*Acta Med. Nagasaki* 34 : 113–116

# AN AUTOPSY CASE OF PARATHYROID CARCINOMA

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*Received for publication, April 28, 1989*

**ABSTRACT** : A case of hyperfunctioning parathyroid carcinoma was found in a 78-year-old female who had suffered from hypercalcemia for 5 years. She died of renal failure and pulmonary edema. Autopsy revealed an encapsulated tumor arising from the left upper parathyroid gland. Histologically, fibrous trabeculae, capsular invasion and blood vessel invasion were occasionally present in this tumor, suggesting that this tumor was malignant. However, mitotic figures were rarely observed. We reviewed reported cases of parathyroid carcinoma and discussed about the significance of mitosis for diagnosis.

## INTRODUCTION

Parathyroid carcinoma is a rare disease. The reported incidence of malignancy is 0.5 to 4 per cent in hyperparathyroidism[1, 2], but the actual incidence is difficult to determine because diagnostic criteria are not adequately established pathologically or clinically. The ratio of hyperfunctioning to all of parathyroid carcinoma is about 0.9[3, 4]. However, up to now, more than one hundred cases of parathyroid carcinoma have been reported worldwide. We examined the histological structure and reviewed the reported cases.

## CASE REPORT

A 78-year-old female was admitted to Nagasaki University Hospital under the semicomatous condition on August 26, 1987. Reviewing the past history, she had suffered from diabetes mellitus and hypertension since 1972. The high value of serum calcium had been first pointed out in December 1982. On admission, the serum level of calcium was 21.1mg/ml and parathormone value was 48ng/ml, (normal value : below 1.3ng/ml). Under the diagnosis of hypercalcemic encephalopathy, forced diuresis was used. In spite of diuresis and hemodialysis, the conscious level was not apparently improved. She died of renal failure and pulmonary edema on September 4, 1987.

## PATHOLOGICAL FINDINGS

Autopsy revealed a well encapsulated, solid tumor arising from the left upper parathyroid gland. It measured 3.5×3.0×2.0cm. The consistency was hard and cut surface was yellow-white in color. Partially it showed cystic and hemorrhagic changes (Fig. 1). Metastatic lesions were not observed in regional lymph nodes and other organs.

Histologically, the primary tumor had a dense fibrous capsule with fibrous trabeculae dividing the tumor into lobules (Fig. 2a). They exhibited mainly trabecular or solid pattern

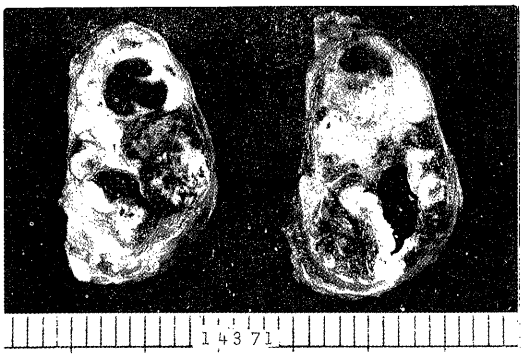

Fig. 1. Cross section of the parathyroid carcinoma. It measured 3.5×3.0×2.0cm, and partially showed cystic, hemorragic changes.

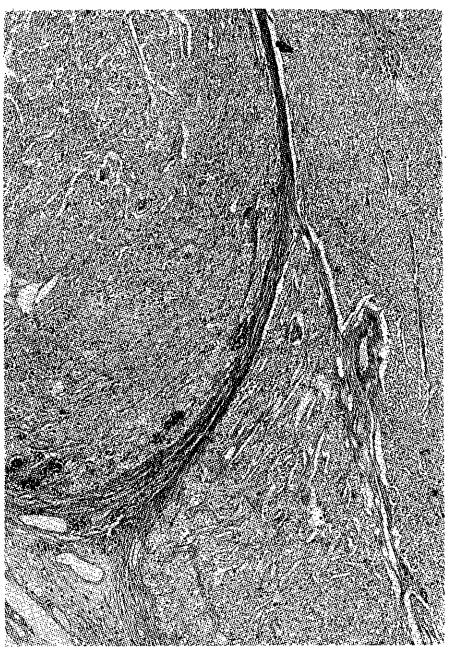

Fig. 2a Fibrous trabeculae in parathyroid carcinoma (H. E. ×25)

