대한세포병리학회지 제1권, 제1호
Kor. J. Cytopath. pp 43 ~ 50
Vol. 1, No. 1, June, 1990

Fine Needle Aspiration Cytology of the Mediastinal Lesions*

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The authors report 16 cases of mediastinal fine-needle aspiration cytology from Jan. 1985 to Mar. 1988 at the Seoul National University Hospital.

Among them, diagnostic material were obtained in fifteen cases, establishing the diagnosis of 7 thymomas, 2 germinomas, 2 neurogenic tumosr, 1 lymphoma, and 3 meastatic carcinomas.

The 9 cytologic diagnoses could be confirmed by histologic examination in 8 patients and by another cytologic method in one patient, allowing concordance rate of 77%.

Key Words : Fine needle aspiration biopsy, Cytology, Mediastinum

Introduction

The lesions of the mediastinum manifestating enlargement in chest X-ray cause a difficult clinical differential diagnosis. This includes diverse entities such as thymoma, lymphoma, Hodgkin's disease, germ cell tumors, metastatic carcinomas, neurogenic tumors, congenital cystic lesions and nonneoplastic processes[1].

Accurate cytohistopathologic diagnosis is essential for determining adequate specific treatment modality in these diverse entities. There is need for a reliable diagnostic method to obtain tissue, but exploratory surgery to obtain tissue is usually a major debilitating operation, due to proximity of heart and great vessles.

The mediastinoscopy was used to obtain tissue biopsy, in this circumstance, however, the posterior mediastinum was not accessible by this method.

Since fine needle aspiration biopsy gained widespread acceptance as a rapid and effective method of investigating pulmonary lesions[2], this technique has been similarly applied to diagnose mediastinal lesions[3-9]. This procedure may prevent the need for unnecessary exploratory thoracotomy for diagnostic purpose in persons with inoperable cancer. Since fine needle aspiration of the mediastinal mass was not a routine technique in investigating these lesions, experience with the cytologic diagnosis of these tumors is limited[3-9].

We reviewed fine needle aspiration cytology specimens of the mediastinal lesions in order to define diagnostic criteria for these lesions.

We described our experience of the fine needle aspiration cytology of the mediastinal lesions which

* This paper was presented on May 20, 1988 at the 13 th meeting of Korean Society of Pathologists.

we examined from January 1985, to March 1988.

Materials and Methods

Sixteen cases of mediastinal lesions trom 15 patients, diagnosed by fine needle aspiration biopsies at Seoul National University Hospital between January 1985 and March 1988 were reviewed.

Fine needle aspiration biopsy was performed by radiologists with fluoroscopic guidance, using 22-gauge needles, through the thoracic wall.

The patients' age ranged from 19 to 69 years.

The aspirated materials were smeared on glass slides, which were fixed in 95% ethanol and stained by Papanicolaou's method. Air-dried smears for May-Grünwald-Giemsa staining were also made.

The results of the cytological examinations could be confirmed in 8 patients by histopathologic examination and in one patients by the cytological examination of the sputum.

Specimens for histopathologic examination were formalin-fixed, paraffin-embedded, sectioned in 5 μ thickness and stained with hematoxylin and eosin.

Results

The specimen obtained was satisfactory in 15 patients and in one patient, insufficient material only containing blood was obtained and repeated aspiration was done and included in this series (Table 1).

Table 1. Results of fine needle aspiration cytology of mediastinal lesions

Results	No. of case
Material adequate for diagnosis	15
Material inadequate for diagnosis	1
False-posifive diagnosis of malignancy	1
False-negative diagnosis of malignancy	0

The fifteen cases were diagnosed as followed :

Thymoma, 6 ; thymoma versus small cell carcinoma, 1 ; Hodgkin's lymphoma, 1 ; germinoma, 2 ; neurogenic tumor, 2 ; metastatic adenocarcinoma, 1 ; metastatic undifferentiated carcinoma, 1 ; metastatic carcinoma, unspecified, 1.

Fifteen cytological diagnoses were histologically confirmed in 8 cases, cytologically and clinically confirmed in 1 case (case 15) and could not be confirmed in 6 cases (Table 2).

Table 2. The Method of confirmation

Method	No.
Diagnosis confirmed by histology	8
Diangosis confirmed by another cytology	1
Diagnosis not confirmed	6

The case 5, which was cytologically suspected as thymoma versus small cell carcinoma, was histologically confirmed as thymoma of mixed type.

In 2 cases there was a discrepancy between cytologic diagnosis and final diagnosis. The case 6, which was cytologically diagnosed as Hodgkin's lymphoma, was histologically confimed as thymoma of epithelial predominance type, making this a case of false-positive diagnosis of malignancy. In the case 12, cytological diagnosis was neurogenic tumor, but histological diagnosis after surgery was accessory lung.

