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A Comparative Study on Histopathological Aspects of Benign and Malignant Smooth Muscle Tumors appeared in Oral Regions

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Summary

Histopathological aspects of two cases of smooth muscle tumors appeared in oral regions (case 1 : angiomyoma ; case 2 : leiomyosarcoma) have been described. Histopathological features of both cases showed a similarity in terms of relationship with blood vessels. In spite of the changes of cell structure and the destructive pattern of cell proliferation, the results as determined by special staining techniques were the same in the benign and malignant tumors. The histopathological features, origin, and differential diagnosis of the two types of tumors were also discussed.

Introduction

Although neoplasms of smooth muscle commonly appear in the uterus, the tumor is rare in the oral region, probably because of the absence of smooth muscle there except in blood vessel walls. Few case reports, therefore, have been published (Farman and Kay 1977[3], Goldblatt and Edesess 1977[4], Hagy and Halperin 1964[5], Merrill and Downs 1967[9], Mindell et al. 1975[10]), and comparative studies of the histopathological aspects of benign and malignant tumors of oral region are also rare.

Recently we were fortunate enough to examine two cases of smooth muscle tumors appeared in the oral region — one benign, the other malignant — and we carefully investigated the histopathological aspects to obtain more information.

Case Reports

Case 1

On June 5, 1985, a 33-year-old man was admitted to the Department of Oral and Maxillofacial

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Surgery I, Matsumoto Dental College Hospital with the chief complaint of a painfull swelling on the lower lip, which had been present for 8 −9 years. When examined a dark purple tumor of 5 mm in diameter was observed on his lower lip. Following clinical diagnosis as hemangioma, excision of the tumor was performed, and the results of histopathological examinations led us to make a diagnosis of angiomyoma. The postoperative course has been good.

Case 2

A 63-year-old woman visited the Department of Oral and Maxillofacial Surgery I, on January 8, 1982, because she complained of pain on her gingiva. About 2 months earlier she had noticed spontaneous pain of the upper left first molar. By inspection a cauliflower-like tumor, 23×24 mm in size, with ulceration was observed in the upper left molar region. Radiograph showed that absorption of bone had occured. Due to a clinical diagnosis as a maxillary malignant tumor, a biopsy was requested. The histopathological examination revealed the tumor to be leiomyosarcoma. After the treatment of a combination of radiotherapy and chemotherapy, resectioning of her maxilla was done. The postoperative course has been good these four years[11].

Methods of Histopathological Observation

These tumors, after extirpation, were fixed in 10% formalin solution and embedded into paraffin. Sections were stained with the following reagents: hematoxylin-eosin, Mallory's azan, Masson's trichrome, van Gieson's stains and silver impregnation.

Results

Case 1

The tumor (MDC 085-85) was composed of numerous thick-walled blood vessels surrounded by spindle-shaped cells (Fig. 1). The lumina of the vessels were oval-to-stellate and some contained red blood cells. A single layer of endothelium lined the vessels. Ground substances also formed portions of the vessel walls and nonvascular component (Fig. 2). In nonvascular sites, spindle-shaped cells had also proliferated within collagenous stromal tissues. Each tumor cell had a large rod-shaped nucleus and eosinophilic cytoplasm, and in some of them the so-called "sun-figure" appeared in cross sections of the cytoplasm. These spindle cells were stained deeply red with Mallory's azan stain (Fig. 3) and with Masson's trichrome stain. In van Gieson's-stained specimens, these tumor cells were stained yellow and were thus cleary distinguishable from the collagenous stromal tissue which had been stained red. No cytoplasmic atypism and no mitotic figures were seen in the parenchymal cells.

Case 2

Histopathologically the tumor of the biopsy specimen (MDC 008-82) was composed of numerous spindle-shaped cells with elongated nuclei (Fig. 4). Some of these cells showed the so-called "sun -figure" in cross sections of the cells (Fig. 5). The cytoplasm of these parenchymal cells was stained red with both Masson's trichrome and Mallory's azan stain (Fig. 6), although blue-staining collagen fibers were noticed in some areas. These cells had strong cellular atypism i. e., pleomorphism, mitotic activity, and hyperchromatic nuclei. There were also some bizzarrely shaped semi-large cells in the proliferative mass of the tumor cells. Some necrotic foci and bleeding were observed in some areas. Also scattered throughout the tumor were the foci of chronic inflammatory cells consisting predominantly of plasma cells (Fig. 7).

