Percutaneous Ultrasound-guided Fine Needle Aspiration of Abdominal Lymphadenopathy in AIDS Patients

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Objective : *To analyse the causes of abdominal lymphadenopathy in AIDS patients and evaluate the performance success rate,diagnostic yielding rate and safety of ultrasound(US)-guided fine needle aspiration (FNA).*

Material and Method : *Medical records of HIV seropositive with abdominal lymphadenopathy who underwent percutaenous US-guided FNA from August 1997 to January 2002 were retrospectively reviewed. Records of clinical and ultrasonographic findings, numbers of FNA performed, numbers of obtained specimen, laboratory results and postoperative problems were analysed. Performance success is defined as obtaining a specimen while diagnostic yielding is performance success with laboratory result.*

Results : *FNA was done 72 times in 71 patients obtaining specimens in 68 cases (performance success rate = 94.4 %) with positive laboratory result in 63 cases (diagnostic yielding rate = 87.5%). The culture gave results in 56 cases; M. tuberculosis(TB)=36, TB with other organisms = 5, Mycobacterium avium complex = 2, Nontuberculous mycobacterium =10, C.neoformans = 1,Salmonella with positive fungal stin= 1, E.coli with P. mirabilis =1. Five cases had positive AFB without culture specimen and one revealed positive AFB stain but negative culture. Lymphoma was found in only one case. No postoperative hemorrhage, peritonitis or perforated bowel in patient or needle stick injury to medical staff was reported.*

Conclusion : *Abdominal lymphadenopathy at Bamrasnaradura Hospital is mostly caused by TB and the second most common is nontuberculous mycobacterium. Percutaneous FNA under US guidance could yield definite diagnosis with a high performance success rate, high diagnostic yielding rate and was safe.*

Keywords : *Abdominal lymph node, Ultrasound, Needle aspiration, AIDS*

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Abdominal lymphadenopathy is one of the common problems in patients with Acquired Immune Deficiency Syndrome (AIDS) that may present alone or with other abnormalities. The precise etiology is often difficult to establish by physical examination, radiographic studies, and routine laboratory tests. Most of the cases at the Bamrasnaradura Hospital were diagnosed by presumptive means and some by lymph node biopsy via laparotomy. Percutaneous ultrasound-guided fine needle aspiration or core biopsy has long been used for the diagnosis of various abdominal masses including abdominal lymphadenopathy.[1-6] To the authors' knowledge, only a small number of AIDS patients with abdominal lymphadenopathy have under gone this procedure[7,8] and the significant data about accurate causes of abdominal lymphadenopathy in AIDS patients has not yet been published, particularly in Thailand.

The purpose of this study was to analyse the causes of abdominal lymphadenopathy in AIDS patients who underwent percutaenous ultrasound-guided fine needle aspiration at the Bamrasnaradura Hospital and to evaluate performance success, diagnostic yielding rates and the safety of the procedure.

Material and Method

The medical records of 71 HIV seropositive patients with abdominal lymphadenopathy who underwent percutaneous ultrasound-guided fine

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needle aspiration (FNA) from August 1997 to January 2002 were retrospectively reviewed. All FNA were done by a radiologist using a 20-gauge lumbar puncture needle under free-hand technique. Numbers of FNA performed, numbers of obtaining specimens, aspirated nodal size and laboratory results of aspirated abdominal lymph nodes and other organ tissue sampling were analysed. Clinical features, ultrasonographic findings other than abdominal lymphadenopathy and postoperative complications were also reviewed.

Performance success is defined as obtaining specimen and diagnostic yielding is defined as a positive laboratory result of the obtained specimen, either positive culture of staining.

Results

Seventy one patients (comprising of 51 males and 20 females with abdominal lymphadenopathy) underwent 72 times of percutaneous ultrasound guided fine needle aspirations, with the procedure being performed twice in one patient. Ages ranged from 19-48 years, with a mean age of 32 years. There were 62 heterosexuals, 4 homosexuals, and 5 intravenous drug users (heterosexual).

Most patients presented with fever, and abdominal pain; while other patients complained of diarrhea, nausea and vomiting, enlarged cervical node(s), abdominal mass, cough, headache, and skin papules. Duration of symptoms ranged from 1 week to more than 2 months.

