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ACCURACY OF IMAGE-GUIDED TRU-CUT BIOPSY IN THE DIAGNOSIS OF PEDIATRICS TUMORS IN BASRA, IRAQ

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ABSTRACT:

Multi-modality image-guided core needle biopsy (ultrasound, computed tomography and magnetic resonance imaging) has become a mainstay in paediatric oncology to avoid invasive and time-consuming surgery while simultaneously improving the diagnostic accuracy and reducing the incidence of sequelae. But a tiny targeted piece has the same quantity and quality of abnormal parts as surgery does.

Objective: To evaluate the diagnostic reliability of image-guided core biopsy in soft tissue or bone tumours in paediatric patients.

Methods: This retrospective study included patients who had clinical and radiological examinations due to solid masses that were considered neoplastic or who were under follow-up oncology treatment with suspected metastasis. All patients underwent image-guided Tru-cut biopsies to confirm or rule out the diagnosis of tumour. The study began in September 2020 and will go until September 2025.

Results: The total number of patients included in the study was one hundred. Sixty-five were men and 35 were females, with a mean age of 1.9 ± 2.4 years. The first trial in 90% of patients provided a sufficient tissue sample; the second trial was used for 10% of patients to collect enough tissue. A Tru-cut needle biopsy was the method of choice in 95 (95%) patients in both trials, whereas in 5 (5%) patients an open biopsy was performed. Of the patients diagnosed using tru-cut needle biopsies, forty (40%) were diagnosed with non-Hodgkin's lymphoma, thirty (30%) with neuroblastoma, ten (10%) with osteosarcoma, ten (10%) with rhabdomyosarcoma, three (3%) with nephroblastoma and two (2%) had boney metastases. 95% of patients were appropriately diagnosed with a tru-cut needle biopsy.

Conclusion: image-guided percutaneous tru-cut needle biopsy allows for accurate and safe sampling of solid tumours in children. It can yield a reliable diagnosis in cases of solid abdominal tumours in children.

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Keywords: Tru-cut biopsy, image, pediatric tumors.

Introduction

An early diagnosis is important for a positive prognosis and for an efficient treatment [4]. Pathological diagnosis is confirmed by surgical excision and core biopsy. However, several illnesses are still difficult to diagnose [3]. A percutaneous needle biopsy (PNB) is a procedure in which tissue or cells are obtained for diagnosis using imaging modalities such as ultrasonography (US), computed tomography (CT), or magnetic resonance imaging (MRI). The technique consists of introducing a needle into a suspected lesion or an organ. The choice of imaging technique depends on the type and location of the lesion, the patient's compliance, the availability of the technology, and the operators' preferences. 1. Ultrasound-guided core needle biopsy of pelvic and abdominal masses in young patients is gaining popularity. FNAC is the safest, least invasive, and cheapest procedure, but it is not popular for young patients due to concerns about inadequate biopsy tissue and accidental organ penetration. Some of the many downsides are high false negative rates, inadequacy, and the difficulty in discriminating between carcinoma in situ and aggressive tumors [4]. Another difficulty with FNAC is the immunohistochemistry research, which is a factor for neoadjuvant treatment [5, 6]. Open surgical biopsy is an accurate approach to obtain tissue samples, but it requires an operating room. This procedure can lead to cosmetic abnormalities and local scarring, and it is commonly accompanied by increased levels of anxiety [7]. Core needle biopsy offers several advantages to open surgical biopsy: it is less expensive, produces a better cosmetic result, and is more tolerated by patients [4]. In addition, it is a suitable sample for immunohistochemical and histological research [8, 9]. Most of the diagnostic techniques for the assessment of masses in the body are based on ultrasonic, CT, or MRI imaging, which is generally used to differentiate between solid and cystic tumors. Ultrasonography also provides forceful sensitivity and specificity for the

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identification of invasive malignancy. The approach is useful because it is accessible to a large population and does not involve radiation exposure for the patients [3]. Core biopsy, which combines ultrasound with other techniques like ultrasound-guided biopsy, has emerged as the gold standard for treating breast cancer patients [10, 11]. Unfortunately, there is insufficient evidence to support the idea that image-guided biopsies yield more accurate outcomes than palpation-guided biopsies. This opinion is mostly based on my own experience and a few studies done after the fact [12]. So the objective of this prospective study is to evaluate the sensitivity and accuracy of image-guided Tru-cut biopsy (TCB) in the diagnosis of pediatric tumor patients in our area.

