

Preoperative Identification of Abdominal Extra-adrenal Paragangliomas Using Fine-needle Biopsy

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Introduction

Fine-needle Biopsy (FNB) has emerged as a valuable tool in the preoperative identification of Abdominal Extra-adrenal Paragangliomas (AEPs), aiding clinicians in making informed decisions regarding patient management. Paragangliomas are rare neuroendocrine tumors arising from chromaffin cells of the sympathetic or parasympathetic nervous system. Although they typically occur in the adrenal glands, they can also manifest at extra-adrenal sites, presenting unique challenges in diagnosis and management. This article explores the role of FNB in identifying AEPs, discusses the diagnostic challenges associated with these tumors, and highlights the importance of accurate preoperative identification in optimizing patient outcomes [1].

Paragangliomas are often referred to as "the great masqueraders" due to their varied clinical presentations and nonspecific symptoms. While adrenal paragangliomas are more common, accounting for approximately 85% of cases, extra-adrenal paragangliomas represent a smaller subset, with the abdomen being one of the most prevalent extra-adrenal locations. These tumors can arise from sympathetic or parasympathetic paraganglia and are frequently found in the retroperitoneum, along the para-aortic sympathetic chain, or near major blood vessels [2].

Description

The clinical manifestations of AEPs are diverse and can include hypertension, palpitations, headache, sweating, and abdominal pain. However, these symptoms are often nonspecific and may mimic other more common conditions, making the diagnosis challenging. Additionally, the biochemical profile of AEPs, characterized by the secretion of catecholamines and their metabolites, adds another layer of complexity to their evaluation. Imaging modalities such as Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) play a crucial role in localizing and characterizing AEPs. However, these modalities may not always provide definitive diagnostic information, especially in cases where the tumor's vascular supply is not well visualized or when there is uncertainty about the lesion's malignant potential. This is where FNB emerges as a valuable adjunctive tool, offering a minimally invasive method for obtaining tissue samples and aiding in the preoperative diagnosis of AEPs [3].

Fine-needle biopsy involves the insertion of a thin, hollow needle into the suspected lesion under imaging guidance, such as ultrasound or CT, to obtain tissue samples for cytological and histological analysis. The samples obtained through FNB can provide valuable information about the tumor's cellular composition, degree of differentiation, and potential for malignancy. In the context of AEPs, FNB can help differentiate these tumors from other abdominal masses and provide insights into their neuroendocrine nature. One of the primary advantages of FNB in the evaluation of AEPs is its ability to distinguish

between benign and malignant lesions. While most AEPs are benign, approximately 10-15% exhibit malignant behavior, highlighting the importance of accurate preoperative diagnosis and risk stratification. Cytological analysis of FNB samples can assess cellular atypia, mitotic activity, and the presence of necrosis, aiding in the determination of tumor aggressiveness and guiding subsequent management strategies [4].

Furthermore, FNB can assist in identifying syndromic forms of paragangliomas, such as those associated with hereditary disorders like Multiple Endocrine Neoplasia type 2 (MEN2), Von Hippel-Lindau (VHL) disease, or Succinate Dehydrogenase (SDH) gene mutations. Recognizing these syndromic associations is crucial as it may influence treatment decisions, screening protocols for other associated tumors, and genetic counseling for affected individuals and their families. Despite its advantages, FNB is not without limitations. Sampling errors, inadequate tissue acquisition, and challenges in interpreting cytological findings can occur, leading to diagnostic uncertainties. In cases where FNB results are inconclusive or discordant with clinical and radiological findings, further evaluation with core needle biopsy or surgical excision may be warranted to obtain a definitive diagnosis [5].

Conclusion

The decision to perform FNB in suspected cases of AEPs should be made based on a multidisciplinary approach involving endocrinologists, radiologists, pathologists, and surgeons. Careful patient selection, consideration of imaging findings, biochemical markers, and clinical presentation are essential factors in optimizing the diagnostic yield of FNB and minimizing potential complications.

In conclusion, preoperative identification of abdominal extra-adrenal paragangliomas using fine-needle biopsy plays a vital role in the management of these rare neuroendocrine tumors. FNB offers a minimally invasive means of obtaining tissue samples, aiding in the differentiation between benign and malignant lesions, identifying syndromic associations, and guiding treatment decisions. While FNB has inherent limitations, its integration into a comprehensive diagnostic algorithm can improve the accuracy of preoperative diagnosis and contribute to favorable patient outcomes. Continued research and collaborative efforts across specialties are necessary to further refine the role of FNB in the evaluation and management of abdominal extra-adrenal paragangliomas.

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Conflict of Interest

None.

References

1. Rangaswamy, M., Sandeep P. Kumar, M. Asha and G. V. Manjunath. "CT-guided fine needle aspiration cytology diagnosis of extra-adrenal pheochromocytoma." *J Cytol* 27 (2010): 26-28.

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2. Gong, Yun, Denise VS DeFrias and Ritu Nayar. "Pitfalls in fine needle aspiration cytology of extraadrenal paraganglioma." *Acta Cytologic* 47 (2003): 1082-1086.
3. Absher, Kimberly J., Deborah A. Witte, Luan D. Truong and Ibrahim Ramzy, et al. "Aspiration biopsy of osseous metastasis of retroperitoneal paraganglioma. Report of a case with cytologic features and differential diagnostic considerations." *Acta cytologic* 45 (2001): 249-253.
4. Thompson, Lester DR, Anthony J. Gill, Sylvia L. Asa and Roderick J. Clifton-Bligh, et al. "Data set for the reporting of pheochromocytoma and paraganglioma: Explanations and recommendations of the guidelines from the International Collaboration on Cancer Reporting." *Human Pathol* 110 (2021): 83-97.
5. Wachtel, Heather, Troy Hutchens, Ezra Baraban and Lauren E. Schwartz, et al. "Predicting metastatic potential in pheochromocytoma and paraganglioma: A comparison of PASS and GAPP scoring systems." *J Clin Endocrinol Metab* 105 (2020): e4661-e4670.

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