

Cytological diagnosis of Adrenocortical Carcinoma with metastatic lesion in liver

Vasudha M. Bhagat, Hemali J. Tailor*, Reena B. Dudhat, Ravi M. Unjiya

Department of Pathology, Govt. Medical College, Surat, Gujarat, India

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Abstract

Adrenocortical Carcinoma (ACC) is rare tumor with a reported incidence of 2 cases per million individuals per year. These tumors are highly aggressive and at the time of diagnosis, these are at higher stage. Here, we report a case of adrenal mass and multiple hypodense lesions in liver detected on imaging study which on subsequent USG-guided fine needle aspiration cytology (FNAC) performed from adrenal glands and liver turned out to be a ACC with metastatic lesion by using immunocytochemistry as an ancillary technique which showed tumor cells immunoreactivity for inhibin and calretinin; and negativity for cytokeratin, vimentin and epithelial membrane antigen (EMA) thus confirming the suspected morphological diagnosis and highlighting the accuracy of FNAC as a diagnostic tool.

***Corresponding author:**

Dr. Hemali J Tailor; 60, Sai Samarpan Society, Bamroli Road, Udhna, Surat, Gujarat, India.
Phone: +91-9825034366; E-mail: hemsanp@yahoo.co.in

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Introduction

Adrenocortical carcinoma (ACC) is a rare but highly malignant tumor. The incidence is 1 to 2 per million people per year, which accounts for 0.02% of all malignant neoplasm in humans. Women are more often affected than men (1.5:1). ACC can develop at any age, with peak before age 5 year and during the fourth and fifth decades of life. Tumor aggressiveness is higher in adults than in children.^[1, 2] Functional tumours occur in 59.3 -62% of cases, and they may produce cortisol (30-40%), androgens (20-30%), oestrogens (6-10%), or aldosterone (2-2.5%).^[3, 4, 5] A mixed pattern of hormone production is seen in 24-35% of patients.^[4, 5] Patients with ACC frequently present at advanced stages. The mean survival duration is approximately 18 months, and the overall 5-year survival rate after diagnosis is less than 50%. The stage of ACC (defined by tumor size, the presence of adjacent organ invasion, lymph node involvement, and distant metastases) remains the most important prognostic factor. In a study of 253 ACCs, the 5-year survival rates for patients with stages I, II, III, and IV were 66%, 58%, 24%, and 0%, respectively.^[6]

Case Report

A 30-year-old lady presented with complaint of pain in abdomen since 1 month. Abdominal ultrasonography (USG) showed a 119x80 mm² sized well defined, mild hypo-echoic focal mass in splenic hilum region with two possibilities of either left adrenal mass (more likely) or pancreatic tail mass (less likely). On CT scan, liver showed moderate hepatomegaly with multiple heterogeneously enhanced lobulated hypo-dense lesions in both liver lobes. These imaging features favored possibility of neoplastic pathology, more likely than infective or inflammatory pathology.

We performed ultrasound-guided Fine needle aspiration cytology (FNAC) from adrenal mass and liver lesion. Grossly, the aspirate was blood mixed. Smears were prepared from the aspirate and slides were prepared. Papanicolaou, Hematoxylin & Eosin (H&E) and May-Grunwald-Giemsa (MGG) staining were done. Microscopically the cellularity was adequate.

In the FNAC done from adrenal mass, the smear showed round to polygonal tumor cells arranged in dissociated groups, cords, acini, enmeshed in fibro-vascular stroma, intermingled with basement membrane material and scattered singly. Tumor cells had moderate anisonucleosis, round-to-ovoid nucleus, irregular & thickened nuclear membrane, few micro/macro nucleoli, coarsely granular chromatin, moderate to abundant fragile foamy/ dense cytoplasm [figure 1]. Few naked nuclei and occa-

sional mitosis was appreciated. Background showed necrotic debris. In support with clinical and radiological data, probable diagnosis of ACC was given.

