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Fine Needle Aspiration Cytology of Chondrosarcoma

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Fine needle aspiration cytologic findings of four cases of chondrosarcoma were described. The cases consisted of one primary scapular tumor, two recurrent shoulder masses, and a right upper quadrant mass which developed after an A-K amputation for an unknown tumor. The aspirates characteristically revealed cell-rich smears containing clusters and isolated cells having abundant cyanophilic cytoplasm and round to oval or elongated vesicular nuclei. The cytoplasm was occasionally foamy. The nuclei were usually small but prominent. Nuclear atypism and pleomorphism were frequently associated. The last case showed epithelioid sheets of polygonal cells, possibly representing chondroblasts, and a well differentiated chondroid element. The fine needle aspiration could be a good diagnostic tool for primary, recurrent, and metastatic chondrosarcomas.

Key Words: Chondrosarcoma, Fine needle aspiration, Cytology

INTRODUCTION

The aspiration biopsy cytology is now regarded as a good diagnostic tool for bone tumors, however cytologic details and variables of which are not very familiar to pathologists. The chondrosarcoma cannot be unequivocally diagnosed cytologically without definite chondroid differentiation of tumor cells and frequently mimics carcinoma or chordoma cytologically. This paper describes common and characteristic cytologic features of four proven cases of chondrosarcoma.

MATERIALS AND METHODS

The cases were selected from the consecutive files of the Dept. of Pathology, K.C.C.H. during the period Jan. 1985-Jun. 1988. The aspiration for the present cases was performed by orthopedic surgeons using a 21-gauge needle attached to a 10 ml disposable plastic syringe. The aspirate was spread on a glass slide as a conventional smear and stained according to Papanicolaou.

RESULTS

Case 1 was a 57 year old female who had suffered from left shoulder pain for 5 years and diagnosed as chondrosarcoma after a biopsy at a general hospital 6 months previously. An X-ray showed speckled density at the neck and glenoid of left scapula. A fine needle aspiration revealed a highly cellular smear containing clustered and isolated cells having abundant cyanophilic cytoplasm with indistinct border and round to oval nuclei with granular chromatin and several small nucleoli(Fig. 1). Nuclear pleomorphism was moderately marked and more severe in isolated cells accompanying multinucleated giant cells. The patient was lost from the follow-up after 200 rads of radiotherapy.

Case 2 and 3 were 41 year old females with a

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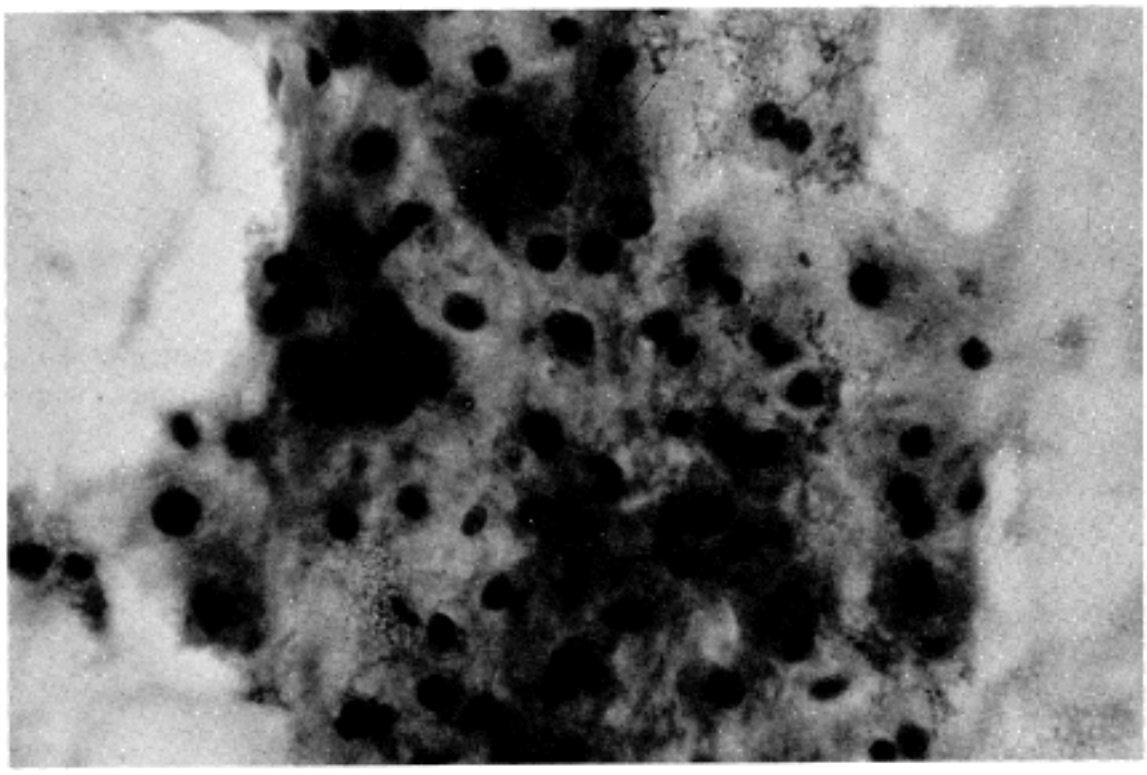

