

Malignant Mesodermal Mixed Tumor of the Bladder: A Case Report

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Abstract: We report an autopsy case of malignant mesodermal mixed tumor of the urinary bladder of a 67 year old male. He had been admitted to Kita Hospital under the diagnosis of Alzheimer's disease since 1979. His dementia aggravated and he was confined to bed in 1985. While in the hospital, he developed hematuria and calculi and necrotic materials were sometimes noticed in his urine. Although the CT scan and intravenous urography revealed left hydronephrosis and vesical lithiasis, urinary cytological studies showed no remarkable changes. At the beginning of September 1992, he was found to have a child's fist-sized tumor in his left lower abdominal cavity, which was diagnosed as a bladder tumor and left renal pelvic tumor. The tumor grew rapidly and reached a child's head-size within 3 months. Several cytological examinations of his urine were performed, but all showed negative for malignancy. There was no tumor response against anti-cancer chemotherapy and he died on November 22, 1992. Autopsy revealed a bulky tumor mass which occupied the whole lower abdominal cavity. Histologically, the tumor was composed of an epithelial element of well differentiated squamous cell carcinoma and a non-epithelial element of rhabdomyosarcoma. The cross striations in rhabdomyosarcoma cells were clearly stained by PTAH. Immunohistochemically, rhabdomyosarcoma cells were positively stained by Desmin and partially by Vimentin. Therefore we diagnosed this tumor as malignant mesodermal mixed tumor of the urinary bladder.

Key words: Malignant mesodermal mixed tumor, Squamous cell carcinoma, Rhabdomyosarcoma, Urinary bladder tumor

INTRODUCTION

Although malignant mesodermal mixed tumors (MMMT) are well known tumors which occur in the uterus, very few reports have been published on MMMTs of the urinary bladder origin (Azuma *et al.*, 1992). Histologically, MMMTs are defined as complex malignant

tumors, consisting partly of recognizably differentiated carcinoma and differentiated sarcoma. In MMMTs of the urinary bladder, the epithelial components may be transitional cell carcinoma (TCC), squamous cell carcinoma (SCC) or adenocarcinoma. The sarcomatous components are most often osteosarcoma or chondrosarcoma, but rhabdomyosarcoma is a very rare component (Holtz *et al.*, 1972; Koss, 1975). We report the clinical and histopathological features of MMMT of the urinary bladder which consists of well differentiated SCC and rhabdomyosarcoma.

CLINICAL SUMMARY

A male patient was diagnosed with Alzheimer's disease in 1979 at the age of 54 years old and admitted to Kita Hospital, Nagasaki. In 1985 his dementia aggravated and he was totally confined to bed. During his hospitalization, hematuria, calculi and sometimes necrotic materials were noticed in his urine. In December 1991, CT scan and intravenous urography revealed left hydronephrosis and vesical lithiasis. At the beginning of September 1992, he was found to have a child's fist-sized tumor in his left lower abdominal cavity, which was diagnosed as a bladder tumor and left renal pelvic tumor. Although several cytological examinations of urine had been done since 1991, no malignancy was indicated. No biopsy was performed due to his general condition. In spite of anti-cancer chemotherapy, the tumor increased its size very rapidly and reached a child head-size by early November 1992 (Photo. 1 and 2). During this period he developed ileus due to tumor compression, and renal failure. He died on November 22, 1992.

AUTOPSY FINDINGS

GROSS FINDINGS: At autopsy, the tumor was found to form a bulky mass with gelatinous, myxomatous, necrotic and cystic appearance in the lower abdominal cavity and firmly adhered to the peritoneum, which compressed the small and large intestines and caused ileus (Photo. 3). Massive metastases and invasions of the tumor were observed in the left ureter, left kidney, left adrenal gland, lumbar vertebral marrows, and mesenteric and periaortic lymph nodes. The right kidney showed moderate hydronephrosis without tumor invasion. Mucinous and gelatinous ascites was observed (3000ml).

HISTOLOGICAL FINDINGS: Normal mucosa of the urinary bladder was replaced by well differentiated SCC with keratinization (Photo. 4) and submucosa to deep muscle layer showed a non-epithelial component of rhabdomyosarcoma with focal myxomatous and necrotic changes. Rhabdomyosarcoma cells were mainly undifferentiated cells which showed irregular-shaped nuclei with coarse chromatin structures and scant or abundant eosinophilic cytoplasm, accompanied with occasional multinucleated giant cells with peripherally placed "wreath-like" nuclei, spindle-shaped cells with hyperchromatic nuclei and tadpole-shaped cells (Photo. 5). Cross striations were clearly demonstrated in cytoplasm of spindle-shaped or tadpole-shaped tumor cells by Phosphotungstic Acid Hematoxylin method (PTAH) (Photo. 6).