Resected materials (MDC 024-82) were investigated carefully to obtain more information. The histopathological appearance of the tumor was similar to that of the biopsy materials, but in this material, cyto-pleomorphism and mitotic activity were much more strong (Fig. 8). Spindle-shaped cells with large ovoid nuclei some of which showed mitotic figures, and fibrillar cytoplasm were seen. The cells were arranged in parallel arrays forming interwoven fascicles. In these sites thin -walled vessels were evident, and adjacent to the vessel wall the tumor cells proliferated (Fig. 8). Moreover, giant cells were found in the parenchymal cells. These giant cells were classified into two types: the one containing large ovoid or round granular nuclei with a nucleolus (Fig. 9), and the other the bizzarre shaped giant cell whose cytoplasm was strongly eosinophilic (Fig. 10). The storomal changes were also appeared as the same as those of the biopsy materials. The silver impregnated specimens showed reticulin fibers distributed among each tumor cell. The other results by the special staining were the same as those of the biopsy materials, but somewhat stained more lightly.

Discussion

Smooth muscle tumors have been classified into the following two groups: leiomyomas (benign) and leiomyosarcomas (malignant). The former have been further classified by Enzinger et al. (1969)[2] into leiomyoma (solid leiomyoma), angiomyoma (vascular leiomyoma), and epithelioid leiomyoma (leiomyoblastoma, bizarre leiomyma). The diagnosis of the cases in this presest paper was based upon the above classification.

The morphological aspects of the cells in the angiomyoma (case 1) were nearly the same as those of normal smooth muscle cells in the medulla of the blood vessel wall. The difference between the two is only the pattern of proliferation. Therefore, the results of the special staininig techniques to the tumor and normal smooth muscle cells were the same. The origin of the tumor of case 1 was considered to be vessel medulla because its histopathological features were the same as those of other reported cases (Cherrick et al. 1973[1], Kawabe et al. 1969[6], Kinoshita et al. 1978[7], White et al. 1985[16]).

In case 2, the malignant tumor (leiomyosarcoma), the cell morphology differed strongly from that of normal smooth muscle cells. In the tumor cells the cyto-pleomorphism and the loss of polarity were clearly observed. These findings suggested only that this tumor was poorly differentiated. Therefore, the observation of hematoxylin-eosin-stained specimens may lead to a diagnosis of malignant non-epithelial tumors (sarcomas), in which belonging malignant fibrous histiocytoma, fibrosarcoma, hemangioperisarcoma, Kaposi's sarcoma, maligant schwannoma and leiomyosarcoma (Kratochvil et al. 1982[8], Morimoto 1973[12]). However, the results by the special staining techniques (Masson's trichrome; Mallory's azan) were highly suggestive of myogenous differentiation (Takagi and Ishikawa 1972[14], Saito et al. 1977[13]). Moreover, the morphology of nuclei was little remaining. In our cases, the so-called "sun figure" around the nuclei in the cross sectioned tumor cells was observed (Takano et al. 1985[15]), and longitudinally sectioned nuclei showed rod-shaped structures similar to those in normal smooth muscle cells. Therefore, this case was diagnosed as a leiomyosarcoma. We considered this tumor to be originated from vessel wall medulla, because of the features of the relationship between the tumor cells and the vessels in the tumor masses, the same as in case 1.

In case 2 there were some characteristic features of malignant tumors, i. e., necrosis, bleeding,

and round cell infiltration (Saito et al. 1977[13]). These findings helped us to diagnose this tumor as a malignant one. In the present paper, only the histopathological features of these two cases were described. In a future paper the fine structures and enzyme histochemical natures of these two smooth muscle tumors by electron microscopy will be reported. Especially we will investigate the relationship between the ultrastructure of tumor cells and the distribution of various types of intermediate filaments in the cytoplasms, and discuss the myogenous differentiation of these tumors.

