ORIGINAL ARTICLE

YIELD OF ULTRASOUND GUIDED FINE NEEDLE ASPIRATION CYTOLOGY

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ABSTRACT

OBJECTIVE: To evaluate the yield of ultrasound guided FNAC and to identify the areas of improvement. **MATERIALS and METHODS:** The study was conducted at the Radiology department Aga khan University. Study required review of medical records, was conducted from Nov. 2006 to Jan. 2007. All patients underwent fine needle aspiration cytology of different organs like thyroid, breast, liver etc. A data was analyzed to evaluate the yield and the areas of improvement for ultrasound guided FNAC. Histopathological results were reviewed and percentage of positive samples was calculated. Areas of improvement were identified. The steps were taken to improve upon the weak areas and the yield. The second prospective study was from Feb. 2007 to May 2007 conducted to determine change. The patients in this phase were selected independent of the first phase. **RESULT:** In the first phase, initially records of 55 patients qualified to be included in the study retrospectively; however final study included 48 patients as records of seven patients were incomplete. The positive yield of ultrasound guided FNAC in the first phase was 89%. In the second phase, a prospective study was conducted on 61 patients. After implementation of identified changes, the positive yield increased to 100% in the second phase. **CONCLUSION:** The audit shows that the yield of ultrasound guided FNAC can be improved significantly by implementing identified changes in the system, thus reducing cost, time and anxiety of patient as well as Radiologist who did the procedure.

KEY WORDS: Ultrasound, FNAC

Introduction

In medicine, ultrasound is used to detect changes in appearance of organs, tissues, and vessels or detect abnormal masses, such as tumors, whether the object is solid or filled with fluid or both. When a nodule is palpable - meaning, we can feel it with our hand - most practitioners do not need to use ultrasound to guide the FNA process. Some nodules are very low lying or cannot be felt but were picked up by ultrasound. In these cases, a practitioner may use ultrasound to ensure that the FNA is accurately performed. For Fine Needle Aspiration (FNA), use a very small needle to extract fluid or cells from the abnormal area. In a fine needle aspiration, a fine gauge needle and a syringe withdraw fluid or clusters of cells. That depends on the skill of the practitioner, our own perceptions of pain. Some practitioners will use a local anesthetic, to numb the injection site. However, patients complain that this can hurt more than the actual FNA procedure. It is now widely accepted as a safe diagnostic procedure in various neoplastic and non-neoplastic disorders of various neck, thyroid, breast, liver, abdominal and pelvic lesions. Ultrasound-guided fine-needle aspiration biopsy seems to be a promising technique for the diagnosis of bone lesions also.

Aspiration cytology is the study of cells, obtained by a fine needle puncture. It is not a recent development. It was pioneered by Martin and Ellis and by Stewart (as quoted by Rowley and Cooperberg) in New York in the early 1930s. However, the technique was ignored for several decades though it was being assessed in Scandinavia. Cytotechnologist assist in the radiological suite by preparing the cytological smear, rapidly staining the slide(s) and making a rapid determination of the adequacy of each needle puncture sample. The radiologist uses this information to determine if another

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puncture is required for assessment of the lesion or target in question. A pathologist examines the removed specimen and makes a final diagnosis, made only from plentiful tissue samples, which permit the pathologists to determine intercellular relationships There are several reasons for the delay in the acceptance of FNAC in our country; prominent amongst them would be that, few pathologists were skilled in cytological interpretations, while most believed that diagnosis could be made only from plentiful tissue samples, which permit the pathologists to determine intercellular relationships. The results from FNA will fall into the following breakdown: Benign 70%, Malignant 5%, Suspicious 10%, Non diagnostic 15%.

Needle core biopsy is different from FNA, in a core biopsy a thicker, large needle is used to obtain a "core" tissue sample for analysis, and the larger sample that can be recut for smaller samples that can be sent out for further analysis. Needle biopsies are typically done using local anesthesia, and these procedures have slightly greater risk of bleeding associated with them. Benefits of FNA are the procedure is less invasive than surgical biopsy, leaves little or no scarring and can be performed in less than an hour, ultrasound imaging uses no ionizing radiation, ultrasound-guided biopsy reliably provides tissue samples that can show whether a benign or malignant, with ultrasound it is possible to follow the motion of the biopsy needle as it moves through the tissue, it is less expensive, recovery time is brief and patients can soon resume their usual activities.