Fig. 1. A cluster of cells having abundant cytoplasm with indistinct margin and round to oval hyperchromatic nuclei with small nucleoli (case 1, Pap, X102).

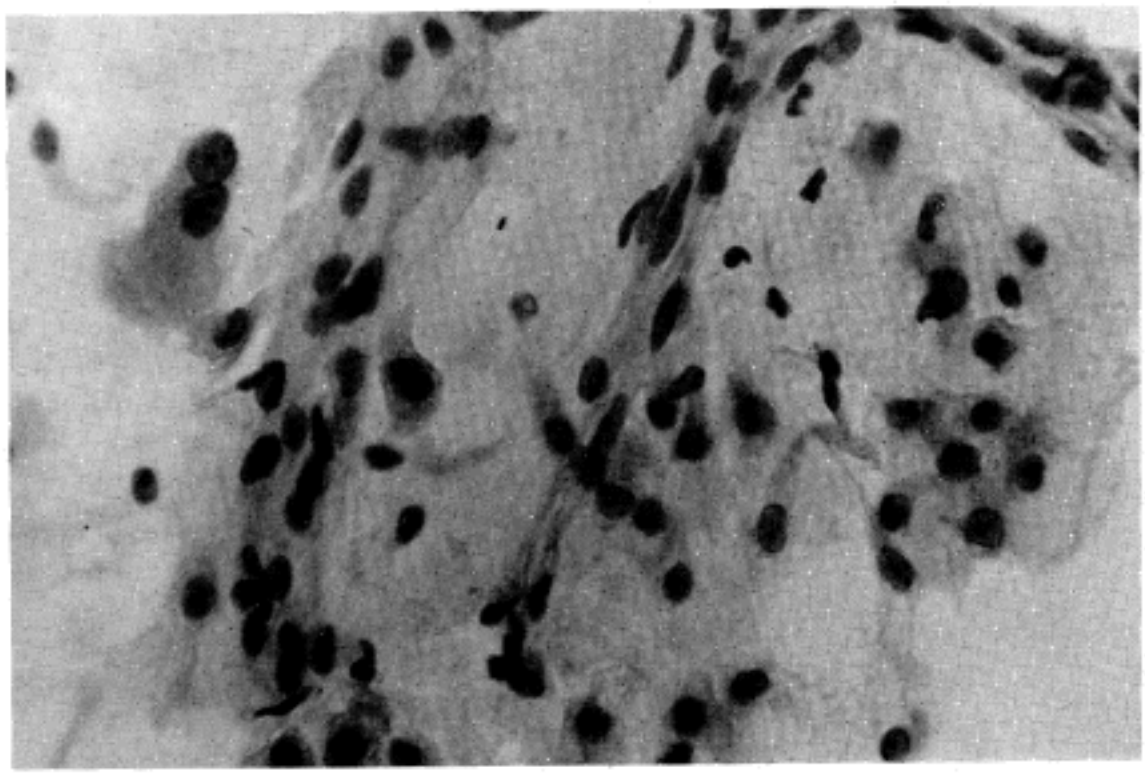

Fig. 2. The cells have abundant finely foamy cytoplasm and round to oval granular nucleoli (case 2, Pap, X160).

recurrent shoulder mass which developed 16 months and 4 months after an operation for the right scapular chondrosarcoma, respectively. Cytologic features of case 2 were very similar to those of case 1 and included more foamy cells(Fig. 2). Case 3 revelaled clustered pyknotic cells with abundant cyanophilic cytoplasm. They were either lost from the follow-up after a reoperation and postoperative radiotherapy.

Case 4 was a 59 year old female presenting with a RUQ mass of 5 months duration. She had received a left A-K amputation 5 years previously for a certain tumor of unknown histology. The mass was in or adjacent to the liver, measuring 18 cm in diameter on a CT scan. The aspirate revealed highly cellular material showing clusters and isolated cells with plump cyanophilic often foamy cytoplasm and oval to elongated hyperchromatic nuclei(Fig. 3). These features were similar to those in the former cases and a fragment of more differentiated chondroid

