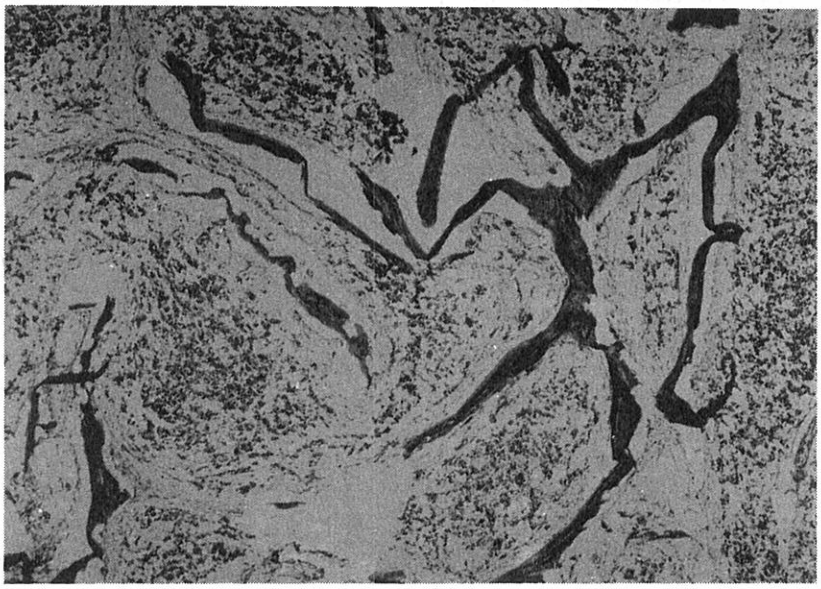

Figure 6. Case 1. Vertebrae, low magnification, H & E stain. Severe atrophy of the crest and fibrosis around the crest are observed.

図6. 症例1. 椎骨，弱拡大，H. & E. 高度の骨梁萎縮及び骨梁周囲の線維化を認める.

TABLE 1. MAJOR AUTOPSY DIAGNOSES (CASE 1, 71-YEAR-OLD FEMALE)
表1. 主要剖検診断（症例1，71歳女性）

1. Parathyroid adenoma (left side, 35 g)
   上皮小体腺腫（左側　35 g）
2. Generalized cystic and fibrous osteodystrophy: bilateral femurs, bilateral tibias, bilateral fibulas, bilateral ribs, vertebrae
   汎発性嚢胞性線維性骨異栄養症：両大腿骨，両脛骨，両腓骨，両肋骨，椎骨
   Fracture and deformity: Bilateral femurs, bilateral tibias, bilateral fibulas, bilateral ribs
   骨折及び変形：両大腿骨，両脛骨，両腓骨，両肋骨
3. Metastatic calcification: lung, stomach, kidney, urinary bladder, ureter
   転移性石灰沈着：肺，胃，腎，膀胱，尿管
4. Calculus of urinary tract: renal pelvis, ureter, urinary bladder
   尿路結石：腎盂，尿管，膀胱
5. Chronic pyelonephritis
   慢性腎盂腎炎
6. Healed gastric ulcer
   胃潰瘍瘢痕

Clinical History. This patient experienced remarkable loss of body weight, arthralgia, stiffness and pain of the shoulders, upper abdominal pains, and pain and numbness of both lower extremities and forearms at age 52 in 1952. These symptoms were aggravated at age 57, and diagnosed as multiple arthritis at age 60. When she fell down at this age, she suffered a bruise on the left anterior chest, and pain increased. Calcification of the hilar region and extensive osteoporosis were observed in an X-ray examination she received at age 63. She experienced fracture of the right femur at age 65, and a diagnosis of hypertension was made about that time. Since then, she had been hospitalized for medical care, and expired without any improvement in March 1972 at age 71.

Major Autopsy Findings. Gross findings. An autopsy was conducted 22 hours after death. Her height was 124 cm, and body weight was 19 kg. Extreme malnutrition was indicated. Superficial observation showed fracture of the right femur. A subcutaneous mass was palpable in the left anterior neck. The mass with fibrous capsule (5 × 3 × 2 cm) was located adjacent to the lower edge of the left lobe of the thyroid, but there was no adhesion to the surrounding tissue (Figure 8). The cut surface of the mass was yellowish red and soft with scattered small cysts.