Risks of FNA are any procedure where the skin is penetrated carries a risk of infection. The chance of infection requiring antibiotic treatment appears to be less than one in 1,000. Doing a biopsy of tissue located deep within the breast carries a slight risk that the needle will pass through the chest wall, allowing air around the lung that could collapse a lung. This is a rare occurrence. Biopsy procedures will occasionally miss a lesion or underestimate the extent of disease present. If the diagnosis remains uncertain after a technically successful procedure, surgical biopsy will usually be necessary.

Repeat procedures were cause discomfort, apprehension and wastage of time to both patient and staff. It also disturbed our scheduled patients and cause unnecessary waiting time. Therefore, the purpose of this study was to evaluate the yield of ultrasound guided FNAC and to identify the areas of improvement. Moreover, after implementing the changes indentified during audit, the change in the yield of FNAC was also determined.

Material and Methods

This is a prospective and retrospective cross sectional study conducted in ultrasound suite of radiology department Aga khan university hospital Karachi Pakistan from October 1st, 2006 to May 1st, 2007. Convenient sampling was employed. All the patients underwent fine needle aspiration cytology of different organs like, thyroid; breasts, neck and liver are selected for the study. The data was analyzed to determine the yield and areas of improvement in ultrasound guided FNAC. There were 116 number of patients were selected. Inclusion criteria were patients were selected from all age groups and irrespective of gender; it includes residents and Radiologist both. Exclusion criteria was bone lesion FNA was not included because we are not doing it and exclude only those patients who had no contact numbers after biopsy.

Data was collected in two phase In First phase: Initially records of 55 patients qualified to be included in the stud retrospectively; from October 2006 to January 2007. However, final study included 48 patients, as records of seven patients were incomplete. Cytopathology results were reviewed and percentage of positive samples was calculated. Operational definitions were those patients who had no contact numbers after biopsy called as incomplete patients, because in first phase, our study was retrospective and we were not sure about their results and Patients called from their homes again if tissues were inadequate were called recall.

These variables were included, we searched that either Radiologist or residents were incompetent, assistant who made slides were incompetent, patients were uncooperative or selection of needles were improper. Areas of improvement were identified and the steps were taken to improve upon the weak areas and yield. These steps of improvement were taken, resident did FNAC under supervision, cytotechnologist called for slide making, we did only those patients who were

cooperated and willing, needle selection was same according to different organs and size we do it and we did not recall patients from home and patient lied until confirmation from cytology.

After implementation of identified changes, re audits it. In the second phase: The second prospective audit was conducted on 61 patients; audit was from February 2007 to May 2007 to determine change. The patients in this phase were selected independent of the first phase.

Results

There were 116 patients selected in this study. In the first phase, a retrospective study was conducted on 55 patients; however final study included 48 patients, as records of seven patients were incomplete. The positive yield of ultrasound guided FNAC in the first phase was 89%. In the second phase, a prospective study was conducted on 61 patients. After implementation of identified changes, the positive yield increased to 100%.

A major improvement was identified that we did not recall patients from home and patient lied until confirmation from cytology. It saved patient and radiologist time and discomfort.

Discussion

US guided FNAC is a rapid, accurate, economical and safe diagnostic procedure that can be used in various neoplastic and non- neoplastic diseases. As diagnosis is rapidly available on FNAC, appropriate medical or surgical therapy can be started earlier, at a same time avoiding unnecessary, expensive and often invasive diagnostic procedures and needles surgery. Our study clearly showed the repeat examination was (11%) compare to international published studies (10%). Procedure repeat rate described in literature ranges from 6% thyroid to 10% and our procedure repeat rate was 11% in higher limits. Study done by Kedar RP, his study showed sensitivity (percentage of patients with a positive lesion who had positive FNAC) of 90.75%. The total failure rate was 9.25%. This included (a) inadequate lesion samples, (6.07%), and (b) inability in cytological interpretation (3.18%). Repeat procedures were mostly due to either Radiologist or residents were incompetent, assistant who made slides were incompetent, patients were in cooperated or selection of needles were not proper.

Conclusion

The study showed that the yield of ultrasound guided FNAC improved significantly by implementing identified changes in the system, thus reducing cost, time and anxiety of patient as well as Radiologist under going the procedure.

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