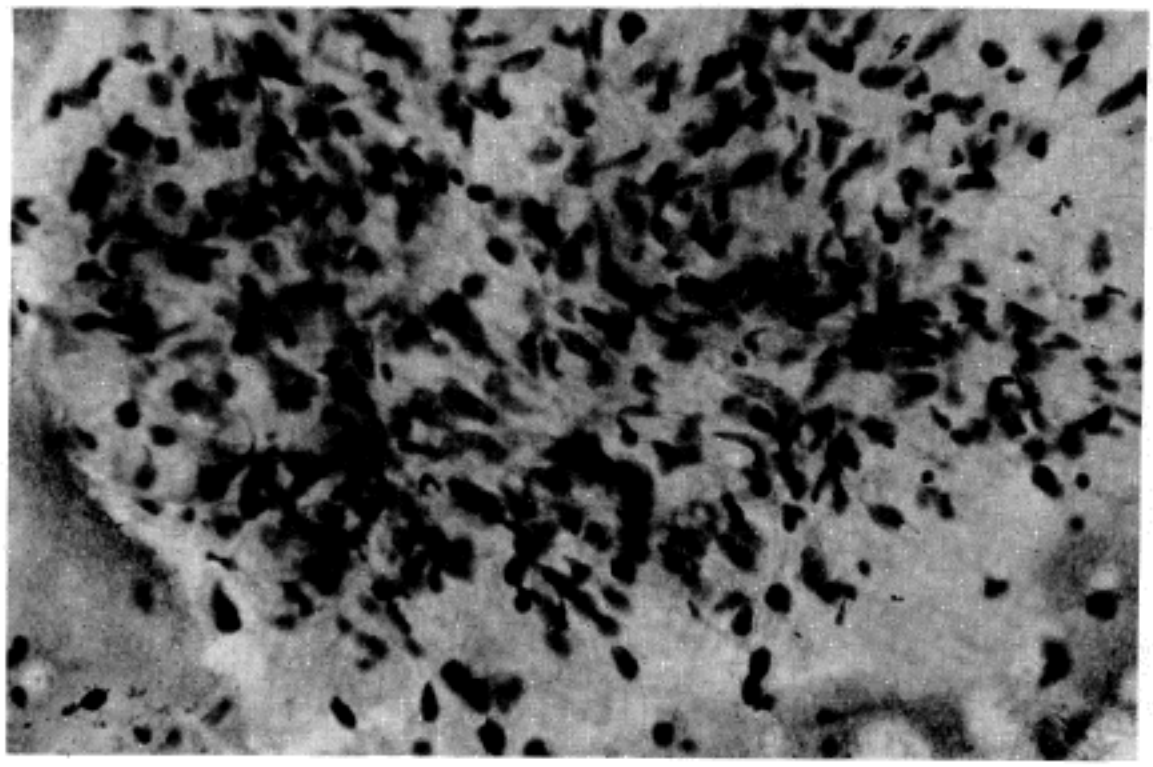

Fig. 3. A cellular clump of elongated cells with indistinct margin (case 4, Pap, X102).

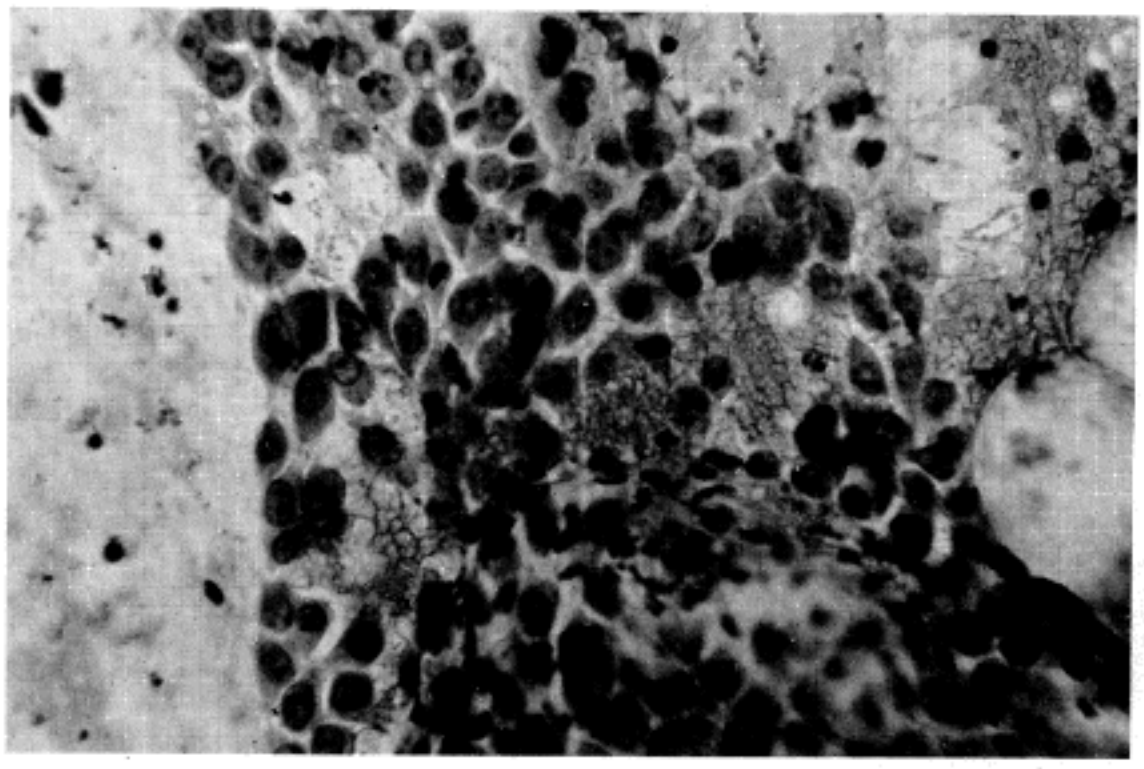

Fig. 4. An epithelioid sheet of polygonal cells showing well delineated cytoplasm and round to ovoid vesicular nuclei (case 4, Pap, X128).

tissue contributed to the diagnosis of metastatic chondrosarcoma. There were another epithelioid sheets of polygonal cells having small amount of well delineated amphophilic cytoplasm and round to ovoid vesicular nuclei with prominent nucleoli, possibly representing chondroblasts(Fig. 4). The cytologic findings of the present cases are summarized in Table 1.