METHODS

This study is set in and designed at Basra Children's Speciality Hospital (BCSH) in Iraq and reports image-guided Tru-cut needle biopsy procedures from September 2020 to September 2025. **Ethical consideration:** The protocol of the study was approved by the research ethics council of the Ministry of Health in Iraq. The patient's family was educated about the study objectives and the prospective benefits and adverse effects of the procedure before signing a written informed consent form. **Case definition; inclusion and exclusion criteria:** Patients referred from the oncology department at BCSH and younger than 15 years of age were recruited for imaging-guided Tru-cut needle biopsy for the diagnosis of solid and cystic masses. We did not include children with haemodynamics too unstable or too large a mass to reach or whose guardians declined to perform the operation. **Procedure:** A thorough laboratory evaluation including tests for screening the clotting system has been performed on each child included in the trial. Ultrasonography and CT/MRI were used to evaluate the site, size, exact location, relationship to the surrounding structures, vascularity and feasibility of a true-cut needle biopsy of the lesion. The procedure was performed in the radiology department by a competent paediatric surgeon, assisted by an

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experienced radiologist. We performed 100 samples from 100 children with disposable sterile 18 G and 16 G Tru-Cut needle biopsies. We put the child under a general anaesthetic, give him a sedative and clean the region around the mass. The radiologist studies the tumour and assesses the vascularity of the tumour on colour Doppler, identifies the major vessels and other essential features and finally indicates a safe skin entry point. The transducer was used to guide a biopsy needle into the tumour and obtain tissue samples, which were stored in 10% formalin. The youngsters were monitored closely for a few hours after surgery in case there were any complications. The biopsies have been examined by a competent histopathologist who has used the required stains and methods such as immunohistochemical staining.

Outcomes: We assessed the method's capacity to obtain an adequate tissue sample to render a histologic diagnosis and the frequency of each diagnosis. The need for open surgical biopsies was considered in case of inconclusive diagnosis. All patients responded well to initial chemotherapy with cyclophosphamide, vincristine and prednisone, confirming the diagnosis of non-Hodgkin's lymphoma, and an immunohistochemical study confirmed the diagnosis. A satisfactory response was defined as the clinical and radiological regression or disappearance of the mass after the completion of all therapy cycles. Histology of the remaining tumours, which were surgically removed after chemotherapy, confirmed the diagnoses of neuroblastoma and nephroblastoma. The surgical complications we looked at were the chances of internal or external bleeding and damage to internal organs.

Statistical analysis:

For ethical reasons all patients were taking modest analgesics, and we could not thus assess the discomfort. But most people don't have discomfort or serious problems. This experiment is a simple descriptive study from the statistical point

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of view. Numerical data like age has been expressed as means and standard deviations (SD).

RESULTS

The total number of patients included and analyzed in this study was 100. The mean age was 3.9 ± 2.4 years; 56 (53.5%) were male and 44 (46.5%) were female. In six patients (6.97 %), the tissue biopsy from the first trial was insufficient, necessitating a second trial that successfully obtained an adequate tissue sample, most of them are at bone biopsy. A definitive diagnosis was reached in 94/ 100 patients (93.3%); four patients needed an open biopsy to get a diagnosis. The diagnosis of those 100 patients was non-Hodgkin's lymphoma in 44 (44%), neuroblastoma in 32(32%) and nephroblastoma in 10 (10 %). See **table 1**

Initial Tru-cut needle biopsy result	Number (%)
Non-Hodgkin lymphoma	44(44%)
Neuroblastoma	32(32%)
Rhabdomyosarcoma	8(8%)
Nephroblastoma	10(10%)
No result/insufficient biopsy	6(4.7)
Total	100 (100)

