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Fine Needle Aspiration Cytology: Compatibility with Final Diagnosis and Complications

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Objective: The aim of this study is to assess the diagnostic result of FNAC and its compatibility with final diagnosis and complications.

Method: One hundred and ninety three referred for fine needle aspiration cytology between September 1996 to March 2000, out of which only 87 records were recovered and studied with reference to age, sex, site, repetition of aspiration, compatibility with final diagnosis and complications following the procedures.

Results: Eighty seven (45%) reports were studied. Seventy (80.5%) aspirations were done under CT guidance and 17 (19.5%) under US guidance. Fourteen aspirations under CT guidance were repeated, 13 were repeated once while one was repeated 3 times due to insufficient material. The commonest aspirated system was the chest (40 patients), followed by the liver 12, pancreas 9, vertebrae 7, long bones 5, kidney 4, neck 3, omentum 3, pelvis 2 psoas muscle 1, and breast 1. The yield for correct diagnostic pathology was 69%.

Conclusion: Image-guided fine needle aspiration has an essential role for establishing tissue diagnosis. In this study fine needle aspiration corresponded with the final diagnosis in 69% of patients. Few minor complications were encountered.

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Fine needle aspiration cytology (FNAC) is a safe, relatively inexpensive and minimally invasive procedure. The main goal is to help the clinician in the management of patients who present with abnormal mass. Knowing beforehand if a lesion is likely to be benign or malignant will aid in planning of surgery or other therapies[1]. Biopsy is the ultimate technique to confirm diagnosis and staging of tumours. Both open and closed biopsy techniques are invasive. FNAC is less invasive and has fewer risks and complications. Clinical, radiological findings and cytological features obtained from FNAC may prevent the use of more invasive diagnostic procedures[2]. FNAC can also be beneficial in evaluating

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complications like haemorrage and excluding malignancies in cystic diseases of the abdomen[3]. FNAC has become one of the commonly requested procedures by clinicians. The procedure is performed by the radiologist under fluoroscopic, ultrasonic (US) or computed Tomography (CT) guidance. The aim of this study is to assess the diagnostic result of FNAC and its compatibility with final diagnosis and complications.

METHODS

One hundred and ninety three FNACs were performed between September 1996 to March 2000. Only 87 records were recovered. Spinal needle 22G was used for aspiration, which was done under local anesthesia. The procedure was performed by the radiologist. If insufficient material for definite diagnosis was obtained, the procedure was repeated. Patients were monitored for complications during and after the procedure for three hours.

RESULTS

Only 87 records of the patients who underwent FNAC in the department were traced. More than half (106) were lost. There were 44 females and 43 male patients, age ranged between 2 and 81 years with a mean of 43.5. Seventy (80.5%) aspirations were done under CT guidance and 17 (19.5%) under US guidance. Fourteen aspirations under CT guidance were repeated, 13 were repeated once, while one was repeated 3 times due to insufficient material.

The commonest aspirated system was the chest (40 patients), followed by the liver 12, pancreas 9, vertebrae 7, long bones 5, kidney 4, neck 3, omentum 3, pelvis 2 psoas muscle 1, and breast 1. Eight patients developed pneumothorax after aspiration of chest lesions. These were managed conservatively except for one patient who had to have an intrathoracic chest tube. The cytology of the 87 patients included in this study, corresponded with the diagnosis in 60 patients (69%).

Three patients had an open biopsy as no specific diagnosis was achieved.

DISCUSSION

The usefulness of fine needle aspiration cytology in achieving the diagnosis of lung lesions is well documented[4]. The majority of FNAC were for lung lesions. Few complications like pneumothorax were encountered (8 patients 20%), one needed a chest drain (2.5%). Li et al reported that the prevalence of pneumothorax and chest tube placement were 21% and 2% respectively[5].

Dahlstrom et al studied 286 patients with pulmonary lesions diagnosed by FNAC, the study showed that image guided FNAC has a sensitivity of 92% and specificity of 96%[6]. In this study the image guided FNAC sensitivity is 69%. Guo reviewed 119 percutaneous, radiologically guided fine-needle aspirations,114 patients had liver masses. It proved that the sensitivity and specificity of FNAC for malignancy was 95.1% and

100% respectively. Therefore, he concluded that FNAC is safe and effective for determining the malignant potential of liver masses and should be the procedure of choice. He also stressed that having a pathologist present in the radiology suite provides optimal circumstances to insure the adequacy of the sample taken[7]. To be more precise some advocate the use of endoscopic ultrasound guided fine needle aspiration for pancreatic lesions as for islet cell tumours rather than under CT guidance[8].

FNAC could help in reaching diagnosis in many difficult situations, for example, deeply seated lymph nodes in the thoracic, retroperitoneal or abdominal region. These can be accessed and aspirated under US or CT guidance[9]. The technique yields sufficient material to assess the molecular nature of some tumours, such analyses are of prognostic significance because tumour behavior and response to therapy can be predicted[10].