References

1) Cherrick, H. M., Dunlap, C. L. and King, O. H. Jr. (1973) Leiomyomas of the oral cavity, Review of the literature and clinicopathologic study of seven new cases. Oral Surg. **35**: 55-66.

2) Enzinger, F. M., Lattes, R. and Torloni, H. (1969) Histological Typing of Soft Tissue Tumours. Internat. histol. classification of tumours No. 3., W.H.O., Geneva.

3) Farman, A.G. and Kay, S. (1977) Oral leiomyosarcoma, Report of a case and review of the literature pertaining to smooth-muscle tumors of the oral cavity. Oral Surg. **43**: 402-409.

4) Goldblatt, L.I. and Edesess, R.B. (1977) Central leiomyoma of the mandible, Report of a case with ultrastructural confirmation. Oral Surg. **43**: 591-597.

5) Hagy, D.M., Halperin, V. and Wood, C. III. (1964) Leiomyoma of the oral cavity, Review of the lietrature and report of a case. Oral Surg. **17**: 749-755.

6) Kawabe, Y., Kondo, T. and Hosoda, S. (1969) Two cases of leiomyosarcoma of the maxillary sinuses. Arch. Otolaryng. **90**: 114-117.

7) Kinoshita, T., Kawabata, M., Shinya, Y., Shindo, J., Shimura, K. and Hisada, T. (1978) Leiomyoma of the oral cavity : report of two cases. Jpn. J. Oral Maxillofac. Surg. **24**: 1141-1146.

8) Kratochvil, F.J.III., MacGregor, S.D., Budnick, S.D. and Allsup, H.W. (1982) Leiomyosarcoma of the maxilla, Report of a case and review of the litrature. Oral Surg. **54**: 647-655.

9) Merrill, R.G. and Downs, J.R. (1967) Oral leiomyomas, Report of two cases. Oral Surg. **23**: 438-442.

10) Mindell, R.S., Calcaterra, T.C. and Ward, P.H. (1975) Leiomyosarcoma of the head and neck : A review of the literature and report of two cases. Laryngsc. **85**: 904-910.

11) Mochizuki, M., Nakajima, S., Kitamura, U., Kage, T., Chino, T., Nakamura, C., Kawakami, T., Eda, S. and Yamamoto, K. (1984) A case of leiomyosarcoma of the maxilla. Jpn. J. Oral Maxillofac. Surg. **30**: 2041.

12) Morimoto, N. (1973) Angiomyoma (vascular leiomyoma)-a clinicopathologic study-. Kagoshima Univ. Med. J. **24**: 663-688.

13) Saito, M., Sasaki, M., Omura, T. Teshima, T. Okabe, H. Takahashi, H. and Okubo, T. (1977) A case of leiomyosarcoma of the maxilla. Jpn. J. Oral Maxollofac. Surg. **23**: 413-417.

14) Takagi, M. and Ishikawa, G. (1972) An autopsy case of leiomyosarcoma of the maxilla. J. Oral Pathol. **1**: 125-132.

15) Takano, N., Ichinokawa, Y., Tanaka, J., Nakano, Y., Isoya, K., Nanba, M., Sato, C., Ide, Y., Hashimoto, S. and Tanaka, Y. (1985) A case of solid leiomyoma in molar region of maxilla. Jpn. J. Oral Maxillofac. Surg. **31**: 1988-1993.

16) White, D.K., Selinger, L.R., Miller, A. S., Behr, M. M. and Damm, D.D. (1985) Primary angioleiomyoma of the mandible. J. Oral Maxillofac. Surg. **43**: 640-644.

