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Cytologic features of tuberculosis manifesting palpable lumps: A fine- needle aspiration biopsy approach +

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Fine- needle aspiration (FNA) biopsy specimens from 20 proven cases of tuberculosis presenting with palpable lumps were studied. Nineteen instances manifested enlarged neck masses and one case revealed a chest- wall lump. The mean age of the group was 19.4 years (range 15-43) with a male to female ratio of 3:7. There were follow-up data on all cases for more than six months. Cytomorphology was categorized into principal and subordinate features. The former showed epithelioid cell aggregates, well-organized granuloma with or without amorphous clumps corresponding to caseous necrosis. The latter revealed necrotizing cellular background containing histiocytes and other mixed leucocytes. Principal features appeared in 11 cases. Search for acid- fast bacilli (AFB) on smears yielded 45% positivity overall. Correlating with cytologic features, AFBs could be discerned in two out of 11 examples that showed principal pattern while AFB positivity was detected in seven out of nine instances with subordinate feature.

FNA can be relied upon to give a presumptive diagnosis of tuberculosis when either clustering of epithelioid cells or AFBs are detected. In addition to simplicity and rapidity, the technique offers benefits over conventional biopsy in that it leaves no scar.

Key words : *FNA, Fine -needle aspiration biopsy cytology, Tuberculosis, Neck mass, Superficial lump.*

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พิษเรื้อรัง สัมปทานกุล, กัญชลี เลิศโกตะสมบัติ, เข็มชาติ ต้นสกุลรุ่งเรือง, วิศิษฐ์ อุดมพาณิชย์. ลักษณะทางเซลล์วิทยาของวัณโรคที่ปรากฏเป็นก้อน โดยวิธีการเจาะดูดด้วยเข็มขนาดเล็ก. จุฬาลงกรณ์เวชสาร 2536 กุมภาพันธ์; 37(2): 119-125

คณะผู้วิจัยได้ศึกษาตัวอย่างที่เจาะดูดออกจากก้อนที่คลำได้ โดยใช้เข็มขนาดเล็กในผู้ป่วยวัณโรค 20 ราย แบ่งออกเป็นก้อนในบริเวณคอ 19 ราย และที่ผนังทรวงอก 1 ราย อายุเฉลี่ยของกลุ่ม 19.4 ปี (พิสัย 15-43 ปี) สัดส่วนของชาย : หญิง = 3:7 ผู้ป่วยทุกรายมีผลการติดตามการดูแลรักษาไม่น้อยกว่า 6 เดือนภาพทางเซลล์พยาธิวิทยาถูกจัดออกเป็นลักษณะหลักกับลักษณะรอง ลักษณะหลักประกอบด้วย การรวมกลุ่มกันของเซลล์อีปิตีเลียออยด์เป็นแกรนูโลมา ซึ่งอาจจะมีหรือไม่มีก้อนออสติฐานที่เป็นเนื้อเยื่อตายแบบเคเซียร่วมอยู่ด้วยก็ได้ ลักษณะรองประกอบด้วยพื้นสเมียร์ที่มีการตายของเซลล์อักเสบ ซึ่งมีทั้งฮิสติโอซัย และเซลล์ชนิดอื่นๆ ผู้ป่วย 11 ราย มีลักษณะสเมียร์แบบภาพหลัก การตรวจหาเชื้อแอซิดฟาสต์แบคทีเรียในสเมียร์พบผลบวกทั้งหมดร้อยละ 45 อยู่ในกลุ่มที่ให้ภาพหลัก 2 ราย จากทั้งหมด 11 ราย และ พบในกลุ่มที่ให้ภาพรอง 7 ราย จากผู้ป่วย 9 ราย

เซลล์วินิจฉัยโดยการเจาะดูดด้วยเข็มขนาดเล็กทำได้ง่ายและให้ผลรวดเร็ว สามารถให้การวินิจฉัยวัณโรคของต่อมน้ำเหลืองได้เมื่อ พบการรวมกลุ่มของเซลล์อีปิตีเลียออยด์ หรือพบเชื้อแอซิดฟาสต์แบคทีเรีย วิธีการนี้ยังมีข้อดีเหนือกว่าการตัดชิ้นเนื้อแบบเดิมโดยที่ไม่ทำให้ผู้ป่วยเป็นแผลเป็น

Tuberculosis remains prevalent in Thailand.⁽¹⁾ Although the disease is manifested in various organs, pulmonary tuberculosis forms the major presentation. Other affected sites include lymph nodes, gastrointestinal tract, cerebrospinal system, bone and joints etc.⁽²⁾ It is when tuberculosis which occurs in soft tissue and lymph nodes that patients seek medical owing to palpable lumps which, can cause diagnostic problems in the out-patient office. In the end, most such patients undergo a biopsy which leaves behind an unpleasant scar. Fine-needle aspiration cytology (FNAC) is a simple technique that is gaining popularity because it enables diagnosis of palpable or visible lumps. It is one of the promising procedures that may replace conventional biopsy.⁽³⁾ This study was undertaken in order to determine cytologic features of tuberculosis and practical criteria for cytodiagnosis.