Photo. 1. CT scan demonstrates a child's head-sized tumor mass in the abdominal cavity.



Photo. 2. MRI reveals an irregular shaped tumor which is occupying the whole pelvic cavity.

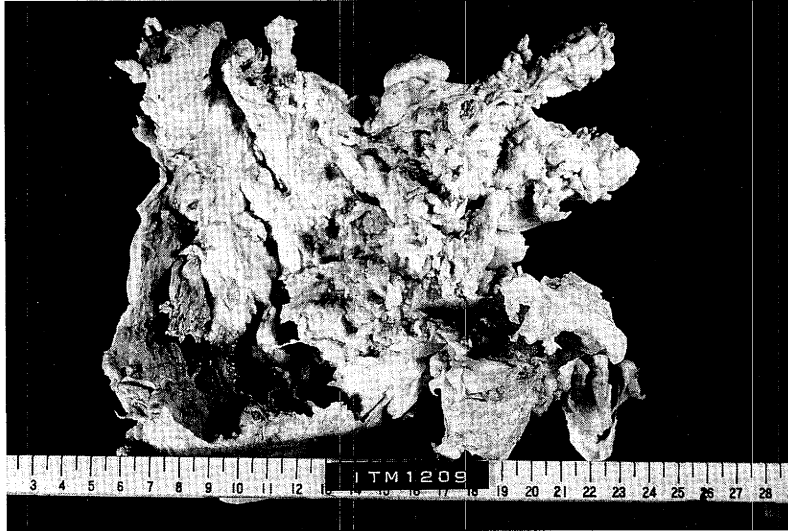


Photo. 3. Gross appearance of the tumor shows a bulky mass with cystic and necrotic change.



Photo. 4. Well differentiated SCC with keratinization in the vesical mucosa (HE, $\times 40$).

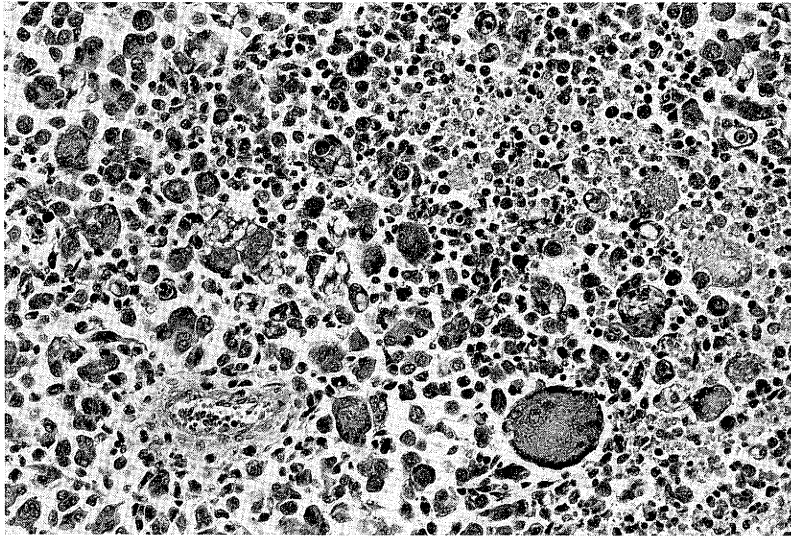


Photo. 5. Undifferentiated tumor cells and occasional multinucleated giant cells with peripherally placed "wreath-like,, nuclei (HE, $\times 100$).

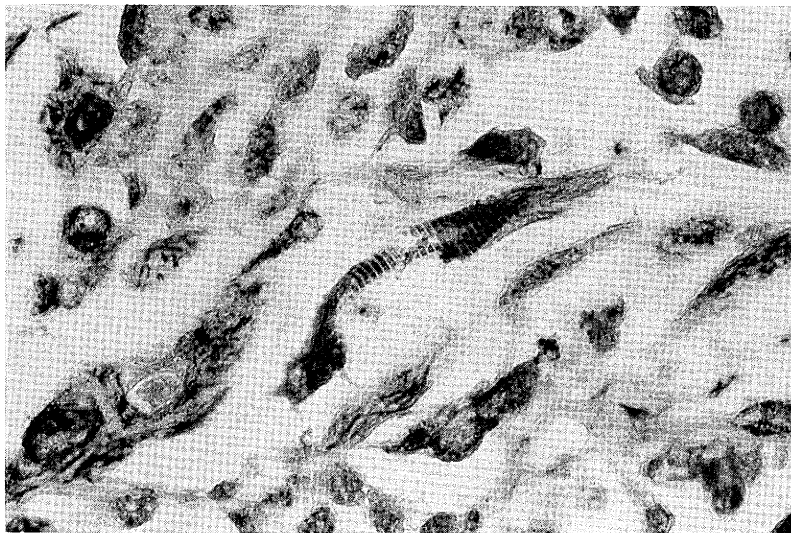


Photo. 6. Cross striations in cytoplasm of spindle-shaped tumor cell (PTAH, $\times 400$).