Ultrasonographic findings other than abdominal lymphadenopathy are as follows; hepatomegaly (32 findings), hepatomegaly with hepatic nodules (3 findings), splenomegaly (27 findings), splenomegaly with splenic nodules (11 findings), and ascites (9 findings).

The aspirated lymph nodal sizes were 1 cm.-2 cm in diameter in 31 cases, 2 cm-3 cm in 18 cases and larger than 3 cm in 11 cases. There was no record of aspirated nodal size in 12 cases.

From 72 FNA procedures 68 specimens were obtained; giving a 94.4% performance success rate. There were 63 positive laboratory results (either positive culture, or staining) rendering an 87.5 % diagnostic yielding rate.

Features of specimens included pus, pus with blood, or frank blood. Following the FNA procedure there was no evidence of hemorrhage, peritonitis or perforated bowel in the patients and no needle-stick injury to any radiologist or assistant.

Positive laboratory results are listed in Table 1. Thirty six specimens showed Mycobaterium tuberculosis (TB) alone, and 5 specimens showed TB with other organisms; TB with Mycobacterium avium complex (MAC) and salmonella, TB with salmonella, TB with enterobacter, TB with Cryptococcal neoformans, TB with Penicillium marneffei. Two specimens revealed MAC, and 10 revealed non-tuberculous mycobacterium which were suspicious for MAC. One of each specimen showed Escherichia coli with Proteus mirabilis, positive budding yeast (?Histoplasma capsulatum) with salmonella, Cryptococcal neoformans and non-Hodgkin's lymphoma. Five cases having only positive AFB stain without adequate specimen for culture and 1 case with positive AFB stain but negative culture result showed clinical improvement after antituberculous drug administration.

Five cases with negative laboratory results were followed up; 2 cases were clinically improved after receiving antituberculous drugs, 1 case had repeated FNA by a physician resulting in positive AFB and was improved following antituberculous drug administration, 2 cases had loss of medical records after being discharged from the hospital. There were 21 cases having positive laboratory results from other organs corresponding to laboratory results from abdominal lymphadenopathy as shown in Table 2.

Table 1. Diagnostic yielding of specimens obtained from 72 performing percutaneous ultrasound-guided fine needle aspiration of abdominal lymphadenopathy

Laboratory results	Number of case(s)
Mycobacterium tuberculosis (TB)	36
TB with other organisms;	5
TB+ salmonella,	
TB+ enterobacter,	
TB+ Cryptococcal neoformans,	
TB+ Penicillium marneffei	
TB+ MAC + salmonella	
Mycobacterium avium complex (MAC)	2
Nontuberculous mycobacteria	10
Cryptococcal neoformans	1
Pos. budding yeast (?Histoplasma capsulatum) + Salmonella	1
Escherichia coli + Proteus mirabilis	1
Pos. AFB stain but Neg. culture	1
Pos. AFB stain (no specimen for culture)	5
Non - Hodgkin's Lymphoma	1
Negative culture or staining	5
* Totally obtained specimens	68

Table 2. Laboratory results , either culture or staining from other organ(s) corresponding to abdominal lymph nodes in 21 cases

Laboratory results from other organs		Laboratory results from abdominal lymph nodes	Number (cases)
Type of specimen	Lab. result		
Sputum	Pos. AFB stain	M. tuberculosis	2
sputum, stool	Pos. AFB stain	M. tuberculosis	1
sputum, stool, cervical node	Pos. AFB stain	M. tuberculosis	1
stool	Pos. AFB stain	M. tuberculosis	1
cervical node	Pos. AFB stain	M. tuberculosis	1
sputum, cervical node	Pos. AFB stain	M. tuberculosis	1
blood	M. tuberculosis	M. tuberculosis	4
stool	Pos. AFB stain	MAC	1
sputum	Pos. AFB stain	NTM	1
blood	NTM	NTM	1
cervical node	Pos. AFB stain	NTM	1
blood, stool, CSF	NTM	NTM	1
duodenal tissue	Suspected MAC	NTM	1
CSF	C. neoformans	C. neoformans	1
Blood	P.marneffei	P.marneffei	1
pleural effusion	M. tuberculosis	Pos. AFB stain	1
cervical node	budding yeast	budding yeast	
(?H. capsulatum)	(?H. capsulatum)		1

Note; M. tuberculosis = Mycobacterium tuberculosis, C. neoformans = Cryptococcal neoformans
P. marneffei = Penicillium marneffei, H. capsulatum = Histoplasma capsulatum
NTM = Nontuberculous mycobacterium, MAC= Mycobacterium avium complex

Discussion

In AIDS patients there are numerous causes of abdominal lymphadenopathy including lymphoid hyperplasia, lymphoma, Kaposi's sarcoma, or infection (such as tuberculosis). Each has a different treatment and prognosis; so correct diagnosis is needed for appropriate management and outcome.