The cases are summarized in Table 3.

In case 15, although material for histologic confirmation was not available, carcinoma cells of squamous cell type were found in the cytologic examination of the patient's sputum, making this a case of metastatic squamous cell carcinoma of lung to the mediastinum.

Overall 7 positive representative cytology was found among 9 cases in which final confirmative diagnosis was made, allowing concordance rate of

Table 3. Summary of cases

No.	Age/Sex	Cytology	Histology
1.	44/M	Thymoma	Thymoma, mixed type
2.	57/F	Thymoma	Thymoma, mixed type
3.	60/F	Thymoma	Thymoma, lymphocytic type
4.	55/F	Thymoma	Thymoma, lymphocytic type
5.	56/M	Thymoma versus small cell ca.	Thymoma, mixed type
6.	38/F	Hodgkin's disease*	Thymoma, epithelial type
7.	53/M	Thymoma	—
8.	60/M	Thymoma	—
9.	19/M	Germinoma	Germinoma
10.	28/M	Germinoma	—
11.	69/F	Neurogenic tumor	—
12.	47/M	Neurogenic tumor**	Accessory lung
13.	59/M	Metastatic adenoca.	—
14.	59/M	Metastatic undifferentiated ca.	—
15.	66/M	Metastatic ca.	—***

* : False-positive diagnosis was done.
** : On review the cytologic material was too scanty to be diagnostic.
*** : Squamous cell carcinoma was diagnosed on cytologic examination of the patient's sputum.
Ca. : Carcinoma

77%. Among the 7 cases, five cases were thymoma, one case was germinoma, and the other one case was metastatic carcinoma.

In classifying the lesions as primary or secondary lesion, 11 were primary mediastinal lesions, 3 were metastases from an occult lung carcinoma, and one was a primary lung lesion manifestating as a mediastinal lesion.

The primary mediastinal lesions were as followed: Thymoma, 8 ; germ cell tumor, 2 ; neurogenic tumor, 1.

Thymoma cases demonstrated biphasic pattern of large clusters of a benign-appearing, cohesive groups of multilayered epithelial cells and lymphocytes in the background of dispersed mature polymorphous lymphocytes (Fig. 1). The individual epithelial cells were round or oval and the nuclei of them were round to oval and vesicular (Fig. 2 & Fig. 3). The cytologic subclassification of the thymoma according to histologic subtype was not done in this series.

Seminomas also have a background of lymphocytes and loose small clusters or single cells of monomorphic malignant cells of epithelial nature. The cytoplasm of the cells were abundant and clear and the nuclei were large and round with distinct nucleoli(Fig. 4). Occasionally, small granulomas of epithelioid cells were found(Fig. 5 & Fig6). There were some multinucleated cells. Serum gonadotrophin and alpha-fetoprotein levels were not elevated in these two cases, rendering the possible diagnosis of pure germ celltumor without choriocarcinomatous or embryonal carcinomatous foci.

Discussion

Thymoma was the most common primary mediastinal tumor in this series. Thymomas posses great histologic diversity, but accurate cytolgic diagnosis of thymoma is achivable if the biphasic pattern of

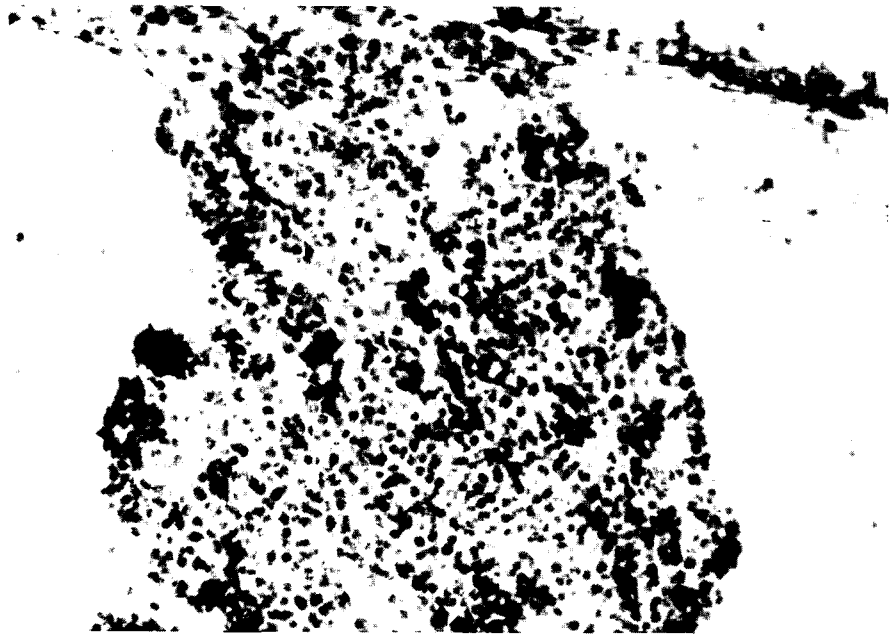

Fig. 1. Aspirated cells from a thyomona(case 1) show a tissue fragment with epithelial cells and lymphocytes(Papanicolaou, ×200).

