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RESEARCH ARTICLE

Accuracy of Ultrasound Guided Fine Needle Aspiration Cytology in Head and Neck Lesions

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Abstract

Background: Palpable superficial mass (es) is a major complain making patients attending any surgical and otolarygeal clinic. Most of these lesions are related to thyroid, cervical lymph nodes or salivary glands Triple assessment technique using clinical examination, ultrasound and cytology are usually sufficient in reaching the final diagnosis especially in specialized surgical centers. **Aims:** The objective of this study was to assess how accurate ultrasound in guessing the diagnosis of the lesion and how accurate as a guide for fine needle aspiration cytology (FNAC). **Methods:** A prospective study included 50 patients who were presented with self-detected head or neck lump and attending the specialized surgical clinic in the Medical City Complex, Baghdad during the period from November 2019 to October 2020. Their age ranged from 10-63 years. Patients were underwent ultrasound examination after clinical examination and then subjected to ultrasound guided FNAC. **Results:** Twenty patients presented with palpable lump were included in this study. Their ages ranged between 10 to 63 years (mean age 37.8 years). Regarding the distribution of the anatomical locations the majority of the lesions were lymph nodes (7/20) six of them are cervical and one of them was inguinal, the 2nd common location was the parotid gland seen in four out of twenty, The provisional diagnosis provided by ultrasound for lococregional pathology was benign in majority of Lymph node group (5/7) and malignant in two, three out of four parotid lesions are benign and all thyroid cases are also benign, The FNAC results in correlation with ultrasound findings are in concordance regarding the lymph nodes and parotid aspirates in 100% while thyroid aspirate was in concordance in 100% after two passes due to bloody aspirate, the aspirate from the breast is 50% in line and no concordance seen in 50 %, the aspirate is compatible regarding the hip mediastinum and sternomastoid while is not conclusive in lung aspirate. The accuracy of ultrasound in guiding the needle for targeting the lesion is 100%, and overall accuracy of ultrasound in reaching the final diagnosis is 85% with 100 % sensitivity. **Conclusion:** Ultrasound guided FNAC represents a reliable interventional radiology modality for targeting the needle to any superficial or ultrasound reachable deep seated head and neck lesion and considered a recommended method for assessment of underlying cause responsible for palpable head and neck mass this is due to reliable focusing the mass lesion, avoiding nearby vital organ or vessel and direct real time visualization of the needle within the lesion and by that sampling cells by flickering the needle within the lesion.

Keywords: Baghdad- head and neck ultrasound- ultrasound guided fine needle aspiration cytology

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Introduction

In certain circumstances, the Clinical examination of head and neck masses can be difficult, because of the confusing location of the lesion [1]. Most frequently these lesions either enlarged lymph nodes, thyroid gland nodules, or salivary gland related lesions. On rare circumstances being thyroglossal duct cysts, glomus tumors of carotid, jugular or vagus nerve [2]. The clinical diagnosis of neck masses is based on clinical history obtained from the patients and data collected from physical examination. Then further diagnosis and management of neck masses

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can include ultrasound, computed tomography, fine-needle aspiration, or even biopsy [3].

Ultrasound is a safe method of diagnosis due to lack of ionizing radiation, very useful in superficial organs like neck, breast and testicle, its working in real time making it operator dependent and ease local intervention procedure [4].

FNAC is a cheap, simple, quick, and worthy procedure. It was performed either with or without imaging guiding, the latter was being real time, and it gives clear details regarding the nature of the imaged lesion. The technique has very little or even no contraindications and complications, and it is suitable for use in an widespread clinical settings [5,6]. It can give precise data for the diagnosis of head and neck masses by discriminating malignant from inflammatory lesions and both had different treatment protocols [7]. Effortlessly, FNAC should be performed before surgical for most cases of query cervical or head masses, as the cytological results can help further future management [1], over the world, FNAC is broadly used and recognized maneuver in the diagnosis of thyroid and breast lesions [8,9].

We aimed from this study is to access how accurate is ultrasound in guessing the nature of lesion and how accurate is ultrasound guidance in giving adequate cell for cytology.

Materials and Methods

Patients

This was a prospective study that enrolled 20 patients who complained of palpable head, neck, breast and groin masses referred from the specialized surgical clinic to interventional Radiology clinic in martyr Ghazi Alharriri and Baghdad Teaching Hospitals, Medical City Complex, Baghdad during the period from November 2019 to October 2020. Their age were between 10-63 years.

All patients after clinical examination by a specialist surgeon were referred for ultrasound examination which was performed by a specialist radiologist using GE Voluson E6 machine. The scanning was performed using 7-12 megahertz linear transducer. The ultrasound examination of the Patients was performed by asking the patient to lie flat on the couch with desired region fully exposed, the mass was assessed for it location, size, and vascularity and these parameters were all documented.

Next step was FNAC which was performed under ultrasound guide by specialist Radiologist.

After sterilizing the area of interest using povidone iodine with probe being covered by sterilized nylon, using 22\23 Gauge needle, in plane approach was used in all cases, once the needle is within the lesion multiple to and fro motions were used until blood stained material seen within the needle hub, one to three attempts were used in each patient according to material gained after each pass. Then the aspirate was smeared on the slides, immerged in absolute alcohol jar and then stained by Papanicolaou and examined cytologically for presence of any abnormal cells and results correlation were done.

Results

Twenty patients presented with palpable lump were included in this study. Their ages ranged between 10 to 63 years (mean age 37.8 years). The details about patients' age are shown in Figures 1.