Methods

Twenty proven cases of tuberculosis presenting with superficial masses retrieved from the files of the FNAC Service Clinic, Department of Pathology, Faculty of Medicine, Chulalongkorn University, from November 1, 1991 to January 31, 1992 were studied. They were retrieved if both cytologic smears and acid fast bacilli (AFB) results were available for analysis. Smears were reviewed by a cytopathologist in order to determine some characteristic features and correlation with the AFB results, which were read by a microbiologist. All cases had been followed up for more than six months period either in the Department of Otolaryngology or the Clinic of Tuberculosis, Department of Medicine. The final diagnosis was 19 cases of tuberculous

lymphadenitis and one case of tuberculous pleuritis with chest-wall involvement.

The procedure of fine-needle aspiration is described here in short. First, a 22-gauge needle (external diameter, 0.7 mm) attached to a 10-ml plastic syringe was advanced into the lump, full suction was applied to yield maximum negative pressure and then the needle was moved to and fro in a jerking manner within the mass. Before the apparatus was withdrawn, the pressure in the syringe was normalized. Subsequently, the aspirated samples were deposited onto slides. Thin smears were produced by placing another slide on top and pulling the two slides apart. Some smears were dipped immediately into 95% ethanol and then stained by modified Papanicolaou technique.⁽⁴⁾ These preparations were for cytomorphologic examination. One to two other smears were stained by Kinyoun's method⁽⁵⁾ to search for AFB. If any specimens remained, they were submitted for culture.

Results

Patients

A summary of clinical data, laboratory findings and confirmed diagnostic means are provided in Table 1. The mean age was 19.4 years (range 15-43). The male to female ratio was 3:7. Thirteen patients presented with multiple neck nodes; nearly all of which were located in the posterior triangle of the neck. Of the seven single masses, three occurred at the supraclavicle, one involved the upper jugular node, one arose at the submandible and yet another appeared as a chest-wall lump.

Table 1. Brief clinical data and laboratory findings of cases studied.

No.	Sex	Age	Location of masses*	Presence of epithelioid: cell aggregate	AFB in smear	Confirmed** diagnostic means
1	M	22	multiple, bilat, post Δ	Yes	+	Tt R _x
2	F	28	multiple, lt, post Δ	No	+	B _x R _x
3	F	15	multiple, lt, post Δ	Yes	+	CF R _x
4	F	43	rt, supraclav	No	+	C _x R _x
5	F	20	rt, supraclav	Yes	-	Tt R _x
6	F	18	multiple, rt, post Δ	Yes	-	B _x R _x
7	M	34	multiple, rt, post Δ	Yes	-	B _x R _x
8	F	17	multiple, rt post Δ	No	-	C _x R _x
9	F	29	multiple, lt, post Δ	Yes	-	B _x R _x
10	M	19	multiple, ulcerated, rt post Δ	No	+	R _x
11	M	24	inflamed, ulcerated, rt post Δ	Yes	-	R _x
12	F	22	multiple, ulcerated, rt post Δ	Yes	-	R _x
13	F	42	multiple, lt, supraclav	No	+	C _x R _x
14	M	16	lt submandibular	Yes	-	R _x
15	F	23	multiple, lt, post Δ	No	-	R _x
16	F	29	multiple, bilat post Δ	Yes	-	H _x R _x
17	M	26	rt post chest wall	No	+	C _x R _x
18	F	27	lt upper jugular	No	+	R _x
19	F	15	multiple, bilat, supraclav	No	+	R _x
20	F	19	lt post Δ	Yes	-	B _x R _x

Abbreviation in column * bilat = bilateral, post Δ = posterior triangle, lt = left, rt = right, supraclav = supraclavicle. in column** Tt = Tuberculin test, R_x = Therapy, B_x = Biopsy, CF = Chest Film, C_x = culture, H_x = history.

Cytologic features

The samples could be classified by cytomorphology into two categories, those with principal features and those with subordinate features.