According to this study, using percutaneous ultrasound guided fine needle aspiration technique, infection is the main etiology of abdominal lymphadenopathy in AIDS patients at the Bamrasnaradura Hospital, much more frequent than neoplastic groups.

In the infectious group Mycobacterium tuberculosis is the most common organism (73.5% of obtained specimens); as the authors found 41 cases by definite diagnosis, and 9 cases by presumptive or therapeutic diagnosis. The second most common organism is nontuberculous mycobacterium and is considered to be mycobacterium avium complex[9,10,11]. Limitations of culture techniques at the Bamrasnaradura Hospital for mycobacterium species caused limited identification of some organisms and incomplete laboratory results. Fungal and bacterial organisms are occasionally the causative agents of enlarged abdominal lymph nodes. Thus, if a minimal amount of specimen is obtained, requests for mycobacterial culture and sensitivity should be the first choice giving the best opportunity to get a diagnosis.

As found in only one case of lymphoma from 71 cases the authors suggest that in Thailand specimens cytology is unnecessary in routine laboratory requests, except for clinically, or sonographically suspected of neoplasms. The authors reviewed ultrasonographic findings of a lymphoma case where the abdominal masses appeared bulky enlarged with hyperechoicity; quite different from other abdominal lymphadenopathy that is caused by infection which usually shows small to moderate in size with hypoechoicity. However, this study was performed in Thailand where the prevalence of infection and neoplasm would be different from other countries (particularly Western countries)[12]. Thus, the authors recommendation about cytologic requests is also to take different population groups into consideration.

The performance success rate of percutaneous ultrasound guided fine needle aspiration in the present study is quite high (94.4%), presumably resulting from selecting the appropriate node for aspiration; a larger node or node not less than 1cm diameter in size, having central necrosis, looking more hypo-echoic, and located not too deep. The authors experienced that in 4 unsuccess ful performances the abdominal lymph nodes were quite small, around 1 cm. in diameter, or with no necrosis. In addition, not all cases of abdominal lymphadenopathy were

included in the present series. There were 566 AIDS patients with abdominal lymph node enlargement detected by ultrasonography during the study period. Had US-guided FNA been performed in most of the 566 cases it is considered the performance success rate would also be changed.

The diagnostic yielding rate is also high (88.4%), the authors experienced that even minimal specimens obtained in needle lumen could render positive laboratory results. In the authors experience the technique of several, minute punctures and aspirations with the tip of the needle either in or near the central part of non-necrotic node helps to obtain more amounts of specimen.

Percutaneous US-guided FNA was performed without reports of postoperative complications to the patients or needle stick injury to any radiologist and technical staff indicating the safety of these performances. The number of laparotomy for lymph node biopsy cases in Bamrasnaradura Hospital decreased from 5 cases from 1994 to 1998 to only 1 case from 1999 to 2002, thus, greatly reducing the risk of contact to surgical staff with infected blood, postoperative complication, and cost of procedure and hospitalization. In addition, there were a few cases which had to be performed and observed in the outpatient department because of the lack of available in-patient beds.

Eventhough percutaneous ultrasound guided fine needle aspiration of abdominal lymphadenopathy is a useful method to establish diagnosis, technical skill of the operator is still required to achieve the procedure. According to the data there are 21 cases who had positive laboratory results from other organs corresponding to that from abdominal lymph nodes. So, percutaneous ultrasound guided fine needle aspiration may be unnecessary after considering other organ tissue sampling.

In conclusion, abdominal lymphadenopathy in AIDS patients at the Bamrasnaradura Hospital is mostly caused by Mycobacterium tuberculosis with, or without, other organisms. Nontuberculous mycobacterium (presumable Mycobacterium avium complex) is the second most common agent. Percutaneous ultrasound guided fine needle aspiration of abdominal lymphadenopathy can be performed instead of laporatomy for lymph node biopsy because of its high performance success rate, high diagnostic yielding rate and safety to the patient or medical staff.