Histological findings. The mass with fibrous capsule was tumor tissue divided by relatively

臨床病歴．1952年．52歳のとき，顕著な体重減少，関節痛，肩のこりと痛み，上腹部痛，両下肢と前腕の痛みとしびれを覚えた．57歳時にこれらの症状が増強し，60歳で多発性関節炎と診断された．同年，転倒した際左前胸部を打撲し，その痛みは増強した．63歳のときにレントゲン検査を受け，肺門部石灰沈着と骨の広範な骨粗鬆症を指摘された．65歳のとき右大腿骨骨折を起こし，同じころ高血圧症の診断を受けた．以後病院で入院治療を受けていたが，1972年3月，71歳，症状の改善なく死亡した．

主要剖検所見．肉眼所見：剖検は死後22時間で行った．身長124cm，体重19kgで栄養状態は著しく悪かった．外表所見では，右大腿骨に骨折を認めた．左前頚部には皮下腫瘤を触知した．腫瘤（5×3×2 cm）は線維性被膜をもち，甲状腺左葉の下端部と接して存在したが，周囲組織との癒着はなかった（図8）．腫瘤の割面の性状は黄赤色，硬度は軟，散在性に小さな嚢胞を認めた．

組織所見：腫瘤は線維性被膜をもち，比較的厚い結合織により分割された腫瘍組織であった．腫瘍組

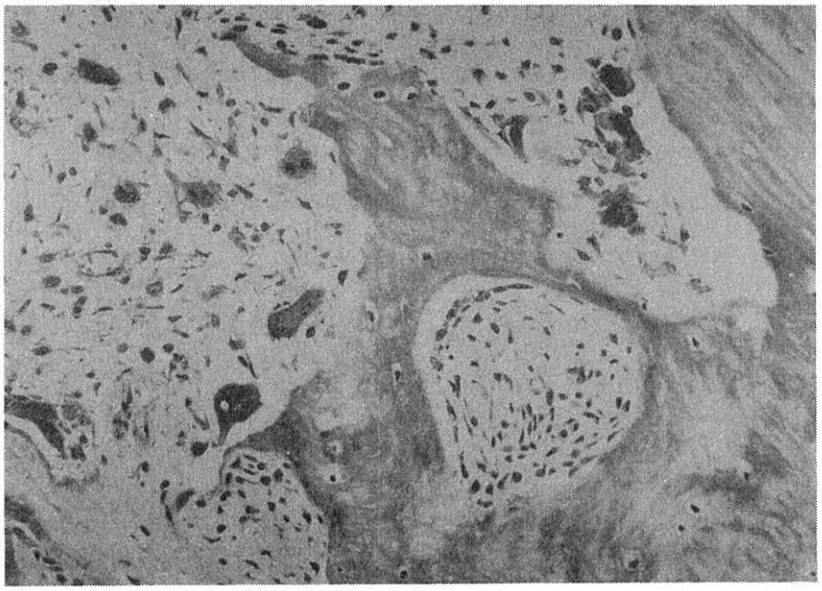

Figure 7. Case 1. Ribs, high magnification, H & E stain. Proliferation of osteoclasts and fibrosis of the bone absorbing site are observed.

図7．症例1．肋骨，強拡大，H. & E. 破骨細胞の増生及び骨吸収部の線維化を認める．

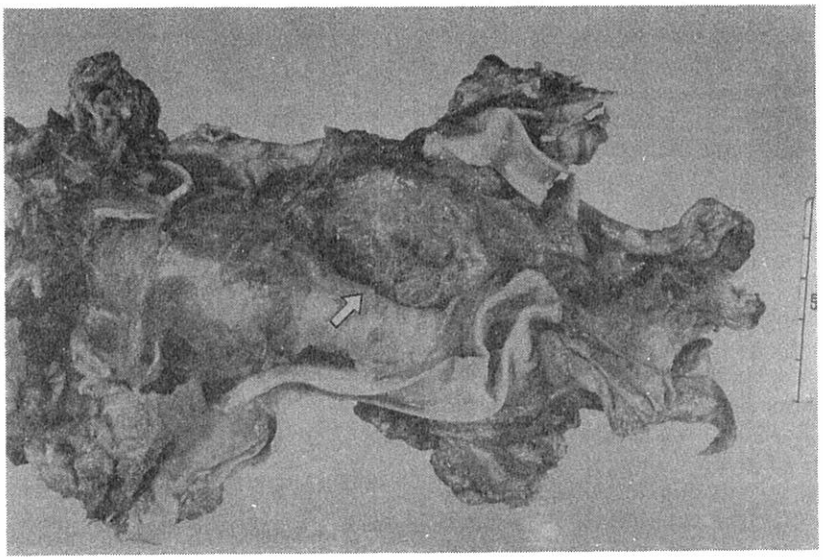

Figure 8. Case 2. Parathyroid tumor. The mass (arrow) adjacent to the lower edge of the left lobe of the thyroid (the thyroid has already been removed).

