PAEDIATRIC ADRENOCORTICAL CARCINOMA: A CASE REPORT

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ABSTRACT

Adrenocortical carcinoma (ACC) is a relatively rare but an aggressive neoplasm that can have variety of manifestations. It can manifest in the form of virilization, hyperaldosteronism, cushingoid features or combination of that. Due to rapid appearance of signs and symptoms in children, these tumours can be diagnosed early however if delayed can bear worse prognosis as they tend to metastasize early in course of disease progression. We report a case of 4 years old female patient from Chitral, Pakistan who was referred to Endocrinology Department from Paediatric Department of Hayatabad Medical Complex, Peshawar Patient presented at paediatric OPD with complaints of weight gain, hirsutism, rashes over the face and acne. Patient had typical moon facies, buffalo hump and distended abdomen without striae as well as mass in the left hypochondrium on examination. On further evaluation clitoromegaly and pubic hair tanner stage 4 were found. Both Ultrasound and CT-Scan showed left supra-renal soft tissue mass invading the inferior venacava (IVC). She was further evaluated and her overnight dexamethasone suppression test (ODST) and serum testosterone levels were high although serum sodium and potassium were normal ruling out hyperaldosteronism. Next, biopsy was performed which was consistent with adrenocortical carcinoma. ACC although rare is highly aggressive tumor that requires early detection and diagnosis specially in children. If diagnosis is delayed prognosis may not be favourable. It therefore requires avid clinical suspicion to proceed onto diagnostic lines for patient's benefit as well as physician's satisfaction.

Keywords: Adrenal Gland; Adrenocortical Carcinoma; Paediatrics

INTRODUCTION

Adrenocortical carcinoma is a very rare tumour having an annual incidence of 0.5-2 cases per million population having a female preponderance.[1] It occurs in two major peaks, in first decade of life and later in forties and fifties.[2] The data from International Paediatric Adrenocortical Tumour registry shows the median age of children developing Adrenocortical carcinoma which is 3.2 years.[3] At the time of presentation most patients have developed advanced disease which can have multiple abdominal or extra-abdominal metastasis. Approximately 60% of all ACCs are functional in nature i.e. they secrete various hormones including cortisol, androgens and oestrogen giving rise to Cushing's syndrome, virilisation and feminization respectively.[4] We report here a case of young girl referred from paediatric department who was evaluated and found to be having a metastatic left sided adreno-carcinoma.

Case Report

We report a case of 4-year-old female patient weighing 16kgs having a BP of 110/70 from Chitral, Pakistan who was referred to Endocrinology Department from Paediatric Department of Hayatabad Medical Complex, Peshawar. The patient presented at pediatric OPD with complaints of weight gain, hirsutism, rashes over the face and pustular acne for the past four months. The patient had typical moon faces, buffalo hump, and distended abdomen without striae as well as a mass in the left hypochondrium on examination. These cushingoid features started to appear just 4 months ago at the time of presentation. On further evaluation clitoromegaly and pubic hair tanner, stage 4 was found. Pubic hair started to grow after one year of age. Ultrasound findings were consistent with a lobulated mass that was irregular and arising from the adrenal gland probably. CT-Scan abdomen and pelvis was performed to further clarify the suspicion which showed a left supra-renal soft tissue mass measuring more than 10cm showing extensive stromal necrosis and invasion of the inferior vena cava (IVC). She was further evaluated and her overnight dexamethasone suppression test(ODST) and serum testosterone levels were high although serum sodium and potassium were normal ruling out hyperaldosteronism. Next, she was biopsied and histopathological examination of the specimen showed large polygonal cells with enlarged nuclei and prominent nucleoli having clear to eosino-

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philic cytoplasm. Atypical Mitosis (5/10HPF), richly vascular stroma with areas of necrosis were also seen which confirmed her to be a case of adrenocortical carcinoma.

DISCUSSION

Adrenocortical carcinoma has an incidence of one in one million populations which shows its rarity but despite it being rare has a poor prognosis.[1] However in children under fifteen years of age it's even more rare i.e. 0.3 cases per million cases.[5] Majority of adrenocortical tumours are sporadic in nature however a small percentage of them is familial. Familial tumours can be a part of Li–Fraumeni syndrome, multiple endocrine neoplasia type 1 or Carney complex.[5,6] Recurrence occurs in 23-85% of patients after having satisfactory removal and five-year overall survival rate is nearly 16-38%.[7] Major culprits implicated to be responsible for its pathogenesis include mutations in insulin-like growth factor II (IGF II), tp53 tumor suppressor gene, the β catenin gene & overexpression of steroidogenic factor 1.[8]

Of all the Adrenocortical carcinomas arising in children, 60% are hormonally active i.e. functional having virilization as the most common feature followed by cushingoid features and then mixed hormonal manifestations.[5] This is in contrast to tumors of adrenal gland arising in adult age group where majority of tumors are non-functional and if functional, Cushing's syndrome is the primary manifestation being reported in up to 30% of all hormonally active tumors.[8,9] Our patient was one of the rare cases as it presented with both virilizing as well as Cushing's features. A similar case was reported by Gundgurthi, et al in India in year 2012.[8]

Imaging is an important and crucial modality to localize the tumor, to look for regional and distant spread, grading the tumor as well as planning out the therapeutic modality. For this purpose, we performed ultrasonography and CT-Scan. PET scan is recommended because it not only informs about malignant potential but also helps in detecting distant spread of the disease as presented by Becherer et al[10] but due to limited resources it was not performed in our case scenario. Radiologically to strike out a contrast between a benign adenoma and carcinoma is difficult but there are certain features that favour malignant lesion[11]; 1. Size greater than 4cm in diameter, 2. Irregular shape with unclear margins, 3. Heterogeneous texture, 4. Usually Vascular and 5. Presence of necrosis, hemorrhage & calcifications. In our case size was greater than 10cm, texture was heterogeneous, necrosis and vascularity being present was pointing towards a malignant lesion rather than a benign one. Histopathological examination of biopsy specimen revealed lesion revealed large polygonal cells arranged in trabecular pattern having clear cytoplasm, enlarged nuclei and prominent nucleoli. Atypical mitosis (5/10HPF), vascular stroma and necrotic areas were also noted. However venous, sinusoidal or capsular invasion could not be assessed owing to small nature of biopsy specimen.

