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**Case Report**

# Adrenal ganglioneuroma; a rare neurogenic tumor in a 25-year-old female

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## ABSTRACT

Ganglioneuromas (GNs) are rare benign tumors originating from the neural crest tissue. They are characteristically located in the posterior mediastinum and retroperitoneum; and are rarely found in the adrenal gland. GNs are usually hormonally inactive, and most of the cases are detected incidentally. We report a case of 25-year-old female who presented with pain abdomen in the right upper quadrant. Imaging studies showed a large well defined hypodense lesion with calcification measuring 14.5×11.5×11cm in the region of right adrenal gland and a possibility of adrenocortical carcinoma was suggested. The patient underwent right adrenalectomy and histopathological examination revealed ganglioneuroma. This report emphasizes that GN can be misdiagnosed preoperatively as the presenting symptoms are nonspecific and imaging characteristics are variable. Histopathological examination is the mainstay of diagnosis.

**Keywords:** Ganglioneuroma, Adrenal gland, Incidentaloma, Neural crest tissue

## INTRODUCTION

Ganglioneuromas (GNs) are rare, differentiated tumors derived from the neural crest tissue.[1,2] They are usually located in the retroperitoneum and posterior mediastinum and less commonly in the cervical region.[3,4] GNs are rarely found in the adrenals.[2] GNs of the retroperitoneum and posterior mediastinum are usually seen in children and young adults whereas adrenal GN occurs most frequently in the fourth and fifth decades of life.[5] Females are more affected by GNs as compared to males.[6] Adrenal GNs can stay asymptomatic until they reach a large size, are hormonally inactive and usually detected incidentally.[7] The imaging characteristics of adrenal GNs are variable and they may be misdiagnosed as other adrenal tumors.[8] With this case report, we present a case of the giant adrenal ganglioneuroma in 25-year-old female.

## CASE REPORT

A 25-year-old female presented with pain in right upper quadrant for 6 months. The pain aggravated on physical exertion. There was no significant surgical or medical history. Physical examination revealed no abnormality and the routine laboratory investigations were within normal limits. Ultrasound abdomen showed a large well-defined heterogenous mass measuring 11.9×10.9 cm in right suprarenal region with areas of hypo and hyper echogenicity containing internal calcified foci; suggesting a possibility of adrenocortical carcinoma. The patient underwent computed tomography of the whole abdomen which showed a large well defined hypodense lesion measuring 14.5×11.5×11 cm with specks of calcification; in the region of right adrenal gland. The lesion was compressing over the right lobe of liver, head of pancreas, C loop of duodenum and upper lobe of right kidney causing scalloping of right lobe of liver. A

diagnosis of adrenocortical adenoma was suggested. Serum cortisol, DHEAS, urine cortisol levels, 24 hr urinary catecholamines and vanillyl mandelic acid (VMA) excretion were within normal ranges. The patient underwent right adrenalectomy, and the specimen was submitted for histopathological examination. Grossly, the specimen was solid, firm, encapsulated and measured 15×12×10 cm (Figure 1 A). The cut surface was solid, gray-white, homogenous, and showed areas of whorling (Figure 1 B). Microscopic examination showed an encapsulated tumor composed of intersecting fascicles of Schwann like cells with interspersed clusters of mature ganglion cells and fibrous stroma. At periphery, tiny compressed normal adrenal cortical tissue was seen. Some of the ganglion cells showed hyperchromasia. Tumor also showed small aggregates of lymphoid cells at places (Figure 2 A-D). The diagnosis of ganglioneuroma; maturing subtype (International neuroblastoma pathology committee 1999) was made. The patient experienced no complications during the post-operative course. No recurrence was detected during 1 year of follow-up visits.

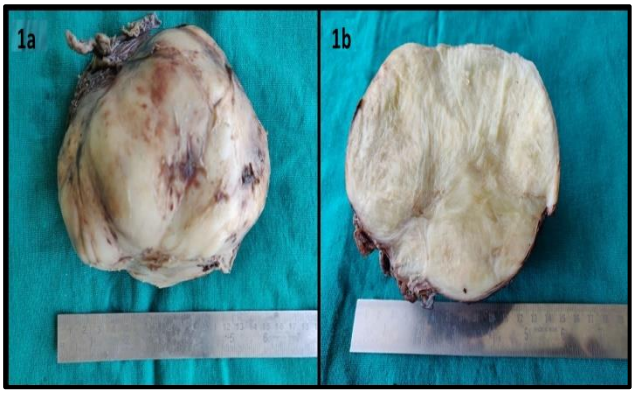


**Figure 1 (A and B): Grossly, the specimen is solid, firm encapsulated and measures 15×12×10 cm. Cut surface is solid, gray-white, homogenous, and showed areas of whorling.**

