Cukurova Medical Journal
ÇUKUROVA ÜNİVERSİTESİ TIP FAKÜLTESİ

Cukurova Med J 2019;44(3):1135-1138
DOI: 10.17826/cumj.494051

OLGU SUNUMU / CASE REPORT

Myelolipomatous changes within adrenocortical adenoma

Adrenokortikal adenomda myelolipomatöz değişiklikler

Canan Fırat[1], Seda Eryiğit[2], Serkan Yener3, Tevfik Demir[3], Ozan Bozkurt[4], Ömer Demir[4], Burçin Tuna[2], Kutsal Yörükoğlu[2]

[1]Dr. Suat Seren Chest Diseases and Thorasic Surgery, Education and Research Hospital, Department of Pathology, İzmir, Turkey
[2]Dokuz Eylul University, Faculty of Medicine, Department of Pathology, [3]Department of Endocrinology, [4]Department of Urology, İzmir, Turkey

Cukurova Medical Journal 2019;44(3):1135-1138.

Abstract
Myelolipoma is a rare benign tumor which is generally detected incidentally. The tumor consists of mature fat tissue and hematopoietic cells that resemble bone marrow. The coexistence of myelolipoma and non-functional adrenocortical adenoma in the same gland is exceedingly rare. We herein present two cases of adrenal myelolipoma in association with non-functional adrenocortical adenoma in left adrenal gland of a 62-year-old woman and non-functional adrenocortical adenoma combined with myelolipoma and endothelial cyst, in right adrenal gland of a 73-years-old man. Microscopically, in the central of the tumor, there was a myelolipomatous area composed of adipocytes and hematopoietic cells surrounded by sheets of adenoma cells. The histopathological diagnosis was "myelolipomatous changes within a non-functional adrenocortical adenoma". The cases are presented here with their rarity and pathological differential diagnosis.
Keywords: Adenoma, adrenal, cortical, myelolipoma, non-functional

Öz
Myelolipoma is a rare benign tumor which is generally detected incidentally. The tumor consists of mature fat tissue and hematopoietic cells that resemble bone marrow. The coexistence of myelolipoma and non-functional adrenocortical adenoma in the same gland is exceedingly rare. We herein present two cases of adrenal myelolipoma in association with non-functional adrenocortical adenoma in left adrenal gland of a 62-year-old woman and non-functional adrenocortical adenoma combined with myelolipoma and endothelial cyst, in right adrenal gland of a 73-years-old man. Microscopically, in the central of the tumor, there was a myelolipomatous area composed of adipocytes and hematopoietic cells surrounded by sheets of adenoma cells. The histopathological diagnosis was "myelolipomatous changes within a non-functional adrenocortical adenoma". The cases are presented here with their rarity and pathological differential diagnosis.
Anahtar kelimeler: Adenoma, adrenal, cortical, myelolipoma, non-functional.

INTRODUCTION

Adrenal myelolipoma is a a rare benign adrenal tumor composed of mature fat tissue and normal hematopoietic cells. Generally, it is diagnosed as an incidenteloma by computed tomography (CT) or magnetic resonance imaging (MRI)[1,2]. Myelolipomatous foci may be seen in adrenal tissue and tumors like adrenocortical adenoma[3], adrenocortical carcinoma[4], pheochromocytoma[5], and ganglioneuroma[6]. Myelolipoma in an adrenal cortical adenoma is rare, although combination of endothelial cyst and myelolipoma is quite rare. There are seven adrenal cortical adenoma and myelolipoma cases, and only one adrenal cortical adenoma associated with both myelolipoma and endothelial cyst reported in the English literature[7-12].

Myelolipomatous metaplasia is believed to develop by any kind of stress[13]. Endothelial cysts are supposed to occur by a local neovascularization

Yazışma Adresi/Address for Correspondence: Dr. Canan Fırat, Dr. Suat Seren Chest Diseases and Thorasic Surgery, Education and Research Hospital, Department of Pathology, İzmir, Turkey E-mail: firatcanan@yandex.com
Geliş tarihi/Received: 09.12.2018 Kabul tarihi/Accepted: 02.03.2019 Çevrimiçi yayın/Published online: 08.09.2019

process[14]. We herein report two adrenocortical adenoma cases associated with myelolipoma in both cases and also endothelial cyst in one of them.

CASE REPORTS

Clinical features

Case 1: A 62-year old woman admitted to our hospital with left-sided abdomino-pelvic pain. Clinical history and physical examination revealed no endocrine dysfunction. The patient underwent MRI which revealed a 5.0x4.0x3.5 cm retroperitoneal mass with a fat component, in the left suprarenal region, Laboratory studies such as blood cell count and biochemical analysis were within the normal ranges. The preoperative diagnosis was non-functional adenoma and the patient underwent laparoscopic left adrenalectomy. Postoperatively, the patient's recovery was uneventful.