図8．症例2．上皮小体腫瘍．甲状腺左葉下端に隣接する腫瘤（矢印）．（甲状腺は既に摘出している）

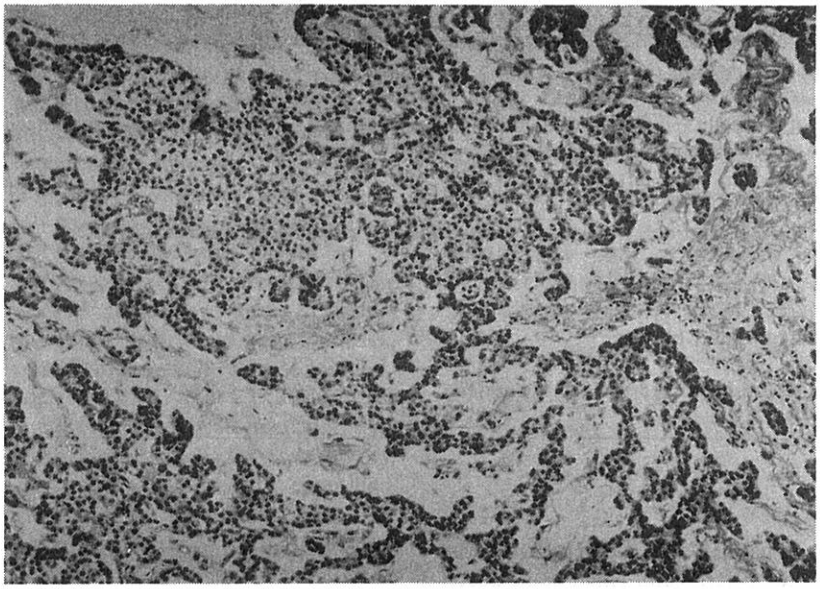

Figure 9. Case 2. Tumor tissue, low magnification, H & E stain. Tumor tissue is composed of large and small solid nests divided with relatively thick connective tissue. Cord-like arrangements of tumor are seen in part.

図9. 症例2. 腫瘍組織，弱拡大，H. & E. 腫瘍組織は比較的厚い結合織により分割された大小の充実性胞巣より成る．一部に腫瘍の索状配列がみられる．

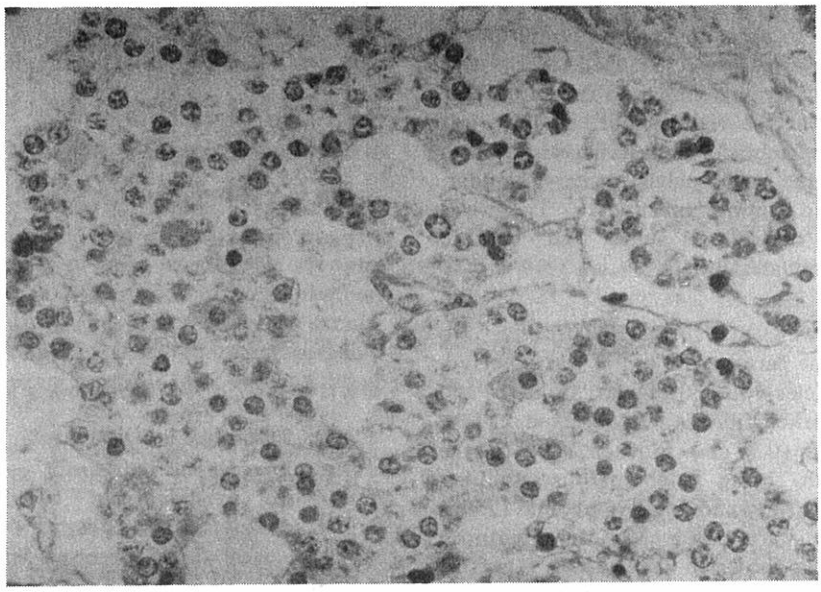

Figure 10. Case 2. Tumor tissue, high magnification, H & E stain. Many tumor cells are cells resembling main cells, but cells like acidophilic cells are partly mixed.