The overall success rate of diagnosis was 95.1% (94/100). The successful diagnosis of pediatrics masses using different image modalities, the ultrasound is the most popular technique accounts for 85%, CT scan for 10% and 5% for MRI, all of them are under general anaesthesia because it's a delicate and precise technique. the failed one was diagnosed by open biopsy mostly with bone tumors with appear as 4 patients with osteosarcoma and 2 patient with aneurysmal bone

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cyst that is because the lack of experience with getting biopsy by none automatic biopsy needle. See **table 2**

The modality of tru cut biopsy reported as percentages

85%	ultrasound guided
10%	CT scan guided
5%	MRI guided

6 of 100 patient need open biopsy and histopathology result was	
4 patients	osteosarcomas
2 patients	Aneurysmal bone cyst

No significant complications were recorded apart from pain at the needle insertion site controlled by simple analgesia.

DISCUSSION

When comparing the results of image-guided core biopsies performed with a 14-16 gauge vacuum-assisted device with those of a 14 gauge semi-automated gun, they concluded that the results obtained with the latter were better with respect to underestimation, re-biopsy and false-negative rates. They also found that imaging-guided core biopsy is an accurate technique for assessment of different bodily lesions. Benign and malignant tumours can be helped by FNAC; however, a Tru-cut needle biopsy is better [13]. The important difficulty is early detection of cancer [14], and TCB can be done in the clinic or outpatient department. In the case of surgical lesion resection, its tattooing activity helps to secure the needle tract and facilitate successful detection [13]. Similarly, Mohamed M, Ayub M T, et al. [15] showed the diagnostic accuracy of TCB was much better than FNAC. This helps safeguard the basic rights of patients and also significantly reduces the enormous financial burden of complete diagnosis and treatment.

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CONCLUSION

Image-guided percutaneous tru-cut needle biopsy is a straightforward, safe and accurate approach in children with solid or cystic tumours. There is sufficient tissue to make a correct diagnosis. It was fine for most people.

References

- 1.A. Bhushan, A. Gonsalves, J.U. Menon Current State of Breast Cancer Diagnosis, Treatment, and Theranostics *Pharmaceutics*, 13 (5) (2021), p. 723, 10.3390/pharmaceutics13050723 May 14 View at publisherView in ScopusGoogle Scholar [2]
- 2.T.K. Sahin, R. Ayasun, A. Rizzo, D.C. Guven Prognostic Value of Neutrophil-to-Eosinophil Ratio (NER) in Cancer: a Systematic Review and Meta-Analysis *Cancers (Basel)*, 16 (21) (2024), p. 3689, 10.3390/cancers16213689 Oct 31 View at publisherView in ScopusGoogle Scholar [3]
- 3.E.S. McDonald, A.S. Clark, J. Tchou, P. Zhang, G.M. Freedman Clinical diagnosis and management of breast cancer *J. Nucl. Med*, 57 (1) (2016), pp. 9S-16S, 10.2967/jnumed.115.157834 FebSuppl View at publisherGoogle Scholar 1. [4]
- 4.E.D. Pisano, L.L. Fajardo, D.J. Caudry, N. Sneige, W.J. Frable, W.A. Berg, *et al.* Fine-needle aspiration biopsy of nonpalpable breast lesions in a multicenter clinical trial: results from the Radiologic Diagnostic Oncology Group V1 *Radiology*, 219 (3) (2001), pp. 785-792, 10.1148/radiology.219.3.r01jn28785 Jun View at publisherView in ScopusGoogle Scholar[5]
- 5.A. Rizzo, F.M. Schipilliti, F. DiCostanzo, S. Acquafredda, G. Arpino, F. Puglisi, *et al.* Discontinuation rate and serious adverse events of chemoimmunotherapy as neoadjuvant treatment for triple-negative breast cancer: a systematic review and meta-analysis *ESMO Open*, 8 (6) (2023), Article 102198, 10.1016/j.esmoop.2023.102198 Dec View PDFView articleView in ScopusGoogle Scholar[6]