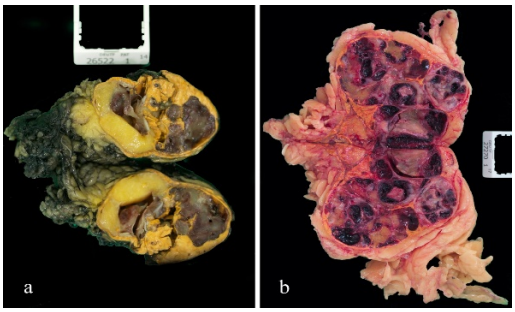

Figure 1- a). The cut surface shows fatty areas and hemorrhagic cystic spaces that were circumscribed with adrenal cortical tissue. b). Myelolipomatous tissue and hemorrhagic cystic spaces replacing almost entire adenomatous tissue

Case 2: A 73-year old man on routine examination was discovered with a mass in the right adrenal gland. The patient had hypertension and hyperlipidemia. Laboratory studies such as blood cell count and biochemical analysis were within the normal ranges. Urinary normetanephrine excretion was mildly elevated. A non-selective alpha-1 blocker was initiated 4 weeks prior to adrenalectomy. The surgical procedure and patient's recovery was uneventful.

Pathological findings

Case 1: The left adrenal weighed 52 g and measured 5.0x4.0x3.5 cm. The cut surface had bright yellow tissue areas and brown, hemorrhagic, cystic, and solid areas. Adjacent to this area, a tan colored adrenal cortical tissue approximately 1 cm width was observed (Figure 1a).

Case 2: The right adrenal weighed 197 g and measured 13x9x4 cm. On the cut surface well delineated yellow adenoma with red and brown, multilocular hemorrhagic cystic areas of 7.5x7.5x4 cm in size, was seen (Figure 1b).

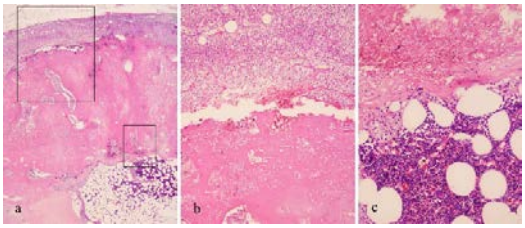

Figure 2-a). Photomicrograph demonstrates both myelolipoma (left) and adenoma (right) components. Hyalinization can be seen between these areas (H&E, Original magnification x20). High magnification of (b). adenoma (H&E, Original magnification x100), and (c) myelolipoma (H&E, Original magnification x200).

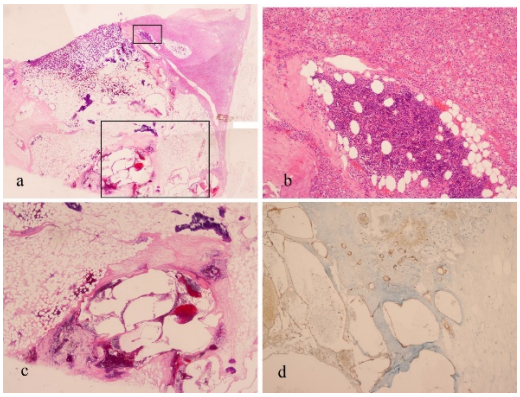

Figure 3-a). On the entire section, cortical adenoma, myelolipoma, and cyst components are noted (H&E, Original magnification x20). High magnification of (b). adenoma and adjacent myelolipoma (H&E, Original magnification x100), (c). endothelial cyst (H&E, Original magnification x100), and (d). CD31 immunostaining of the endothelial cyst (CD31, Original magnification x100).

Microscopically the tumors in the both cases were surrounded by a thin fibrous pseudocapsule. The tumor was predominantly composed of mature adipocytes and hematopoietic cells with trilineage differentiation. These areas contained monotonous clear cells arranged in a trabecular growth pattern, consistent with an adenoma (Figure 2 and 3). Foci of hemorrhage, hyalinized stroma and focal calcification

were noted. Evaluation of the clinical and histological features (Weiss scoring system), the tumors were defined as non-functional adrenocortical adenoma with myelolipomatous changes. Additionally, in case 2, there was an endothelial cyst lined by flattened cells.

DISCUSSION

Myelolipoma is a benign tumor which is composed of mature fat cells and hematopoietic cells at different maturation phases[15]. It has a 0.2% incidence in autopsy series but, with the frequent use of CT and MRI scanning methods, incidence of myelolipoma has been increased[16]. As it may be seen as isolated myelolipoma, it can also be observed together with other adrenal pathologies with a frequency of 5-15%[16].