Regarding the distribution of the anatomical locations the majority of the lesions were lymph nodes (7/20) six of them are cervical and one of them was inguinal, the 2nd common location was the parotid gland seen in four of twenty, the remaining locations were illustrated in the Table 1.

The provisional diagnosis provided by ultrasound for lococregional pathology was benign in majority of Lymph node group (5/7) and malignant in two, three out of four parotid lesions are benign and all thyroid cases are also benign, further details regarding the ultrasound findings are demonstrated in Table 2.

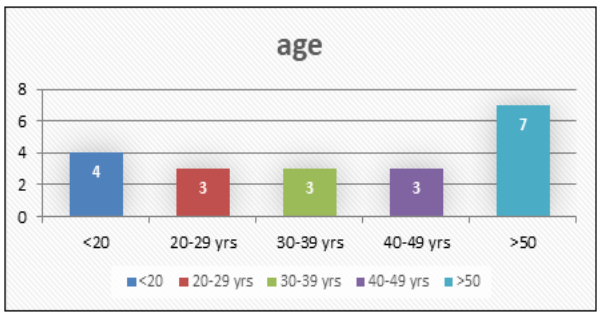

Figure 1. Age Distribution of the Study Population

Table 1. Locoregional Distribution of the Study Sample

		No.(Percent)
Lymph nodes	Cervical	6 (30)
	Inguinal	1 (5)
Parotid		4 (20)
Thyroid		3 (15)
Breast		2 (10)
Other *		4 (20)
Total		20 (100)

*One case is from sternomastoid muscle, one from hip effusion, 1 from the lung and last one is from mediastinum

Table 2. Ultrasound Results According the Locoregional Pathology

Region		Ultrasound findings	%
Lymph nodes		Benign	5 (71)
		Malignant	2 (29)
Parotid		Benign	3 (75)
		Malignant	1 (25)
Thyroid		Benign	3 (100)
Breast		Malignant	2 (100)
Other	Hip	Benign	1 (25)
	Lung	Benign	1 (25)
	Mediastinal	Malignant	1 (25)
	Sternomastoid	Benign	1 (25)

Table 3. Validity Test of Ultrasound in Diagnosis of Benign Regional Lesions in Correlation with FNAC Results

	FNAC		Total
Ultrasound	Positive	Negative	
Positive	12	3	15
Negative	0	5	5
Total	12	8	20
Sensitivity (%)		100	
Specificity (%)		62	
Negative predictive value (%)		100	
Accuracy (%)		85	

The FNAC results in correlation with ultrasound findings are in concordance regarding the lymph nodes and parotid aspirates in 100% while thyroid aspirate was in concordance in 100% after two passes due to bloody aspirate, the aspirate from the breast is 50% in line and no concordance seen in 50 %, the aspirate is compatible regarding the hip mediastinum and sternomastoid while is not conclusive in lung aspirate

The accuracy of ultrasound in guiding the needle for targeting the lesion is 100%, however the accuracy of ultrasound in reaching the final diagnosis was illustrated in Table 3.

Discussion

FNAC is a simple, Safe, rapid and easy method in sampling cells for cytology especially for focal superficial lesion, as well as it is relatively cheap when compared to the core needle biopsy [10,11]. In Iraq FNAC remains the first choice in evaluating any suspicious breast lesion detected by ultrasound or mammography and can plan for future management of the breast cancer [12]. Nevertheless, drawback for FNAC include difficulty in giving the precise histopathlogy, difficulty in differentiation ductal from lobular breast carcinoma in poorly differentiated cases and the providing the hormonal receptors and HER2 status if the aspirated samples are insufficient [13].

The accurate diagnosis requires the availability of competent radiologist or interventional radiologist; skilled in aspiration and targeting the lesion, as well as availability of high resolution ultrasound probe and qualified ultrasound machine, finally well trained cyto-technicians to ensure the preparation of quality smears [14,15]. In our study there was high concordance between the ultrasound guiding and FNAC results with 100% targeting the lesion by the needle, the explanation to that is 1st due to that the FNAC was done by subspecialist intervention radiologists who are skilled in ultrasound guided procedures including biopsy and aspiration and 2nd reason was the technique utilized which is the use of in plain method ultrasound technique where the probe is parallel to needle and this allows visualization of the needle from skin down to the lesion [16].

In our study ,most of sample aspirated yield sufficient material in most of the cases, except for the thyroid lesions were 3 attempts was performed in two of three patient due to vascular nature of solid thyroid nodule resulting in bloody smear ,this was solved by increasing the needle gauge to 23 and minimize the moving within the lesion, in other hand the aspiration from two lymph nodes lesion gave insufficient cells due to texture of Lymph node in these cases multiple to and fro passes with negative pressure was done and this solves the problem, the cytological results reveals normal cellular pattern [17,18].

The sensitivity of ultrasound in detection of lesion pathology as benign or malignant was 100% while the specificity was 62% and overall accuracy was 85% , That was in concordance with results by Alina Iacob etal, Wilkinson AR etal, Anne S and Hafez NH etal who reported the following Sensitivity between 82.14% and 95%, and a Specificity of 62.7% to 100% [19-22].

In conclusions, ultrasound is an efficient, cost effective, tool for guiding FNAC from superficial lesions; being lacking of ionizing radiation and when performed by professional, well trained radiologists the results are highly accurate. This is usually enforced by major role of thorough history, proper clinical examination and competent cytology all are of utmost importance in yielding a high productive and precise diagnosis.

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