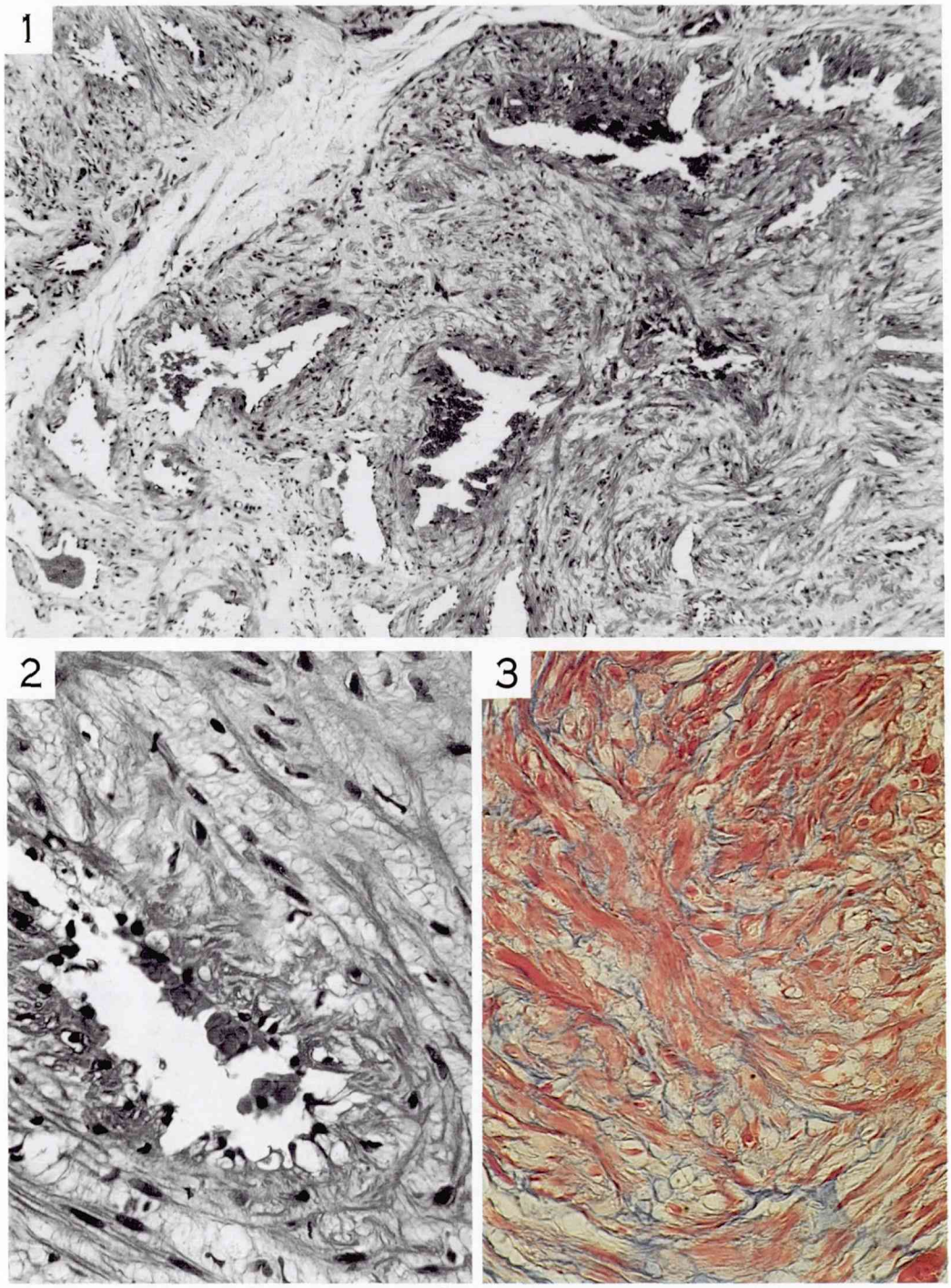

Fig. 1. Low-power view showing proliferation of smooth muscle cells from the vessels (Case 1. H-E, ×75)

Fig. 2. High-power view of parenchymal cells (Case 1. H-E, ×400)

Fig. 3. Red stained tumoral smooth muscle cells among the collagenous stromal tissues stained blue (Case 1. Mallory' azan, ×400)