Myelolipoma may be associated more commonly with hormonally active lesions (functional adenomas) and rarely with hormonally inactive lesions (non-functional cortical adenomas)[3,4].

Macroscopically, myelolipomas are well-circumscribed and surrouded by a thin pseudocapsule. The cut surface is variegated with yellow and brown areas, depending on the ratio of adipose tissue and bone marrow tissue components[17]. Microscopically, myelolipoma consists of mature adipocytes and erythrocytes, granulocytes, megakaryocytes at different stages of maturation. According to dominant cell type (clear, oncocytic etc.) adenoma is composed of uniform sized and shaped cells in a trabecular or alveolar pattern.

The histopathological differential diagnosis of myelolipoma includes angiomyolipoma, liposarcoma, lipoma, and extramedullary myeloid tumor. Myelolipoma is distinguished from angiolipoma by the absence of spindle cells and thick-walled blood vessels and existence of the hematopoietic cells.

Myelolipoma is composed of mature adipocytes in contrast to liposarcoma, and can easily be distinguished morphologically. Histopathologically, lipomas are composed of mature adipose tissue, showing minimal variation in cell size, without hematopoiesis. Extramedullary myeloid cell tumor is a localized malignant tumor of diffuse replacement of immature myeloid cells at the extramedullary site and distinguished from myelolipomas by the presence of diffuse extramedullary hematopoiesis, organomegaly (specially splenomegaly), and chronic anemia[18].

There are different hypotheses about the pathogenesis of myelolipoma. These may be summarized as 1) necrosis and hemorrhage stimulating the hematopoietic cells to migrate to the adrenal gland, 2) embolization of bone marrow, 3) misplacement of myeloid cells during embryogenesis, and 4) metaplastic changes of adrenal stromal cells[11]. Masugi et al. suggested that high steroid hormone levels in the adrenal cortex suppress the production of a series of cytokines that stimulate interstitial cells such as fibroblasts which have metaplastic potential[19]. Thus, metaplastic changes mostly can be seen in non-functional adenomas. In 2002, Chang et al. reported a case of adrenal myelolipoma that has balanced translocation t(3;21)(q25;p11) which supports a distinct hypothesis of a neoplastic process rather than hypotheses supporting the metaplastic process above[20].

Adrenal endothelial cysts are believed to be the result of pseudocysts by some authors [21]. Others suggest them to develop by re-canalization of intraparenchymal hemorrhage, from a preexisting hamartoma or ectatic lymphatic channels[14,22]. As cystic degeneration is usual in large adrenal tumors, and endothelial cysts may contain normal adrenal tissue islands, main differential diagnosis of endothelial cyst is central ischemic degeneration in an adrenocortical adenoma. The differential diagnosis also includes other adrenal cysts. In one of our cases, the three lesions were seperated, and the cyst lining was immunohistochemically positive with endothelial markers. However, as both myelolipomas and endothelial cysts are believed to be reactive/degenerative processes, one can not exclude the possibity of these two lesions to develop from adrenocortical adenoma in the same manner.

Due to the absence of hormonal production, myelolipoma within a non-functional adrenocortial adenoma may get a false pre-operative malignant diagnosis, like liposarcoma or adrenocortical carcinoma, particularly depending on fat, hemorrhage, and necrosis components, radiologically. This should be kept in mind that non-functional adrenal cortical adenoma with myelolipomatous changes may cause heterogeneous appearance. Therefore, to avoid of a possible malignant preoperative over-diagnosis, the differantial diagnosis should also include adenoma with myelolipomatous change and pathological examination should be done carefully for the final correct diagnosis.

Yazar Katkıları: Çalışma konsepti/Tasarımı: KY, SE, CF; Veri toplama: TD, SY, OB, ÖD; Veri analizi ve yorumlama: SE, CF, KY; Yazı taslağı: CF, SE; İçeriğin eleştirel incelenmesi: CF, SE, SY, TD, OB, ÖD, BT, KY; Son onay ve sorumluluk: CF, SE, SY, TD, OB, ÖD, BT, KY; Teknik ve malzeme desteği: TD, SY, OB, ÖD; Süpervizyon: CF, SE, SY, TD, OB, ÖD, BT, KY; Fon sağlama (mevcut ise): yok.
Hakem Değerlendirmesi: Dış bağımsız.
Çıkar Çatışması: Yazarlar çıkar çatışması beyan etmemişlerdir.
Finansal Destek: Yazarlar finansal destek beyan etmemişlerdir.