(Fig. 3), with focal calcification in the peripheral fibrous tissue (Fig. 2b). It appeared to invade the thick fibrous capsulae and blood vessels. Vessel invasion was confirmed by the presence of endothelial lining on the surface of tumor cell cluster (Fig. 4a, 4b). Mitotic figures were rarely observed. The tumor cells had pleomorphic nuclei with prominent nucleoli. The nuclear to cytoplasmic ratio was greater. The cytoplasm was clear, with slight granular, somewhat eosinophilic, cuboid in shape, and

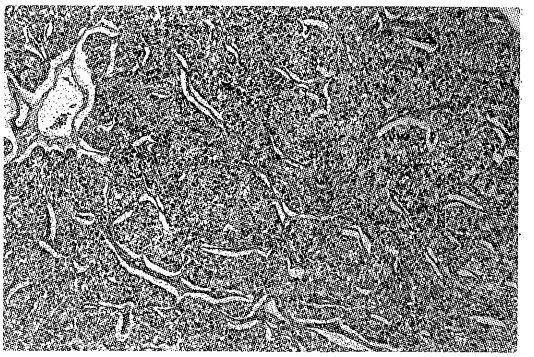

Fig. 3. Trabecuiar and solid pattern in parathyroid carcinoma (H. E. ×125)

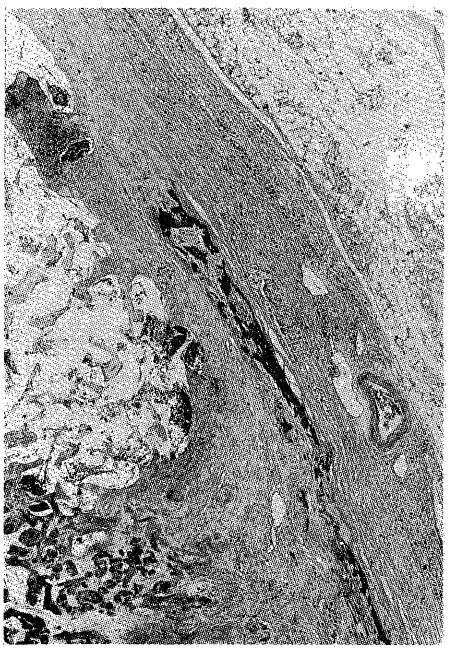

Fig. 2b. Calcification in thick fibrous capsule (H. E. ×25)

poorly outline (Fig. 5).

Diabetic glomerulosclerosis and vascular nephrosclerosis were observed in the kidneys. Calcific deposits (known as metastatic calcification) were found in the lungs and kidneys, and atherosclerotic change was moderate in the aorta and coronary artery.

## DISCUSSION

The average age of the patients of parathyroid carcinoma was 45 years old, and there was no sex predominance. The average size of

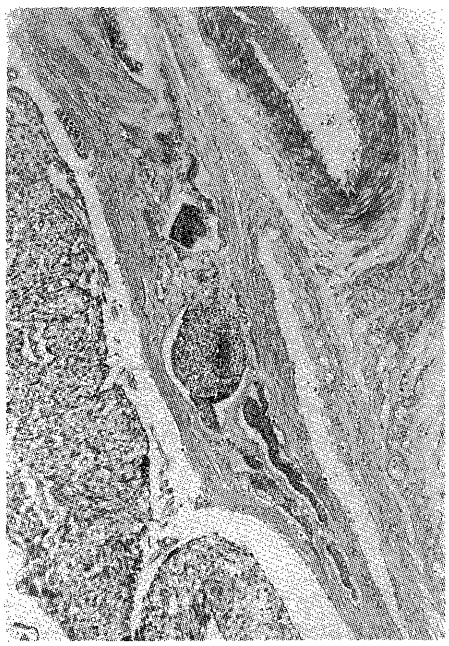

Fig. 4a. Capsular invasion in parathyroid carcinoma (H. E. ×60)