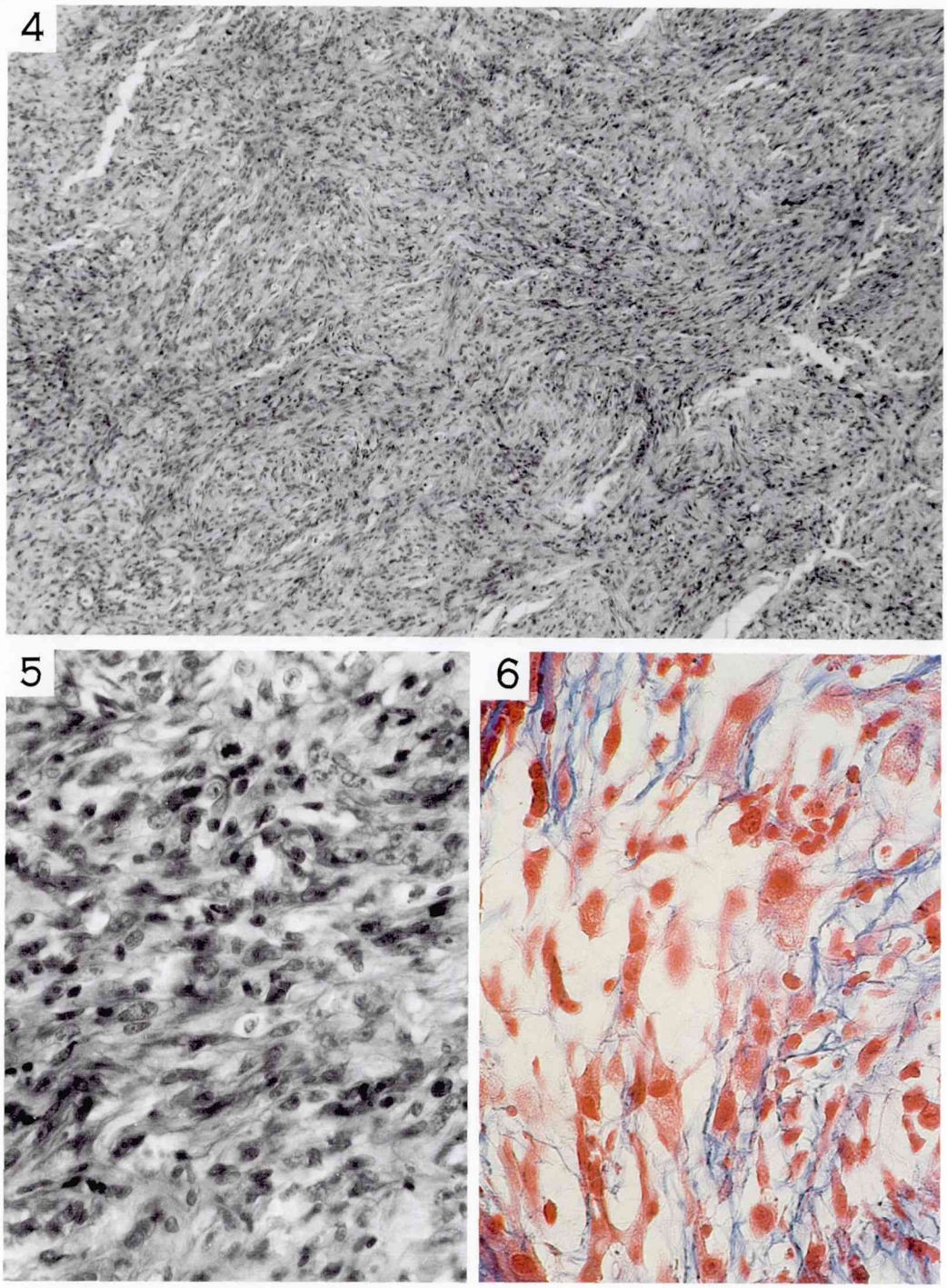

Fig. 4. Low-power view showing proliferation of numerous spindle-shaped cells (Case 2. H-E, × 75)

Fig. 5. Some so-called "sun figure" in the cross sections of the cytoplasms (Case 2. H-E, ×400)

Fig. 6. Red stained cytoplasms of tumor cells (Case 2. Mallory's azan, ×400)