Author Contributions: Concept/Design : KY, SE, CF; Data acquisition: TD, SY, OB, ÖD; Data analysis and interpretation: SE, CF, KY; Drafting manuscript: CF, SE; Critical revision of manuscript: CF, SE, SY, TD, OB, ÖD, BT, KY; Final approval and accountability: CF, SE, SY, TD, OB, ÖD, BT, KY; Technical or material support: TD, SY, OB, ÖD; Supervision: CF, SE, SY, TD, OB, ÖD, BT, KY; Securing funding (if available): n/a.
Peer-review: Externally peer-reviewed.
Conflict of Interest: Authors declared no conflict of interest.
Financial Disclosure: Authors declared no financial support

REFERENCES

1. Lerttumnongtum P, Muttarak M, Visrutaratna P , Charin Y. Imaging features of unusual adrenal masses. Australas Radiol. 2004;48:107-13.
2. Kenney P J, Wagner BJ, Rao P, Heffess CS. Myelolipoma: CT pathologic features. Radiology. 1998;208:87-95.
3. Arm, R, Cappola AR, Horenstein RB, Drachenberg CB, Sasano H., Papadimitriou JC. Adrenal cortical adenoma with excess black pigment deposition, combined with myelolipoma, clinical Cushing's syndrome. Int J Surg Pathol. 2004;12:57-61.
4. Sun X, A Ayala, C Y Castro. Adrenocortical carcinoma with concomitant myelolipoma in a patient with hyperaldosteronism. Arch Pathol Lab Med. 2005;129:144-7.
5. Ukimura O, Inui E, Ochiai A, Kojima M , Watanabe H. Combined adrenal myelolipoma , pheochromocytoma. J Urol. 1995;154:1470.
6. Merchant S H, Herman CM, Amin MB, Ro JY, Toroncoso P. Myelolipoma associated with adrenal ganglioneuroma. Arch Pathol Lab Med. 2002;126:736-7.
7. Weiner S, Bernstein RG, Lowy S, Karp H. Case report. Combined adrenal adenoma, myelolipoma. J Comput Assist Tomogr. 1981;5:440-2.
8. Gurbuz E, Sayar H, Bakaris S, Inci MF. Adrenal myelolipoma's connection with adenoma in the same adrenal gland. BMJ Case Rep. 2013;2013:pii: bcr2013008925.
9. Ong K, K B Tan, T C Putti. Myelolipoma within a non-functional adrenal cortical adenoma. Singapore Med J. 2007;48:200-2.
10. Manassero F, Pomara G, Rappa F, Cuttano MG, Crisci A, Selli C. Adrenal myelolipom associated with adenoma. Int J Urol. 2004;11:326-8.
11. Yamada S, Tanimoto A, Wang KY, Ding Y, Guo X, Shimajiri S et al. Non-functional adrenocortical adenoma: a unique case of combination with myelolipoma, endothelial cysts. Pathol Res Pract. 2011;207(3):192-6.
12. Al-Brahim N, Asa S. Myelolipoma with adrenocortical adenoma: an unusual combination that can resemble carcinoma. Endocr Pathol. 2007;18:103-5.
13. Bisho E, Eble JN, Cheng L. Adrenal myelolipomas show nonr, om X-chromosome inactivation in hematopoietic elements, fat: support for a clonal origin of myelolipomas, Am J Surg Pathol. 2006;30:838–43.
14. Nigawara T, Sakihara S, Kageyama K, Endothelial cyst of the adrenal gland associated with adrenocortical adenoma: preoperative images simulate carcinoma, Intern Med. 2009;48:235-40.
15. 15.Goetz S P, Niemann TH, Robinson RA, Cohen MB. Hematopoietic elements associated with adrenal glands. A study of the spectrum of change in nine cases. Arch Pathol Lab Med. 1994;118:895-6.
16. Lockhart M E, J.K. Smith, P J Kenney. Imaging of adrenal masses. Eur J Radiol. 2002;41:95-112.
17. Plaut A. Myelolipoma in the adrenal cortex; myeloadipose structures. Am J Pathol. 1958; 34:487-515.
18. Fowler M R, Williams RB, Alba JM, Byrd CR Extra-adrenal myelolipomas compared with extramedullary hematopoietic tumors: a case of presacral myelolipoma. Am J Surg Pathol. 1982;6:363-74.
19. Masugi Y, Kameyama K, Aiba M, Mukai M, Hara S, Ohigashi T et al. Non-functional adrenocortical adenoma with extensive degeneration. Pathol Int. 2003;53:241-5.
20. Chan K C, Chen PI, Huang ZH, Lin YM, Kuo PL. Adrenal myelolipoma with translocation (3;21) (q25;p11). Cancer Genet Cytogenet. 2002;134:77-80.
21. Wu Y, Chang KL, Weiss LM. Adrenal pseudocysts. Pathol Case Rev. 2005;10:263-68.
22. Carvounis E, Marinis A, Arkadopoulos N, Vascular adrenal cysts. A brief review of the literature, Arch Pathol Lab Med. 2006;130:1722-24.