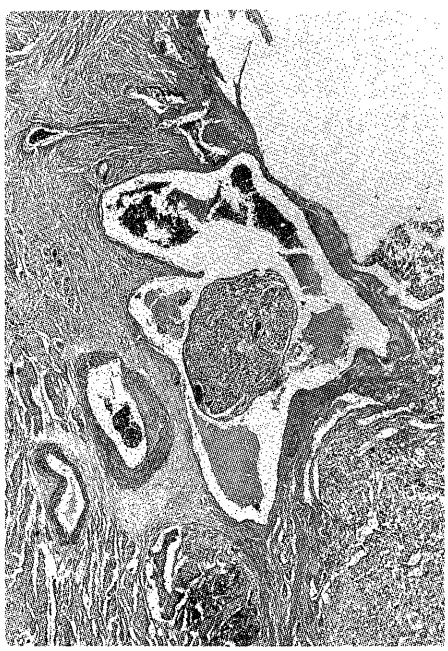

Fig. 4b. Vessel invasion was seen and the presence of endothelial lining on the surface of tumor cell cluster (H. E. × 25)

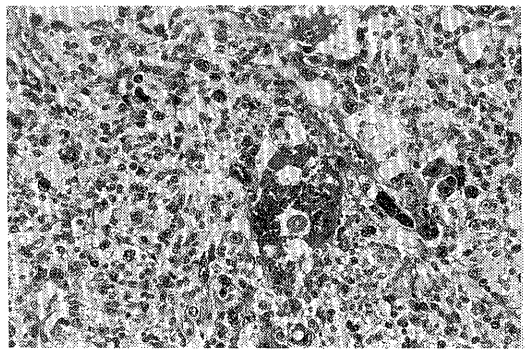

Fig. 5. Bizarre nucleus with prominent nucleoli in parathyroid carcinoma (H. E. ×250)

tumor was 3.3cm (range 1.3 to 6.2cm), and the initial serum calcium level averaged 15.2mg/ml[1),2),6)]. Common presenting complications of malignant tumor were bone disease, renal disease and palpable neck mass, and approximately 90 per cent of parathyroid carcinoma was functioning.

According to Schantz and Castleman' description, the criteria for diagnosis of parathyroid carcinoma were fibrous trabeculae, mitotic figure, capsular invasion and vessel invasion. In the revised AFIP fascicle in 1978, not only above four criterias but also other features ; grey-tan color, hard consistency, and lobulated cut surface were emphasized for diagnosis of parathyroid carcinoma.

In the study of 70 cases of parathyroid carcinoma of Schantz and Castleman, mitoses were seen in 81 per cent of carcinoma and 10 per cent of cases with metastasis had no mitosis and 50 per cent of cases had only rare mitosis[1)]. In contrast, the presence of mitotic activity in benign parathyroid disease was reported by Snover and Foucar in 1981[8)]. In their 27 cases, mitosis were observed in 71 per cent of the adenoma and 80 per cent of the hyperplasia of parathyroid gland by careful examination. It comes to the conclusion that the usefulness of mitosis as a diagnostic criteria is still controversial, and the presence of mitosis in a parathyroid tumor should always alert the possibility of carcinoma only.

The cytological differences between the benign and malignant of parathyroid tumor, are briefly described as follows : In hyper-

plastic change, there is no obvious increase in dimension of the nucleus, the chromatin is more generally dispersed throughout the karyoplasm, and the nucleolus remains inconspicuous. In adenomatous change, the nuclear chromatin displays a pheripheral condensation and a definite, but not prominent, nucleolus is often present. In malignant change, the nuclei show extreme variation in size and shape. The chromatin is dispersed as dense clumps throughout the karyoplasm. Nucleolus is prominent, and double nucleoli are also common findings[5),7),9)].

In the present case, the tumor was considered as a parathyroid carcinoma from the clinical history and pathological findings, although the mitotic figures were very few. The similar case was reported by Stevenson as a case of functional carcinoma in which no mitosis was found.

In general, the growth rate of parathyroid carcinoma is slow. Because of the poor effect of chemotherapy and radiotherapy to improve survival, operation is the only chance for cure[1),2),6)]. And because local recurrent rate is higher than 30 per cent, repeated resection of local cervical implants has an important role in palliative management[1),2)], The average 5-year survival rate is about 40-50 per cent. The cause of death of parathyroid carcinoma is usually due to the cardiac and renal sequelae of uncontrolled hyperparathyroidism rather than to local invasion or distant metastasis.

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