図10. 症例2. 腫瘍組織，強拡大，H. & E. 腫瘍細胞の多くは主細胞類似の細胞より成るが，一部に好酸性細胞類似の細胞が混在している．

TABLE 2. MAJOR AUTOPSY DIAGNOSES (CASE 2, 71-YEAR-OLD FEMALE)
表 2. 主要剖検診断（症例 2, 71歳女性）

1. Parathyroid adenoma (left side, 5 × 3 × 2 cm)
   上皮小体腺腫（左側，大きさ 5×3×2 cm）
2. Generalized cystic and fibrous osteodystrophy: right femur, left rib, left clavicle, vertebrae
   汎発性嚢胞性線維性骨異栄養症：右大腿骨，左肋骨，左鎖骨，椎骨
   Fracture: right femur, left rib
   骨折：右大腿骨，左肋骨
3. Metastatic calcification: renal pelvis, urinary bladder, gallbladder, common bile duct
   転移性石灰沈着：腎盂，膀胱，胆嚢，総胆管
4. Acute and chronic pyelonephritis
   急性及び慢性腎盂腎炎
5. Calculus of urinary bladder
   膀胱結石
6. Hydronephrosis and hydrocele of the ureter
   水腎症及び尿管水瘤

thick connective tissue. The tumor tissue was mostly composed of large and small solid nests, but cord-like or duct-like arrangements were observed in part (Figure 9). Most of the tumor cells were polygonal cells with small elliptic nuclei showing sparse chromatin arrangement and relatively pale cytoplasm, however, tumor cells with acidophilic cytoplasm were partly mixed (Figure 10). Tumor cells showed weak atypia. Mitotic figures, infiltration into capsule, and metastasis to other organs and lymph nodes were not observed. Generalized cystic and fibrous osteodystrophy similar to that of Case 1 was observed in the right femur, left rib, left clavicle, and vertebrae. Metastatic calcification was seen in the renal pelvis, urinary bladder, gallbladder, and common bile duct. There was complication of severe acute and chronic pyelonephritis bilaterally.

The thyroid weighed 5.1 g with atrophy. No adhesion to the parathyroid tumor was observed. Thyroid follicles were irregular in size and shape, and marked fibrosis was observed. There was a nodule (0.5 cm) in each lobe of the thyroid, both being adenomatous nodules. Cystoma in the ovary and two leiomyomas (2 cm) in the uterus were observed. Major autopsy diagnoses are as shown in Table 2. In reporting the direct cause of death, importance was attached to acute and chronic pyelonephritis caused by renal pelvis stone attributable to hyperparathyroidism due to parathyroid adenoma.

織の多くは大小の充実性胞巣より成るが，一部には，索状配列あるいは嚢状に拡張した腺管様配列があった（図９）．腫瘍細胞のほとんどは，まばらなクロマチン配列を示す小型楕円核に比較的淡明な細胞質をもつ多角形の細胞であるが，一部には好酸性の細胞質をもつ腫瘍細胞が混在していた（図10）．腫瘍細胞の異形性は乏しく，核分裂像，被膜内浸潤像，他臓器及びリンパ節への転移像もなかった．右大腿骨，左肋骨，左鎖骨，椎骨には，症例１と同様の汎発性嚢胞性線維性骨異栄養症があり，腎盂，膀胱，胆嚢，総胆管には転移性石灰沈着を認めた．両腎には，高度の急性及び慢性腎盂腎炎像を合併していた．

甲状腺は 5.1 gと萎縮しており，上皮小体腫瘍との癒着はなかった．甲状腺小胞の大きさ及び形は一定ではなく顕著な線維化が認められた．甲状腺両葉にそれぞれ結節（径 0.5cm）があり，ともに腺腫様結節であった．卵巣には嚢腫，子宮には平滑筋腫（２cm）２個が見られた．主要剖検診断は表２のごとくであり，直接死因は，上皮小体腺腫による上皮小体機能亢進症に起因した腎盂結石による急性及び慢性腎盂腎炎が重視された．