1. The principal feature comprised of epithelioid cell aggregate with or without clumps of caseating material. Some cellular aggregation gave unequivocally the pattern of histopathologic granuloma with Langhans' multinucleated giant cells (Fig. 1). Others were just clusterings of epithelioid cells forming syncytial cell masses (Fig. 2). The epithelioid cells harboured an elongated nuclei with fine granular chromatin and small nucleoli in an ample cytoplasm that had an indistinct outline. Caseating material was revealed to be solid, amorphous and trashy clumps incorporated with nuclear debris (Fig. 3).

2. The subordinate features were those without epithelioid cells in aggregation. Some disclosed many discrete and viable histiocytes

(Fig. 4). Some showed necrotizing cellular background (Figs. 5,6). Cells were of mixed type including polymorphonuclear leucocytes, lymphoid cells and mono-histiocytes. The pattern contrasted with the suppurative feature which consisted mainly of neutrophils and nuclear fragmentation.

There were 11 instances in which epithelioid cells could be found and justifiable to call them cases of granulomatous inflammation. The other nine cases showed only subordinate features.

Correlation between cytologic features and AFB findings

The solutions are illustrated in Table 1. Two cases out of 11 with principal feature had AFB positivity (18%), while in seven samples out of nine with subordinate features AFB could be discerned on the smears (78%). A suggestive cytodiagnosis could be rendered in 18 out of 20 tuberculous lesions when the criteria were based on either granulomatous feature or AFB positivity.

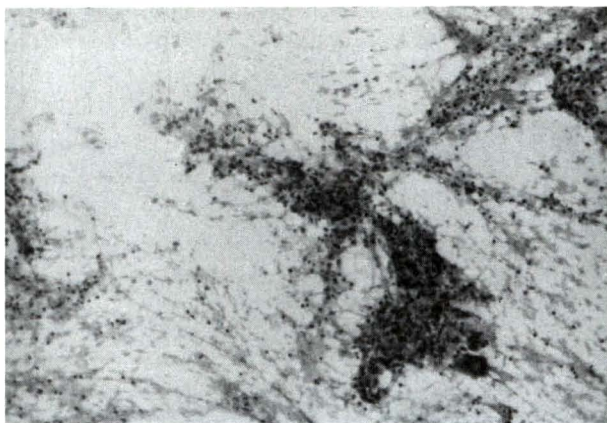


Figure 1. Principal cytologic feature showing the pattern of granuloma. Note Langhans giant cells at the left bottom of the cellular aggregate. (Pap. $\times 100$)

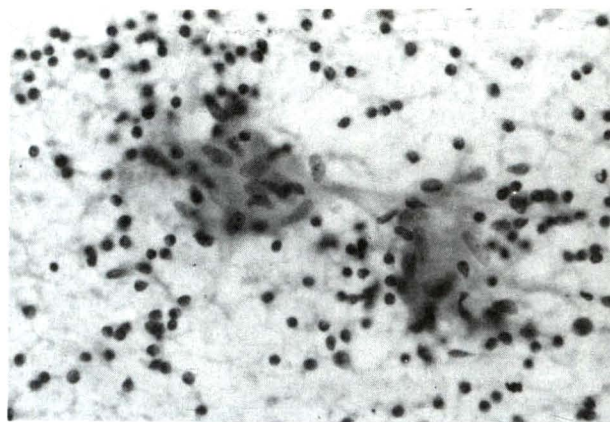


Figure 2. Principal cytologic feature showing clustering of epithelioid cells. Note the elongated and normochromatic nuclei. Cytoplasmic boundary is indistinct. (Pap $\times 600$)

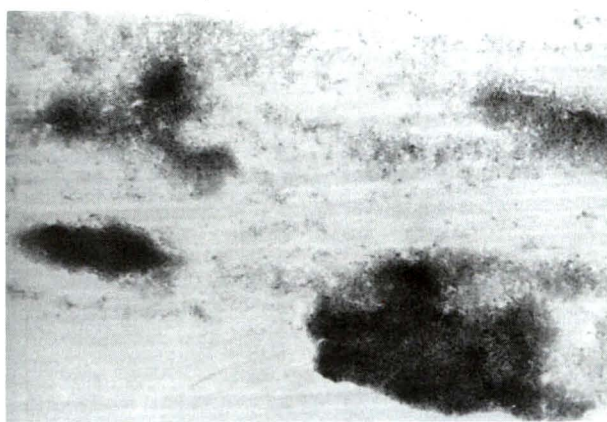


Figure 3 Principal background feature showing amorphous and trashy clumps corresponding to caseous necrosis. (Pap $\times 100$)