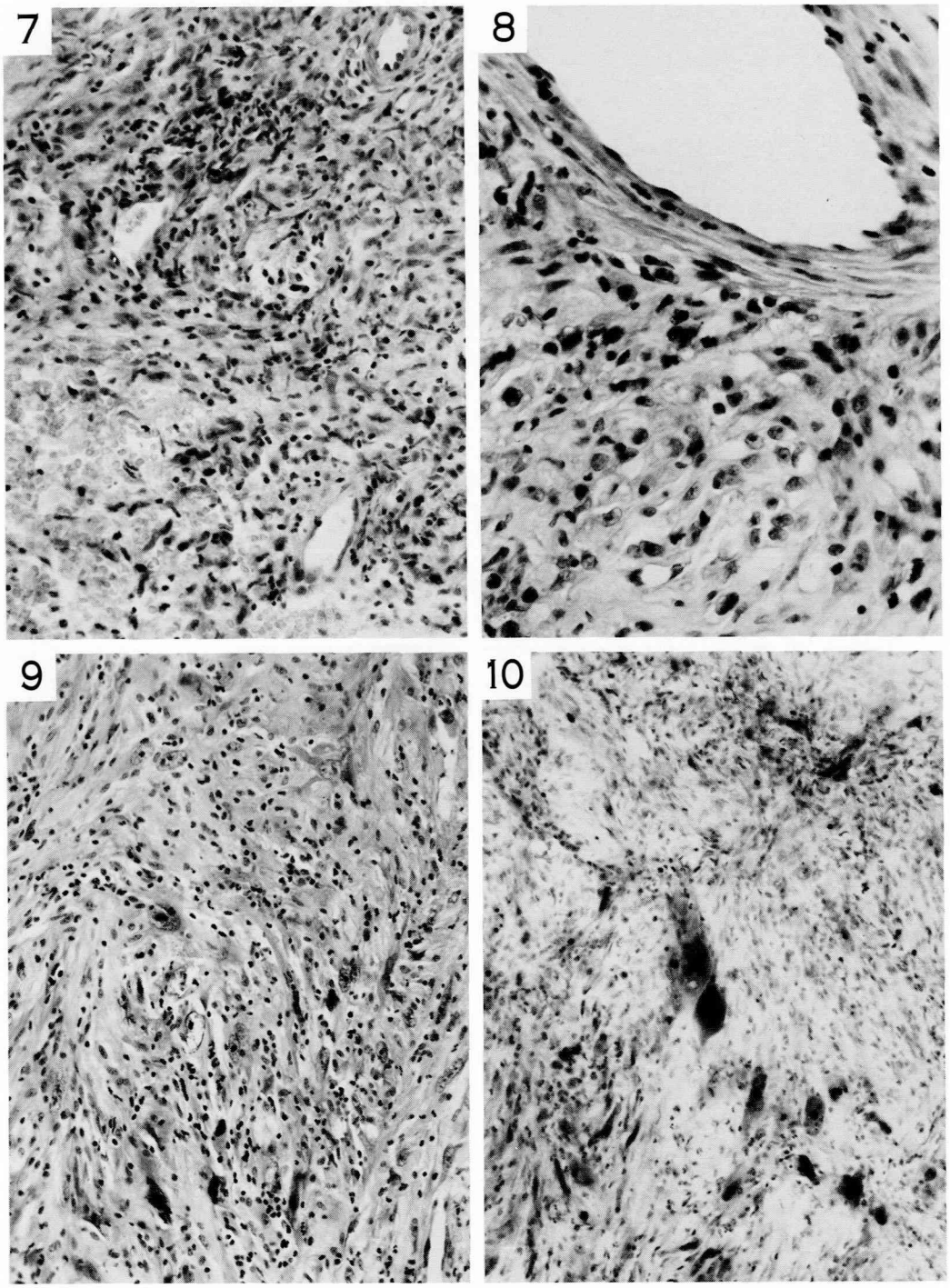

Fig. 7. Necrotic focous and inflammatory cell infiltration in the tumor mass (Case 2. H-E, ×250)
Fig. 8. Tumor cells proliferating adjacent to the vessel wall (Case 2. H-E, ×400)
Fig. 9. Some giant cells with large round or oval nuclei (Caee 2. H-E, ×250)
Fig. 10. Some bizarre giant cells in the proliferation of the tumor cells (Case 2. H-E, ×160)