Epithelial and sarcomatous lesions were intermingled in superficial submucosa of the bladder, while no distinct transitions from epithelial to non-epithelial elements were seen. Although epithelial components of SCC were found only in the mucosa of the bladder, lower part of the left ureter and the mesenteric lymph nodes, rhabdomyosarcoma components were observed from submucosa to deep muscle layers of the bladder and almost all other metastatic and invaded areas.

IMMUNOHISTOCHEMICAL FINDINGS: Immunohistochemical stainings were performed using PAP method (Dako System Corp. USA). Table 1 describes immunohistochemical results of each tumor cells. Epithelial membrane antigen (EMA) and Keratin were positively stained in SCC nests. Among the rhabdomyosarcoma cells, undifferentiated cells were positive for Vimentin, but weakly positive for Desmin. Multinucleated giant cells with "wreath-like" nuclei, spindle-shaped cells and tadpole-shaped cells were positive only for Desmin.

Table 1. Immunohistochemical results

	SCC	UC ¹	GC ²	TC ³ (SC ⁴)
EMA	+	-	-	-
Keratin	+	-	-	-
Desmin	-	±	+	+
Myoglobin	-	-	-	-
Vimentin	-	+	-	-
Myosin	-	-	-	-
Actin	-	-	-	-

¹: Undifferentiated cells. ²: Multinucleated giant cells.

³: Tadpole-shaped cells. ⁴: Spindle-shaped cells

DISCUSSION

Almost all urinary bladder tumors are of epithelial lineage and they are usually TCC and less commonly SCC (Faysal, 1981, Peterson, 1986). Although MMMTs are well known tumors which occur in the uterus, MMMTs of the urinary bladder origin are extremely uncommon. Only 70 cases of MMMT have been reported in the world and 10 of these cases are from Japan (Azuma, *et al.*, 1992). MMMTs are usually found in patients from 27 to 91 years of age (average 65 years), and mostly males are affected, male to female ratio of 10 to 3 (Matsui *et al.*, 1993). MMMTs are highly malignant tumors composed of elements of carcinoma and differentiated sarcoma, and they are usually chondrosarcoma or osteosarcoma. The rhabdomyosarcoma element, commonly accompanied in MMMTs of the uterus, has not been or rarely been recorded in MMMTs of the urinary bladder (Holtz *et al.*, 1972; Koss, 1975).

Histologically our case was composed of epithelial elements as well differentiated SCC and non-epithelial elements of rhabdomyosarcoma, which is a heterologous tumor in the blad-

der. Although the rhabdomyosarcoma cells were mainly composed of poorly differentiated cells, with irregular-shaped nuclei, coarse chromatin structure and scant or abundant eosinophilic cytoplasm, as well as occasional multinucleated giant cells with peripherally placed "wreath-like" nuclei, we observed tadpole-shaped cells and spindle-shaped cells which cytoplasm showed cross striation by PTAH stain.

Immunohistochemically, in epithelial components of SCC, tumor cells were positively stained by epithelial markers, such as EMA and Keratin. In non-epithelial components of rhabdomyosarcoma, tumor cells were positive for Desmin and partially Vimentin but negative for Myoglobin. However, among the various markers, Myoglobin and particularly Desmin, the muscle type of intermediate filaments appear to be most useful for diagnosis of rhabdomyosarcoma. Poorly differentiated or primitive cells of rhabdomyosarcomas may stain positively for Desmin but usually do not stain for Myoglobin. Vimentin is more prominent in undifferentiated rhabdomyosarcoma than in well differentiated tumors (Enzinger, 1988).

Thus, the histological and immunohistochemical findings of the present case are satisfied with a diagnosis of MMMT.

In regard to histogenesis of MMMT, there remain many unanswered questions (Koss, 1975, 1985; Patterson and Dale, 1976; Fromowitz *et al.*, 1984; Kanno *et al.*, 1985; Fleming, 1987). Norris and Taylor (1965) reported that MMMTs of the uterus arise from the mesodermal neoplastic cells, which individually have the capacity to form epithelial and non-epithelial elements. Although no transition between carcinomatous and sarcomatous elements was found in our case, there were diffuse intermingled areas with many SCC foci in rhabdomyosarcoma, which support their theory.

We report a very rare case of MMMT from the bladder, which consists of SCC and rhabdomyosarcoma elements in the same tumor.

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