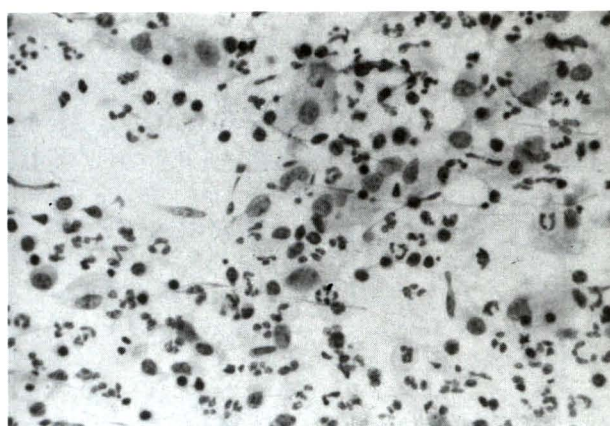


Figure 4. Subordinate cytologic feature showing a fair number of viable histiocytes admixed with neutrophils and lymphoid cells. (Pap $\times 600$)

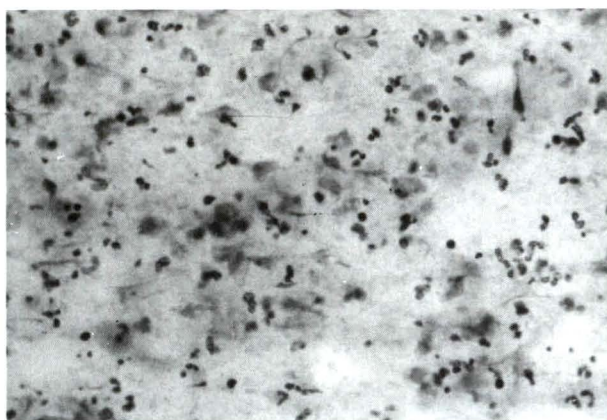


Figure 5. Subordinate cytologic feature showing necrotizing cellular debris. (Pap $\times 600$)



Figure 6. Subordinate background feature showing mixed inflammatory cells and necrotizing background. (Pap $\times 100$)

Discussion

In this study, most of the tuberculous lymphadenitis occurred in young adults and in the neck region. Thus, for practical purposes, a patient with neck lumps needs a complete examination of the oropharyngeal cavity, nasopharynx and larynx in addition to a characterization of the palpable masses. Knowledge about onset of illness as well as past history may be helpful in making a diagnosis. Chest roentgenography is usually requested. These investigations are aimed at ruling out primary cancer. When tuberculosis is considered, the problem will be to what extent the diagnostic procedures be implemented, i.e. does every suggestive lump need to be biopsied for tuberculosis? Since the disease is common in Thailand and there are many other helpful diagnostic means, namely tuberculin test, clinical history, characteristic and location of the masses and response to anti-tuberculous drugs, some physicians would consider a histopathologic examination as the last choice. Moreover, biopsy itself does not give a definite diagnosis of tuberculosis.⁽⁶⁾ Histopathology usually reveals granulomas with or without caseation.⁽⁶⁾ AFB positivity in sections has a yield as low as 18%.⁽⁷⁾ As far as microbiologic study is concerned, finding AFB on sections or smears is not definite proof of tuberculosis since other mycobacterium infections can also be the cause. Nevertheless, in routine practice, culture technique is too cumbersome and time-consuming to use in every case. In this context, clinicopathological features or therapeutic trial are practical means to help in making a final diagnosis.

FNAC opens a new avenue for diagnosing tuberculosis.^(8,9) It is simple, safe, speedy and non-traumatizing.^(8,10) This study implies the reliability of cytologic features and the way to make a cytodiagnosis. With regard to histopathology, smears with principal features suggest granulomatous inflammation. Caseous necrosis can be demonstrated. FNAC is useful because AFB positivity yields a higher percentage than sections; the number varies from 43 to 56%^(8,11) in the literature; for this study, AFB positivity was 45%. Additionally, the technique enables the remainder of the sample to be cultured which will give a definite diagnosis and increase the yield.⁽⁹⁾ Detection of AFB is more often in smears with necrotizing cellular background than in smears with epithelioid cell aggregate.^(9,11)

This fact helps to bridge the gap because subordinate features by themselves are non-specific. Therefore, when criteria for cytodiagnosis that is based on either the presence of epithelioid cell aggregate or AFB is utilized, many tuberculosis cases can be detected by FNAC.

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