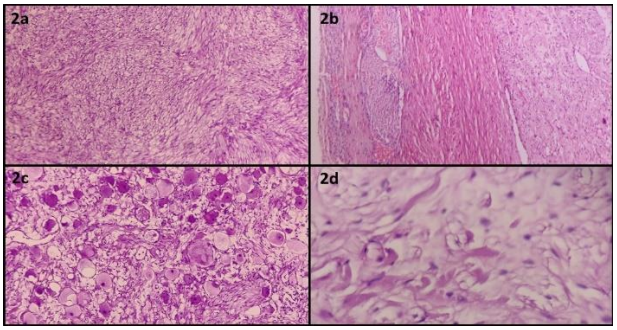


**Figure 2 (A-D): A tumor composed of intersecting fascicles of Schwann like cells (H and E; 100x), microphotograph shows capsule and tiny compressed normal adrenal cortical tissue (H and E; 100x), microphotograph shows clusters of ganglion cells with intersecting fascicles of Schwann cells (H and E; 400x), microphotograph shows intersecting fascicles with fibrous stroma (H and E;400x).**

## DISCUSSION

Ganglioneuroma (GN) is a member of a group of neurogenic tumors that include ganglioblastoma and neuroblastoma. It differs from other neurogenic tumors in its benign potential.[9] Adrenal GNs originate from adrenal medulla. They are usually hormonally silent and as a result can be asymptomatic; even when the lesion is of substantial size.[8,10] Their imaging characteristics are variable and they may be misdiagnosed preoperatively as other adrenal neoplasms and lesions including adenoma, myelolipoma, cyst, lipoma, pheochromocytoma, adrenal carcinoma, metastatic neoplasm, hyperplasia and tuberculosis.[1,2,8] Elevated plasma and urinary catecholamines levels have been seen in up to 30% of patients with GN but the patients rarely showed symptoms of catecholamine excess.[2] Occasionally, composite tumors with pheochromocytoma are seen and they may secrete cortisol and androgen.[11] In all cases of adrenal incidentalomas evaluation, urine must be monitored for catecholamine and fractionated metanephrine for 24 hours. The increases in levels of metanephrine and/ or catecholamine indicate that the tumoral mass is pheochromocytoma with a 91% and 98% of sensitivity and specificity, respectively.[12] GN can also produce and secrete other hormones, such as testosterone, indicating the pluripotency of its precursor cells.[13] The gross features are an encapsulated solid mass with a firm consistency and solid gray- white homogenous cut surface with areas of whorling. Microscopic examination shows mature ganglion cells and schwann cells showing intersecting fascicles with fibrous stroma. GN can be classified into two main groups: mature and maturing. The mature type is composed of mature schwann cells, ganglion cells and perineural cells, whereas the maturing type consists of cells with different maturation levels, ranging from mature cells to neuroblasts with a similar stroma. Immunohistochemically, GNs are characterized by reactivity for S-100, vimentin, synaptophysin and neuronal markers.[11] The tyrosine kinase receptor ERBB3 is one of the most upregulated genes in GNs.[14] High expression of GATA3 in 100% of GNs has been reported.[15,16] GN, in contrast to neuroblastoma does not exhibit MYCN gene amplifications.[2] The coexistence of GN with neuroblastoma has been associated with a hemizygous deletion of 11q14.1-23.3 attributing to the deletion of NCAM1 and CADM1 genes which lie on 11q.[17] Tumor size is an important prognostic factor for adrenal masses. If the tumor size is larger than 6cm, there is a 25% chance of the lesion being adrenocortical carcinoma.[18] Li et al confirmed that histopathological diagnosis is essential and surgical excision is the primary treatment modality for adrenal GNs.[19] Now a days, laparoscopic adrenalectomy is the procedure of choice but few variables like size, hormonal activity, tumor location, proximity to adjacent structures etc. must be evaluated before adopting the approach to operate these tumors.[18] Postoperative adjuvant therapy is not needed in patients with adrenal GNs, and prognosis is excellent.[2,20] Post operative follow up must not be ignored as rarely

recurrence or malignant transformation can also occur.[18,21]

## CONCLUSION

GNs are usually discovered incidentally, and they tend to be hormonally silent. Preoperatively, they can be erroneously diagnosed as other adrenal tumors. Careful evaluation by using appropriate hormonal tests and imaging procedures is required for preoperative evaluation. Definitive diagnosis can be made by histopathological examination. The prognosis is very good with surgical removal.