DISCUSSION

The first report on parathyroid adenoma following X-irradiation was made in 1975 by Rosen et al.[1] Tisell et al[2] reported in 1976 that 24 (14%) of 170 patients who underwent surgical therapy for hyperparathyroidism had received therapeutic radiation of 200-3,000 rad to the neck for various benign diseases during their youth. They were diagnosed as hyperparathyroid 42 years (on the average) after irradiation. Histological classification of the 24 cases with a history of radiation therapy was as follows: 19 cases of adenoma, 3 cases of hyperplasia, and 1 case with both these abnormalities, and one unclassifiable which was excluded. Prinz et al[3] reported in 1977 that 27 (30%) of 89 patients who underwent surgical operation for primary hyperparathyroidism had a past history of irradiation. Of these patients, 13 cases had adenomas and the remaining 14 cases had hyperplasia. In 1978, Swelstad et al[4] reported eight cases of hyperparathyroidism developing after irradiation, of whom seven cases had adenomas and one case had hyperplasia. Russ et al[5] reported in 1979 that 19 (26%) of 74 patients who underwent surgical operation for primary parathyroidism which later revealed to be parathyroid adenomas had a past history of X-irradiation to the neck. Irradiation was experienced at an average age of 16 (range 0-44 years) with the adenomas being removed at an average of 30 years (range 24-47 years) after irradiation.

The two parathyroid adenoma cases reported here were exposed to 55 rad and 28 rad of A-bomb radiation in Hiroshima at age 51 and 45, respectively. The exposure dose was not high, but no cases of giant parathyroid adenoma complicated with hyperfunction were observed in the controls (0 rad plus not-in-city group). These two patients died of hyperparathyroidism 20 and 26 years, respectively, after A-bomb exposure.

Animal studies show that parathyroid tumors can be induced by exposure to X-rays. Investigating whole-body X-irradiation of rats (one 500 rad exposure and three 350 rad exposures), Berdjis[17] observed development of parathyroid tumors in 8% of the irradiated group, but none in the nonirradiated group. He has further reported an increased frequency of acidophilic cells in the irradiated group while

考　察

X線照射後に発生した上皮小体腺腫の報告は，1975年Rosen ら[1]によって初めて行われた．その翌年，Tisell ら[2]は上皮小体機能亢進症のために外科的治療を受けた170人の患者のうち24人（14%）は，若年時に各種良性疾患のため頚部に200～3,000 rad の放射線治療照射の既往歴のあったことを報告した．これらの患者は，照射してから平均42年後に上皮小体機能亢進症と診断されていた．放射線治療照射歴のある24例の組織学的内訳は，不詳の1例を除いて腺腫19例，過形成3例，その両方をもつもの1例であった．Prinz ら[3]は原発性上皮小体機能亢進症のために外科的手術を受けた89人の患者のうち27人（30%）が放射線照射の既往をもっていたことを1977年に報告した．このうち13人は腺腫，残り14人は過形成であった．1978年に Swelstad ら[4]も放射線照射後に発生した上皮小体機能亢進症患者の8例を報告したが，7例は腺腫，1例は過形成であった．更に翌年，Russ ら[5]は原発性上皮小体機能亢進症のために外科的手術を受け，その後上皮小体腺腫を発症した74人の患者のうち19人（26%）に頚部へのX線照射の既往のあることを報告した．照射は平均16歳（0－44歳）のときに受けており，腺腫が摘出されたのは照射後平均30年後（24－47年）であった．

今回報告した上皮小体腺腫の2例は，それぞれ51歳及び45歳のときに，広島で55 rad 及び28 rad の原爆放射線を被曝していた．被曝線量は決して高くないが，対照群（0 rad 被爆群及び原爆時に広島市内にいなかった者）には，このような機能亢進症を伴う巨大上皮小体腺腫はみられなかった．この2例は被爆後各々20年及び26年の後に上皮小体機能亢進症を起こし死亡した．

動物にX線照射を行って上皮小体腫瘍を誘発した報告がある．Berdjis[17]はラットにX線全身照射（500 rad 1回照射及び350 rad 3回照射）を行い，非照射群にはみられなかった上皮小体腫瘍が照射群に8%発生した．その中で，正常ラットにはみられなかった好酸性細胞が，照射群に増加して認められた

such cells were not observed in normal rats. In the above-mentioned report by Russ et al[5] acidophilic cells were observed in 50% of radiation-related human parathyroid adenoma cases, of which two cases were functional adenoma having almost 50% acidophilic cells.