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การใช้เข็มเจาะดูดต่อมน้ำเหลืองโตในช่องท้องในผู้ป่วยเอดส์ โดยใช้เครื่องอัลตร้าซาวด์ช่วยนำ

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เนื่องจากปัญหาต่อมน้ำเหลืองในช่องท้องโต พบได้ไม่น้อยในผู้ป่วยเอดส์ ซึ่งเกิดได้จากการติดเชื้อชนิดต่าง ๆ หรือ เป็นเนื้องอก และในช่วงเวลาที่ผ่านมาการวินิจฉัยมักได้จากการคาดเดาโดยอาศัยผลการตรวจอวัยวะอื่น หรือการผ่าตัดเปิดช่องท้องเพื่อตัดชิ้นเนื้อส่งตรวจทางพยาธิวิทยา คณะผู้วิจัยจึงได้ทำการศึกษาโดยรวบรวมแฟ้มประวัติผู้ป่วยเอดส์ที่มีต่อมน้ำเหลืองโตในช่องท้อง และได้รับการเจาะทางหน้าท้องด้วยเข็มขนาดเล็ก เพื่อดูดต่อมน้ำเหลืองโดยใช้เครื่องอัลตร้าซาวด์ช่วยนำ ช่วงตั้งแต่เดือนสิงหาคม 2540 ถึงเดือนมกราคม 2545 ในโรงพยาบาลบำราศนราดูร ซึ่งมีผู้ป่วยทั้งหมด 71 ราย เพื่อวิเคราะห์สาเหตุของต่อมน้ำเหลืองโต, ประเมินอัตราความสำเร็จของการเจาะดูด, อัตราการได้ผลบวกของสิ่งส่งตรวจและภาวะแทรกซ้อนของการเจาะท้องอยู่โดยบันทึกจำนวนครั้งทั้งหมดของการเจาะดูดต่อมน้ำเหลือง, จำนวนครั้งที่เจาะดูดได้สำเร็จ, ผลตรวจจากห้องชันสูตรของต่อมน้ำเหลืองในช่องท้องและสิ่งส่งตรวจจากอวัยวะอื่น และข้อมูลทางคลินิคอื่น ๆ ของผู้ป่วย ผลจากการศึกษาพบว่าผลชันสูตรต่อมน้ำเหลืองโตนั้น เพาะเชื้อขึ้น 56 ราย เป็น M.tuberculosis มากที่สุด 41 ราย (พบร่วมกับเชื้ออื่น 5 ราย) รองลงมาเป็น Nontuberculous mycobacteria 10 ราย, M.avium complex 2 ราย, C. neoformans 1 ราย, Salmonella + positive fungal stain 1 ราย, E. coli + P.mirabillis 1 ราย ส่วนชิ้นเนื้อที่เพาะเชื้อไม่ขึ้น 6 ราย ย้อม AFB ได้ผลบวกและพบ 1 รายเป็น Lymphoma อัตราความสำเร็จของการเจาะดูด = 94.4 %, อัตราการได้ผลบวกของสิ่งส่งตรวจจากช่องท้อง = 87.5% และไม่พบภาวะแทรกซ้อนด้านการตกเลือด ลำไส้ทะลุ หรือ การติดเชื้อ ผลจากการศึกษาครั้งนี้สรุปได้ว่า ในผู้ป่วยโรคเอดส์ที่มีต่อมน้ำเหลืองโตในท้องส่วนใหญ่มีสาเหตุมาจากติดเชื้อโดยเฉพาะเชื้อ M. tuberculosis และ Nontuberculous mycobacteria การวินิจฉัยด้วยการใช้เข็มเจาะดูดต่อมน้ำเหลืองจากทางหน้าท้องโดยใช้เครื่องอัลตร้าซาวด์ช่วยนำสามารถให้ผลตรวจด้วยอัตราสูง และมีความเสี่ยงจากปัญหาแทรกซ้อนน้อยมาก จึงเป็นวิธีที่ช่วยทดแทนการผ่าตัดเปิดช่องท้องเพื่อตัดชิ้นเนื้อต่อมน้ำเหลืองได้