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## REFERENCES

1. Erem C, Ucuncu O, Nuhoglu I, Cinal A, Cobanoglu U, Demirel A et al. Adrenal Ganglioneuroma: report of a new case. Endocrine. 2009;35:293-6.
2. Georger B, Hero B, Harns D, Grebe J, Scheidhauer K, Berthold F. Metabolic activity and clinical features of primary ganglioneuromas. Cancer. 2001;91:1905-13.
3. Rha SE, Byun JY, Jung SE, Chun HJ, Lee HG, Lee JM. Neurogenic tumors in the abdomen: tumor types and imaging characteristics. Radiographics. 2003;23:29-43.
4. Zografos GN, Kothonidis K, Ageli C, Kopanakis N, Dimitriou K, Papaliodi E et al. Laparoscopic resection of large adrenal ganglioneuroma. JSLS 2007;11:487-92.
5. Li L, Shao J, Gu J, Wang X, Qu L. Adrenal Ganglioneuromas: experience from a retrospective study in Chinese population. Urol J. 2014;11:1485-90.
6. Sucandy I, Akmal YM, Sheldon DG. Ganglioneuroma of the adrenal gland and retroperitoneum: a case report. N Am J Med Sci. 2011;3:336-8.
7. Jaulim A, Nkwam N, Williams S. mature ganglioneuroma as a rare cause of visible hematuria: A case report and literature review. Int J Surg Case Rep. 2015;14:1-3.
8. Qing Y, Bin X, Jian W, Li G, Linhui W, Bing L, Hirqing W, Yinghao S. Adrenal ganglioneuromas: a 10- year experience in Chinese population. Surgery. 2010;147:854-60.
9. Joshi VV. Peripheral neuroblastic tumors: pathologic classification based on recommendations of international neuroblastoma pathology committee (modification of Shimada classification). Pediatr Dev Pathol. 2000;3:184-99.
10. Allende DS, Hansel DE, MacLennan GT. Ganglioneuroma of the adrenal gland. J Urol. 2009182:714-5.
11. Sasaki S, Yasuda T, Kaneto H, Otsuki M, Tabuch Y, Fujita Y et al. Large adrenal ganglioneuroma. Intern Med. 2012;51:2365-70.
12. Kacagan C, Basaran E, Erdem H, Tekin A, Kayikci A, Cam K. Case Report: Large adrenal ganglioneuroma. Int J Surg Case rep. 2014;5:253-5.
13. Mack E, Sarto GE, Crummy AB, Carlson IH, Curet LB, Wu J. Virilizing adrenal ganglioneuroma. JAMA 1978;239:2273-4.
14. Wilzen A, Krona C, Sveinbjornsson B, Kristiansson E, Dalevi D, Ora I et al. ERBB3 is a marker of a ganglioneuroblastoma/ ganglioneuroma- like expression profile in neuroblastic tumors. Mol Cancer. 2013;12:70.
15. Nonaka D, Wang BY, Edmondson D, Beckett E, Sun CC. A study of gata3 and phox2b expression in tumors of the autonomic nervous system. Am J Surg Pathol. 2013;37:1236-41.
16. Ordóñez NG. Value of GATA3 immunostaining in tumor diagnosis: a review. Adv Anat Pathol. 2013;20:352-60.
17. Shiohama T, Fujii K, Hino M, Shimizu K, Ohashi H, Kambe M et al. Coexistence of neuroblastoma and ganglioneuroma in a girl with a hemizygous deletion of Chromosome 11q14.1-23.3. Am J Med Genet A 2016;170A:492-7.
18. Mylonas KS, Schizas D, Economopoulos KP. Adrenal ganglioneuroma: What you need to know. World J Clin Cases. 2017;5(10):373-7.
19. Li J, Yang CH, Li LM. Diagnosis and treatment of 29 cases of adrenal ganglioneuroma. Eur Rev Med Pharmacol Sci. 2013;17:1110-3.
20. Shawa H, Elsayes KM, Javadi S, Morani AK, Williams MD, Lee JE et al. Adrenal Ganglioneuroma: features and outcomes of 27 cases at a referral cancer centre. Clin Endocrinol (oxf). 2014;80(3):342-7.
21. De Chadarevian JP, Pascasio JM, Halligan GE, Katz DA, Locono JA. Malignant peripheral nerve sheath tumor arising from an adrenal ganglioneuroma in a 6- year- old boy. Pediatr Dev Pathol. 2010;7(3):277-84.

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