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<https://eurekaoa.com/index.php/5>

6. . Rizzo, A. Cusmai, S. Acquafredda, F. Giovannelli, L. Rinaldi, A. Misino, *et al.* KEYNOTE-522, IMpassion031 and GeparNUEVO: changing the paradigm of neoadjuvant immune checkpoint inhibitors in early triple-negative breast cancer *Future Oncol*, 18 (18) (2022), pp. 2301-2309, 10.2217/fon-2021-1647 Jun View in ScopusGoogle Scholar [7]
7. S. Hari, S. Kumari, A. Srivastava, Sanjay Thulkar, S. Mathur, Prasad Thotton Veedu Image guided versus palpation guided core needle biopsy of palpable breast masses: a prospective study *Indian J. Med. Res*, 143 (5) (2016), pp. 597-604, 10.4103/0971-5916.187108 Jan View in ScopusGoogle Scholar [8]
8. L. Liberman, T.L. Feng, D.D. Dershaw, E.A. Morris, A.F. Abramson US-guided core breast biopsy: use and cost-effectiveness *Radiology*, 208 (3) (1998), pp. 717-723, 10.1148/radiology.208.3.9722851 Sep View in ScopusGoogle Scholar [9]
9. R. Caputo, G. Buono, M. Piezzo, C. Martinelli, D. Cianniello, A. Rizzo, *et al.* Sacituzumab Govitecan for the treatment of advanced triple negative breast cancer patients: a multi-center real-world analysis *Front Oncol*, 14 (2024), Article 1362641, 10.3389/fonc.2024.1362641 Mar 26 View in ScopusGoogle Scholar [10]
10. A. Sridharan, J.R. Eisenbrey, P. Machado, H. Ojeda Fournier, A. Wilkes, A. Sevrukov, *et al.* Quantitative analysis of vascular heterogeneity in breast lesions using contrast-enhanced 3-D harmonic and subharmonic ultrasound imaging *IEEE Trans Ultrason. Ferroelectr Freq. Control*, 62 (3) (2015), pp. 502-510, 10.1109/tuffc.2014.006886 Mar View in ScopusGoogle Scholar [11]
11. S. Kaplan Automated whole breast ultrasound *Radiol. Clin. North Am*, 52 (3) (2014), pp. 539-546, 10.1016/j.rcl.2014.01.002 May View PDF View article View in ScopusGoogle Scholar [12]
12. V.I. Shah, U. Raju, D. Chitale, V. Deshpande, N. Gregory, V. Strand False-negative core needle biopsies of the breast: an analysis of clinical, radiologic, and

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<https://eurekaoa.com/index.php/5>

pathologic findings in 27 consecutive cases of missed breast cancer
Cancer, 97 (8) (2003), pp. 1824-1831, 10.1002/cncr.11278 Apr 15[25]

13.C.D. Scopa, D. Koukouras, J. Spiliotis, J. Harkoftakis, S. Koureleas, D. Kyriakopoulou, *et al.* Comparison of fine needle aspiration and Tru-Cut biopsy of palpable mammary lesions
Cancer Detect. Prev, 20 (6) (1996), pp. 620-624

PMID: 8939348 View in Scopus Google Scholar[26]

14.S.Moharamipour, M. Aminifar, M.R. Foroughi Gilvae, P. Faranoush, R. Mahdavi, H. Abadijoo, *et al.* Hydroelectric actuator for 3-dimensional analysis of electrophoretic and dielectrophoretic behavior of cancer cells; suitable in diagnosis and invasion studies
Biomater. Adv, 151 (2023), Article 213476, 10.1016/j.bioadv.2023.213476 May 31 View PDF View article View in Scopus Google Scholar[27]

15.M. Ahmed, T.M. Ayub, R. Raza, M.B. Ghazipura, Abdul Rehman, L.S. Sherani Comparative analysis of the diagnostic accuracy of fine-needle aspiration cytology (FNAC) versus true-cut biopsy in the detection of malignancy within detectable breast Masses.