This study reports on 87 patients that underwent FNAC. The commonest aspirations are of chest and abdominal lesions.

Forty five percent (45%) of the reports were studied, the rest could not be traced probably due to misplaced files. The available cytology results corresponded to the clinical diagnosis in 60 Patients (69%), only 3 patients had to have open biopsy to reach the diagnosis. FNAC was repeated in 14 patients (16%), 13 had to have a second aspirate and only one patient had to be repeated 3 times. Repetition can be avoided by the presence of the cytologist during the session of FNAC in order to review the slides under the microscope.

Although FNAC is widely used in the radiology department, we have noticed that few neck and breast aspirations were done but not documented. Aspiration cytology under US or CT guidance should be encouraged especially for neck tumours as reports have shown FNAC to have a high sensitivity and specificity in neck tomours[11,12]. It is important that FNAC is obtained from solid areas of thyroid nodules. Using US guidance, the cystic areas seldom provide adequate material when aspirated due to degeneration[12].

It is shown that in breast lesions even if FNAC is obtained, it is important to be able to compliment cytological diagnosis with core biopsy, as there are indisputable advantages[13], for example, in the diagnosis of mammographically detected microcalcification. FNAC and core biopsy are efficient alternatives to surgical biopsy in non palpable breast lesions[14].

FNAC provides a sampling of cells and it is cost effective. The main limitations are insufficient sampling rate and inability to diagnose invasion. Core biopsy allows architectural description and the diagnosis of benign and malignant lesions, but it is more expensive and time consuming[14].

CONCLUSION

In this study FNAC corresponded with the final diagnosis in 69% of patients. Few minor complications have been encountered. Image-guided FNAC has a pivotal

role for establishing tissue diagnosis. It is also helpful and accurate in follow up of patients with a known malignant disease, thereby avoiding surgical intervention. If FNAC fails to provide accurate tissue diagnosis, an open biopsy would be the following step.

REFERENCES

1. Schindler S, Nayar R, Dutra J,et al. Diagnostic challenges in aspiration cytology of the salivary glands. Semin Diagn Pathol 2001;18:124-46.
2. Koh JS, Chung JH, Kweon MS, et al. Fine needle aspiration Cytology of late-stage callus in stress fracture. A case report. Acta Cytol 2001;45:445-8.
3. Silverman JF, Prichard J, Regueiro MD. Fine needle aspiration cytology of a pancreatic cyst in a patient with autosomal dominant polycystic kidney disease. A case report. Acta Cytol 2001;45:415-9.
4. Bakshi NA, Volk EE. Pulmonary mucormycosis diagnosed by fine needle aspiration cytology. A case report. Acta Cytol 2001;45:411-4.
5. Li H, Boiselle PM, Shepard JO, et al. Diagnostic accuracy and safety of CT-guided percutaneous needle aspiration biopsy of the lung: comparison of small and large pulmonary nodules. AJR Am J Roentgenol 1997;168:1111-2.
6. Dahlstrom JE, Langdale-Smith GM, James DT. Fine needle aspiration cytology of pulmonary lesions: a reliable diagnostic test. Pathology 2001;33:13-6.
7. Guo Z, Kurtyez DF, Salem R, et al. Radiologically guided percutaneous fine-needle aspiration of the liver: Retrospective study of 119 cases evaluating diagnostic effectiveness and clinical complications. Diagn Cytopathol 2002;26:283-9.
8. Jhala D, Eloubeidi M, Chhieng DC, et al. Fine needle aspiration biopsy of the islet cell tumor of the pancreas: A comparison between computerized axial tomography and endoscopic ultrasound-guided fine needle aspiration biopsy. Ann Diagn Pathol 2002;6:106-12.
9. Nahar Saikia U, Khirdwadkar N, Saikia B, et al. Image-guided fine-needle aspiration cytology of deep-seated enlarged lymph nodes. Acta Radiol 2002;43: 230-4.
10. Frostad B, Martinsson T, Tani E, et al. The use of fine-needle aspiration cytology in the molecular characterization of neuroblastoma in children. Cancer1999;87:60-8.
11. Hee CG, Perry CF. Fine-needle aspiration cytology of parotid tumours: is it useful? ANZ J Surg 2001;71:345-8.
12. Court-Payen M, Nygaard B, Horn T, et al. US-guided fine-needle aspiration biopsy of thyroid nodules. Acta Radiol 2002;43:131-40.
13. Litherland JC. Should fine needle aspiration cytology in breast assessment be abandoned? Clin Radiol 2002;57:81-4.
14. Meunier M, Clough K. Fine needle aspiration cytology versus percutaneous biopsy of non palpable breast lesions. Eur J Radiol 2002;42:10-6.