The staging of pediatric ACC is based on weight, size and amount of resected tumor where Stage I is a tumor less than 5cm, weighing less than 200g and completely resected; stage II greater than 5 cm, weighing more than 200g with complete resection; stage III spread to regional nodes, kidney or inferior vena cava with incomplete resection and stage IV comprising of distant spread to either lung or liver or both.[12] Keeping this in mind our case was staged as Stage III adrenocortical carcinoma.

Open surgery remains the mainstay of treatment in Stages I-III of the tumor and laparoscopic one is discouraged, still the recurrence remains very high.[13] Patient was referred to surgical department for open surgery due to advanced stage and size of the tumor but it wasn't successful and he couldn't survive.

CONCLUSION

ACC although rare is highly aggressive tumor that requires early detection and diagnosis specially in children. If diagnosis is delayed prognosis may not be favorable. It therefore requires avid clinical suspicion to proceed onto diagnostic lines for patient's benefit as well as physician's satisfaction.

REFERENCES

1. Bellantone R, Ferrante A, Boscherini M, Lombardi CP, Crucitti P, Crucitti F, et al. Role of reoperation in recurrence of adrenal cortical carcinoma: results from 188 cases collected in the Italian National Registry for Adrenal Cortical Carcinoma. Surgery. 1997;122(6):1212-8. DOI:10.1016/s0039-6060(97)90229-4.
2. Ng L, Libertino JM. Adrenocortical carcinoma: diagnosis, evaluation and treatment. J Urol. 2003;169(1):5-11. DOI:10.1097/01.ju.0000030148.59051.35..
3. Michalkiewicz E, Sandrini R, Figueiredo

B, Miranda EC, Caran E, Oliveira-Filho AG, Marques R, Pianovski MA, Lacerda L, Cristofani LM, Jenkins J, Rodriguez-Galindo C, Ribeiro RC. Clinical and outcome characteristics of children with adrenocortical tumors: a report from the International Pediatric Adrenocortical Tumor Registry. J Clin Oncol. 2004;22(5):838-45. DOI:10.1200/JCO.2004.08.085.

4. Pommier RF, Brennan MF. An eleven-year experience with adrenocortical carcinoma. Surgery. 1992;112(6):963-70; discussion 970-1.
5. Zachariah C, Adity S, Helina R. Farrago of Pediatric Solid Malignancies from a Tertiary Care Centre in Northeast India: A Retrospective Analysis. Int J Sci Study. 2021;8(10):101-7.
6. Sutter JA, Grimberg A. Adrenocortical tumors and hyperplasias in childhood--etiology, genetics, clinical presentation and therapy. Pediatr Endocrinol Rev. 2006;4(1):32-9.
7. Crucitti F, Bellantone R, Ferrante A, Boscherini M, Crucitti P. The Italian Registry for Adrenal Cortical Carcinoma: analysis of a multiinstitutional series of 129 patients. The ACC Italian Registry Study Group. Surgery. 1996;119(2):161-70. DOI:10.1016/s0039-6060(96)80164-4.
8. Rahar S, Chauhan DS, Singh S, Ahuja A, Bhardwaj M, Sen A. Adrenocortical Carcinoma in a 6-Month-Old Infant. J Indian Assoc Pediatr Surg. 2020;25(5):310-313. DOI: 10.4103/jiaps.JIAPS_155_19. .
9. Icard P, Goudet P, Charpenay C, Andreassian B, Carnaille B, Chapuis Y, et al. Adrenocortical carcinomas: surgical trends and results of a 253-patient series from the French Association of Endocrine Surgeons study group. World J Surg. 2001;25(7):891-7. DOI:10.1007/s00268-001-0047-y.
10. Becherer A, Vierhapper H, Potzi C, Karanikas G, Kurtaran A, Schmaljohann J, et al. Cancer Biother Radiopharm. 2001;16(4):289-95. DOI:10.1089/108497801753131363.
11. Young WF Jr. Clinical practice. The incidentally discovered adrenal mass. N Engl J Med. 2007;356(6):601-10. DOI:10.1056/NEJMcp065470.
12. Teinturier C, Pauchard MS, Brugières L, Landais P, Chaussain JL, Bougnères PF. Clinical and prognostic aspects of adrenocortical neoplasms in childhood. Med Pediatr Oncol. 1999 Feb;32(2):106-11. DOI:10.1002/(sici)1096-911x(199902)32:2<106::aid-mpo7>3.0.co;2-j.
13. Schteingart DE, Doherty GM, Gauger PG, Giordano TJ, Hammer GD, Korobkin M, et al. Management of patients with adrenal cancer: recommendations of an international consensus conference. Endocr Relat Cancer. 2005;12(3):667-80. DOI:10.1677/erc.1.01029.

Author's Contribution

SA conceived the idea and helped in writing of case report. MA contributed in data collection. AR Helped in investigation of the study. FG contributed in data analysis. TGK helped managing the patients. Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Conflict of Interest

Authors declared no conflict of interest

Grant Support and Financial Disclosure

None

Data Sharing Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.