Fig. 2. Aspirates from a thymoma(case 2) show ovoid or round epithelial cells with vesicular nuclei in the background of lymphocytes(Papanicolaou, ×400).

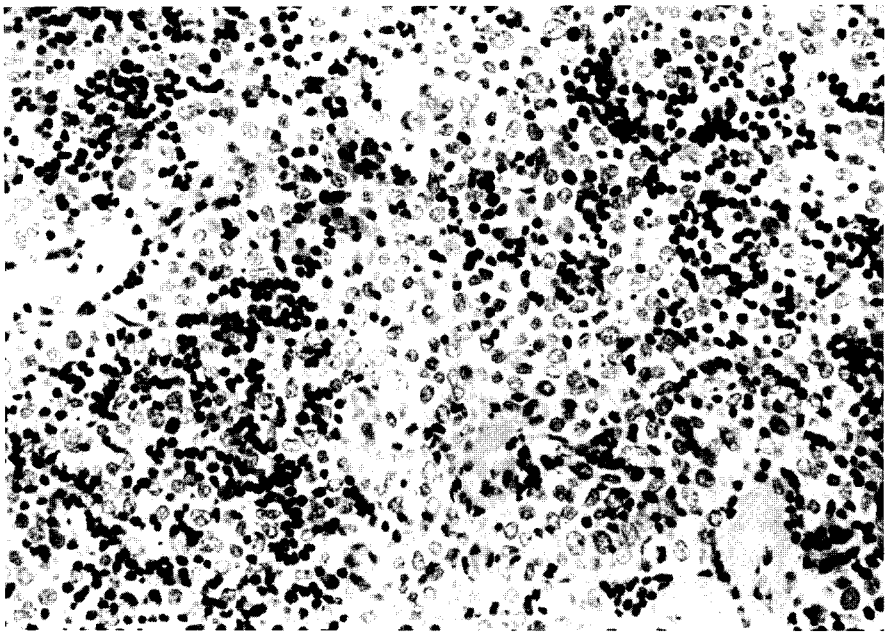

Fig. 3. Tissue section of thyomoma showing sheets of epithelial cells with scattered lymphocytes (H-E, ×200)

Fig. 4. Aspirates from germinoma (case 9) show loose small cluster or single cells of epithelial nature with large nuclei and abundant clear cytoplam(Papanicolaou, ×400).

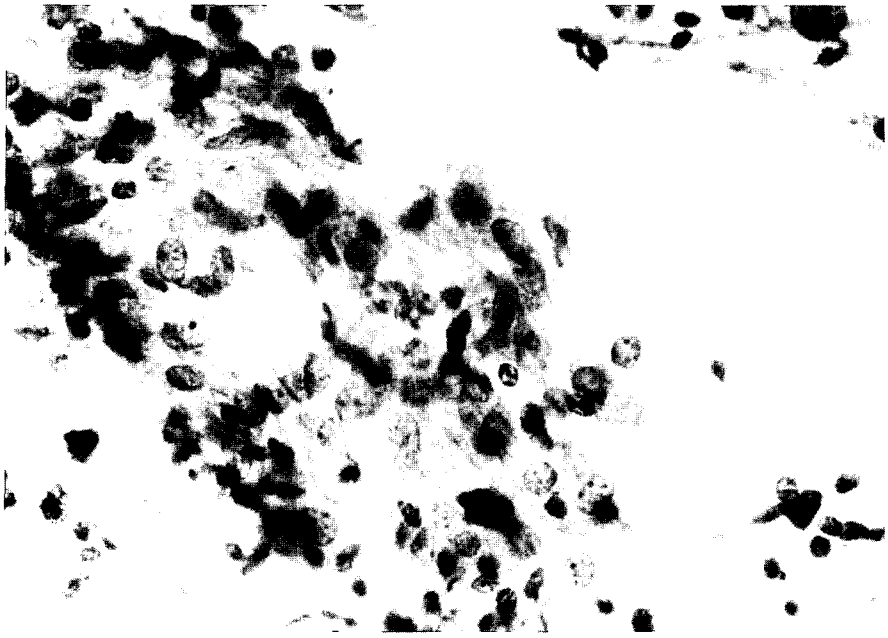

Fig. 5. Aspirates from germinoma(case 9) show aggregates of epithelioid cells (Papanicolaou, ×400).