The two cases reported here are functional adenoma. Both showed proliferation of acidophilic cells, these having been found to occupy most of the tumor in one of the cases. This suggests that these parathyroid adenomas might have been induced by irradiation.

Differentiation, whether the tumor is an adenoma or carcinoma, is a problem in parathyroid tumors as in the case of tumors of other endocrine glands. Schantz and Castleman[18] have given as criterion for histological diagnosis of parathyroid cancer, a cord-like arrangement of cells, a thick crest of connective tissue, and infiltration and metastasis to the capsule and blood vessels, with special emphasis on mitotic figures. Since the present two cases showed few mitoses and no infiltration to the surrounding tissue, they were diagnosed as adenoma.

There are many reports that parathyroid adenoma is frequently complicated with malignant neoplasm of other organs, especially thyroid cancer,[19-23] and a high frequency of complication with nonmalignant thyroid diseases are also reported.[24,25] Russ et al[5] have described that parathyroid adenoma patients with a history of irradiation had a higher frequency of thyroid abnormalities (including thyroid cancer) than nonirradiated patients. One of the two parathyroid adenomas reported here had adenomatous nodules in the thyroid. The other showed a healed gastric ulcer. Hyperparathyroidism is frequently complicated by ulcer of the digestive organs.[26] Statistics on primary hyperparathyroidism in Japan for the period 1935-70 show that 26 of 202 clinical cases were complicated by ulcer of the digestive organs.[27]

Two cases of giant parathyroid tumor, complicated by hyperfunction, which developed in A-bomb survivors have been reported. Considering the possibility that parathyroid tumors may develop following irradiation, it is necessary to conduct parathyroid hormone tests and measurements of calcium in serum for A-bomb survivors with a mass in the neck,

ことを述べている．更に，前述したRuss ら[5]の報告では，放射線照射に関連したヒト上皮小体腺腫の50%に好酸性細胞をみており，これらのうち2例は，その約½を好酸性細胞が占めている機能性腺腫であった．

今回報告する2例は機能性腺腫であるが，ともに好酸性細胞の増殖がみられ，1例では腫瘍の大部分を占めていることが認められた．これは上皮小体腺腫が放射線照射によって発生したのかもしれないことを示唆する．

上皮小体腫瘍もほかの内分泌腫瘍と同様に腺腫か癌かの鑑別が問題となるが，Schantz 及び Castleman[18]は上皮小体癌の組織診断基準として，特に核分裂像を重視し，その他に細胞の索状配列，厚い結合織の梁，被膜及び血管への浸潤及び転移を挙げている．今回の2症例は核分裂に乏しく周囲組織への浸潤もなく，腺腫と診断した．

上皮小体腺腫に他臓器の悪性新生物，特に甲状腺癌との合併頻度が高いことが多く報告され，[19-23] また非悪性甲状腺疾患との合併頻度が高いという報告もある．[24,25] 更に Russ ら[5]は照射の既往歴のある上皮小体腺腫の患者は，照射歴のない例に比べて甲状腺異常(甲状腺癌を含む)の頻度が高いことを述べている．我々の報告した2例の上皮小体腺腫のうち1例は甲状腺に腺腫様結節をもっていた．他の1例には治療した胃潰瘍がみられたが，上皮小体機能亢進症には消化性潰瘍がしばしば合併する．[26] 1935～70年にみられた日本における原発性上皮小体機能亢進症の集計では，臨床例202例中の26例に消化性潰瘍の合併をみている．[27]

原爆被爆者に発生した機能亢進症を伴う巨大上皮小体腫瘍の2例を報告したが，放射線照射後に上皮小体腫瘍が発生する可能性を考えるとき，頚部腫瘤を有する被爆者，特に関節痛及び骨折を伴う者に対しては，上皮小体ホルモン検査及び血清カルシウム

especially in cases accompanied by arthralgia and fracture. Arthritis, bone diseases, and kidney diseases may increase with aging among A-bomb survivors. So, it is also necessary to make a differential diagnosis of parathyroid tumors for patients with such diseases, because parathyroid tumors appear to have long latent periods following irradiation.

の測定を行う必要がある．原爆被爆者の高齢化に伴い，関節炎，骨疾患，腎疾患の増加が推察されるが，上皮小体腫瘍が放射線被曝後に長い潜伏期間を有する可能性を考慮し，このような疾患を有する患者に対して上皮小体腫瘍の鑑別診断も必要である．

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