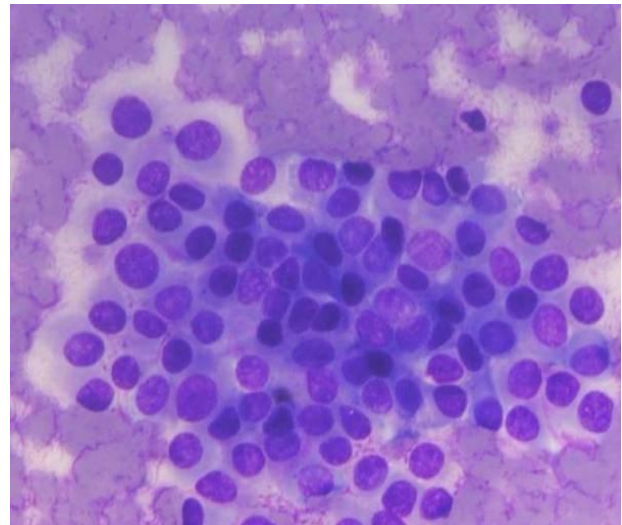


Figure 1: FNAC from primary tumor (MGG stain, 40x)

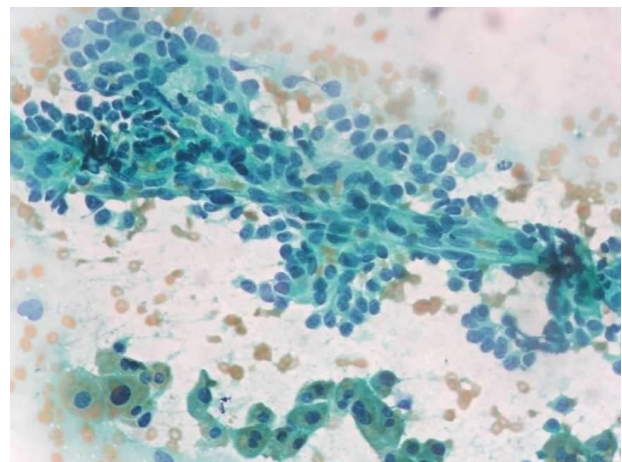


Figure 2: FNAC from liver lesion (Pap stain, 40x)

In the FNAC done from liver, the smear showed similar morphology of tumor cells as described above, interspersed with cohesive groups of hepatocytes. Few binucleated/ multinucleated cells with bilobated nuclei and other cells with intra cytoplasmic inclusion, abundant foamy fragile cytoplasm were seen [figure 2]. It was reported as metastatic carcinoma (possibility of metastatic ACC). Immunocytochemistry (ICC) revealed tumor cells reactive for calretinin and inhibin and immune negative for CK, EMA and vimentin.

Table 1: Differential diagnosis between primary HCC, metastatic ACC and metastatic RCC

Criteria	Primary HCC	Metastatic ACC	Metastatic RCC
Cellular features and arrangement	Cells are polygonal in shape and show endothelial wrapping	Cells are polygonal in shape and may show endothelial wrapping but without transgressing endothelium	Polygonal cells arranged singly and in clusters. Clear cells arranged in nests with intervening stroma and blood vessels. Large groups or sheets of cells are arranged along transgressing endothelium.
Nuclear features	prominent nucleoli	prominent nucleoli are not a feature	Nuclei are round with prominent nucleoli
HMW CK	-	-	+
LMW CK	+	-/ few cells +	+
Vimentin	+/-	+	+
EMA	+	-	+
CD 10	Canalicular	-	+
AFP	+	-	-
HepPar	+	-	-
Synaptophysin	-	+	-
Calretinin	-	+	-
Inhibin	-	+	-

HMW CK: high-molecular-weight cytokeratin; LMW CK: low-molecular-weight cytokeratin;

Discussion

ACCs are sporadic but may occasionally be associated with genetic syndromes. Patients usually present with symptoms relating to the presence of a mass, but may also present related to syndromes. Patients with ACC are often in the advanced stages of disease even at the time of diagnosis. Our patient initially presented with liver metastases. Differential diagnosis of metastatic clear cell tumour in liver can be primary clear cell hepatocellular carcinoma (HCC), metastatic ACC, metastatic renal cell carcinoma (RCC) and other tumours with clear cell features (Table 1).^[7]

In our case, ICC revealed tumor cells reactive for calretinin and inhibin; and immune negative for CK, EMA and vimentin. The prognosis of ACC is poor with an overall 5-year survival rate of 15%-47%. The 5-year survival rates decrease from 30%-45% in stage I, 12.5%-57% in stage II, 5%-18% in stage III, to 0% in stage IV tumours.^[4] When metastatic disease is present at initial presentation, death usually occurs within one year.^[8] However, cases with long-term survival have been reported^[9, 10]

In our case, ACC was confirmed at both primary and metastatic site by immunocytochemistry and

FNAC was highly accurate in diagnosing such a rare and highly aggressive tumour which is usually at advanced stage at the time of diagnosis.

Conclusion

Fine needle aspiration cytology can be highly accurate and helpful in cytological diagnosis of rare tumours as that of adrenal gland with the application of ancillary technique like immunocytochemistry.

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Competing Interests

None declared.

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