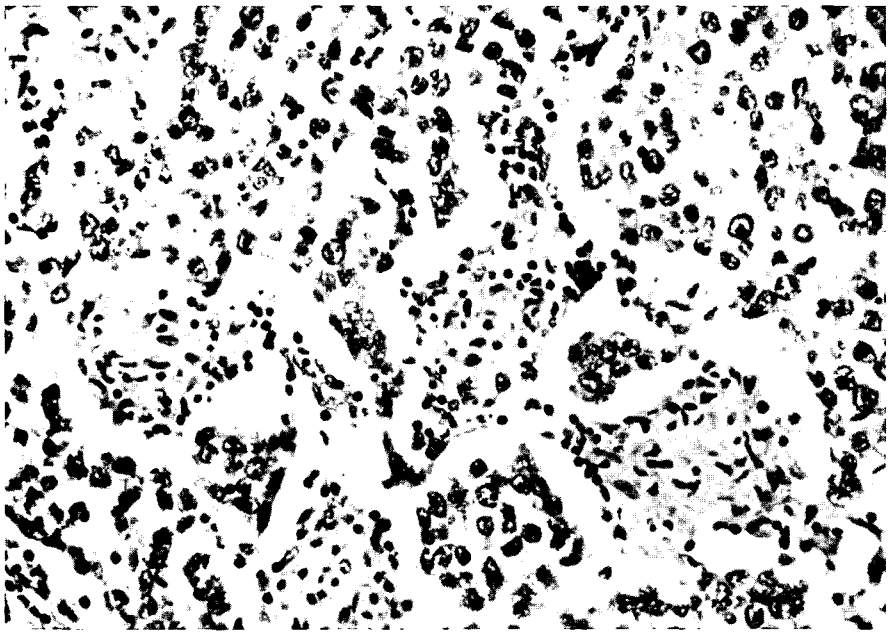

Fig. 6. Tissue section of seminoma(case 9) with prominent granulomatous reaction (H-E, ×200).

epithelial cell clusters and dispersed lymphocytes is recognized and correlated with the clinical and radiologic findings[10-12]. Tao et al. suggested that a classification of thymoma based upon the size, shape, pleomorphism, and composition rate of the epithelial component may have prognostic value[13].

In the literature, 72% to 82% of mediastinal aspirates yield diagnostic material.

The major cytologic differential diagnosis of thymoma includes non-Hodgkin's lymphoma and small cell carcinoma.

In this study a false-positive diagnosis of Hodgkin's disease was done, with the misinterpretation of cytologic findings that most of the found are lymphoid cells.

Marked crushing artifact, dispersed malignant cells not making large clusters, nuclear moulding, and fine stippled chromatin were the features of small cell carcinoma, different from thymoma.

In malignant lymphoma, most cells were dispersed singly with monotonous appearance.

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= 국문 초록 =

종격동 병변의 경흉 세침흡인 세포학적 진단

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방사선 검사상 종격동 확장으로 나타나는 질환은 흉선종, 배아종, 신경원성 종양, 림프종 등의 원발성 종격동 종양 및 폐암의 림프절 전이 등으로 매우 다양하고 또 이들의 감별진단

이 환자의 치료 방침을 정하는데 중요하나, 조직학적 진단을 하기 위해 외과적 생검을 하기에는 그 위험도가 높은 장기이므로 세침흡인 세포학적 생검이 아주 유용한 방법이 되고 있음에도, 그 세포병리학적 진단 기준은 아직 우리에게 친숙한 편이 아니다. 저자들은 1985년에서 1988년 3월 까지 서울대학교 병원 병리과에서 검색된 종격동 병변의 세침흡인 생검 16예를 세포병리학적으로 관찰하고 그 결과를 검토하여 보았다.

판독 적절한 검체가 흡인되었던 15예 중 흉선종이 7예, 배아종이 2예, 신경원성 종양이 2예, 림프종이 1예 폐암의 림프절 전이 3예가 세포학적으로 진단 되었다. 조직학적이나 다른 세포학적 방법으로 확진된 예와 본 연구의 세포학적 진단이 비교 가능하였던 9예중 7예에서 진단이 일치하였는데, 그중 5예는 흉선종, 1예는 배아종이었고 1예는 전이성 암으로 진단 일치율은 77%였다.

조직학적 진단과 세포학적 진단이 상이하였던 예는 2예로 1예는 흉선종이 림프종으로, 1예는 첨폐가 신경원성 종양으로 오진되었다.

흉선종은 세포학적으로 특징적인 소견을 보여, 대개의 경우 진단에 별 어려움이 없었으나 림프종과 소형세포암이 감별을 요하는 진단이었다.