DISCUSSION

Fine needle aspiration biopsy cytology was introduced as a valuable diagnostic tool for various bone tumors, and comparative studies on the cytology and histology of bone tumors revealed an accuracy 94~95%[1~3].

The present cases of chondrosarcoma showed rather characteristic features including clusters of

Table 1. Summary of cytologic features

Case	Cellularity	Pattern	Cytoplasm	Nuclei	Pleomorphism
1	High	Clusters & isolated	Abundant Cyanophilic Indistinct border	Round to oval Granular chromatin Several nucleoli	Marked with giant cells
2	Moderate	Clusters & isolated	Abundant Cyanophilic Often foamy Indistinct border	Round to oval Granular chromatin Small nucleoli	Moderate
3	Moderate	Clusters	Abundant Cyanophilic Indistinct border	Pyknotic	
4	High	1) Clusters & isolated	Abundant Cyanophilic Often foamy Indistinct border	Oval to elongated Granular chromatin Small nucleoli	Moderate with chondroid differentiation
		2) Sheets	Small amount Eosinophilic Distinct border	Round to ovoid Vesicular Prominent nucleoli	

plump cells having poorly-outlined abundant cyanophilic cytoplasm and round to oval or elongated nuclei with small but prominent nucleoli. These findings do not fit those described elsewhere, such as atypical plump double nuclei[4], round well-delineated cytoplasm with lacuna formation[5] or vacuolated well-outlined cytoplasm with signet ring-cell configuration[6]. The epithelioid sheets of polygonal cells seen in one of our cases have once been described[6]. These cells closely resemble the distinctive tumor cells of chondroblastoma and are considered to be chondroblasts.

The existence of chondroid tissue alone does not always make the diagnosis of chondrosarcoma, which is supported by obvious nuclear atypia and pleomorphism in comparison to benign chondroma. Chondrosarcoma often mimics chordoma cytologically as well as in the histologic section and the presence of large physalipherous cells and bland nuclei favor the latter diagnosis. Calafati et al described three types of cells in an extraskeletal chondrosarcoma, consisting of round or polygonal cells having abundant finely vacuolated cytoplasm and round to oval granular nuclei, binucleated or multinucleated cartilage cells and small poorly differentiated cells, probably malignant chondroblasts[7]. The former cells were similar to this presentation, but the latter two types were not observed in the present tumors.

It is of importance that the cytologic diagnosis of chondrosarcoma and other bone tumors be made with consistent clinical and radiologic findings as well as in the open biopsy. The bone tumor cytology would be particularly helpful for highly malignant bone tumors in which open biopsy might be dangerous or suspected recurrent tumors.

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＝국문초록＝

연골육종의 세침천자 세포학적 소견

원자력병원 해부병리과 및 정형외과*

조 경 자·장 자 준·이 수 용

세침천자를 시행한 연골육종 4예의 세포학적 소견을 기술하였다. 공통적으로 세포가 풍부한 도말 표본을 볼수 있었으며 세포들은 집단을 이루거나 흩어져 있었고 풍부한 호청성 세포질을 가지고 있었다. 세포의 경계는 매우 불명확하고 핵은 둥글거나 난원형 또는 장형으로 입상 염색질과 작지만 분명한 핵소체를 보였다. 세포의 이형성 및 다형성이 흔히 동반되었다. 우측 상복부종괴를 주소로 한 1예에서는 연골아세포로 생각되는 유상피성 다각세포와 분화가 잘 된 연골조직이 관찰되어 간으로 전이한 연골육종의 진단이 용이했다. 세침천자 세포학은 생검이 위험한 악성 골종양 및 재발 또는 전이가 의심되는 예에서 진단에 큰 도움이 될 것이다.