Sarcoid-Like Reaction Associated with Renal Cell Carcinoma - A Case Report.

Asma Iftikhar
Muhammad A I Cheema
Preethi Ramachandran
Sonu Sahni

Touro College of Osteopathic Medicine (New York), sonu.sahni@touro.edu

Follow this and additional works at: https://touroscholar.touro.edu/tcomny_pubs

Part of the Cancer Biology Commons, and the Respiratory System Commons

Recommended Citation
Iftikhar, A., Cheema, M. A. I., Ramachandran, P., & Sahni, S. (2019). Sarcoid-like reaction associated with renal cell carcinoma – A case report. Respiratory Medicine Case Reports, 27, [Article 100847].

This Article is brought to you for free and open access by the Touro College of Osteopathic Medicine (New York) at Touro Scholar. It has been accepted for inclusion in Touro College of Osteopathic Medicine (New York) Publications and Research by an authorized administrator of Touro Scholar. For more information, please contact touro.scholar@touro.edu.
Case report

Sarcoid-like reaction associated with renal cell carcinoma – A case report

Asma Iftikhar*a, Muhammad A.I. Cheema*b, Preethi Ramachandranb, Sonu Sahnic,d,*

a New York – Presbyterian Queens, Division of Pulmonary, Critical Care and Sleep Medicine, Flushing, NY, 11355, USA
b Brookdale University Hospital Medical Center, Division of Hematology and Oncology, Brooklyn, NY, 11212, USA
c Brookdale University Hospital Medical Center, Department of Internal Medicine, Brooklyn, NY, 11212, USA
d Touro College of Osteopathic Medicine, Department of Primary Care, New York, NY, 10027, USA

ARTICLE INFO

Keywords:
Renal cell carcinoma
Sarcoid like reaction
Paraneoplastic syndrome
Metastatic disease

Abstract

Renal cell carcinoma (RCC) is a highly vascular tumor, which may spread to the lungs and other organs. It often presents with localized or systemic manifestation, including paraneoplastic syndromes. Sarcoidosis is a systemic granulomatous inflammatory disease characterized by non-caseating granulomas that typically affects the respiratory system. In the absence of any evidence of systemic sarcoidosis they are referred to as sarcoid-like reactions. Non-caseating epithelioid granulomas, also regarded to sarcoid-like granulomas have been described in association with certain malignancies such as carcinomas of the breast, colon, seminoma, and Hodgkin’s lymphoma. However, sarcoid like reaction associated with renal cell carcinoma is uncommon. Herein we present a rare case of a patient with renal cell carcinoma with mediastinal lymphadenopathy initially thought to metastatic disease, though revealed a sarcoid-like reaction with review of literature.

1. Introduction

Renal cell carcinoma (RCC) is a highly vascular tumor, which may spread to the lungs and other organs via the hematogenous or lymphatic route. Patients with RCC can present with local or systemic manifestations which may be due to metastases or paraneoplastic syndromes. The pulmonary manifestations of RCC are many and varied as patients may present with hemoptysis, pleural effusion, pulmonary embolism or arteriovenous fistulas [1]. Though rare, RCC may also spread through the lymphatic system and involve the mediastinal lymph nodes. This may lead to mediastinal and hilar lymphadenopathy and rarely may it present as a sarcoid-like reaction. Herein we present a rare case of a patient with diagnosed RCC presenting with mediastinal lymphadenopathy initially thought to metastatic disease, which later was determined to be sarcoid-like reaction.

2. Case report

A 45-year-old obese Asian female with only significant past medical history of RCC diagnosed one year prior for which she underwent left partial nephrectomy presented to our outpatient with a chief complaint of progressively worsening dyspnea on exertion, palpitations and wheezing over the previous 3 months. She denied any history of smoking or alcohol use. She also denied history of chest pain, dizziness, weight loss or fever. Her weight was noted to be 88.9 kg with a BMI of 37.69 kg/m². Vital signs were within normal limits with a blood pressure of 130/90 mmHg, pulse of 74 beats/min and O₂ saturation of 96% on room air. On physical examination, she was noted to be obese with no evidence of respiratory distress. Lungs were clear to auscultation bilaterally. Abdominal and neurological examination were unremarkable. Laboratory values are summarized in Table 1.

Patient underwent CT scan of the chest with contrast that there were several mildly enlarged, mildly hypermetabolic mediastinal and bilateral hilar lymph nodes. A right paratracheal lymph node had a measurement of 4.0 SUV. The patient then underwent a bronchoscopy with biopsy which showed endobronchial lesion in the anterior segment of their right superior lobe, subcarinal and right hilar lymphadenopathy. The biopsy showed evidence of non-necrotizing granulomatous inflammation. Fungal and AFB stains were negative. Histological slides have been displayed in Fig. 2. The patient has remained well and has been following as an outpatient. Periodic spirometry and flow volumes loops are being conducted without ant observed changes in pulmonary function.

* Corresponding author. Brookdale University Hospital Medical Center, Department of Internal Medicine, Brooklyn, NY, 11212, USA.
E-mail address: sahni.sonu@gmail.com (S. Sahnì).

https://doi.org/10.1016/j.rmcr.2019.100847
Received 24 February 2019; Received in revised form 14 April 2019; Accepted 14 April 2019
2213-0071/ © 2019 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/BY-NC-ND/4.0/).
3. Discussion

Granulomatous inflammation is a type of chronic inflammatory process that is characterized by accumulation of epithelioid and multinucleated giant cells [2]. In the absence of systemic sarcoidosis granulomas are traditionally formed in response to perceived foreign substances that the immune system is unable to eliminate or they immune mediated. Foreign body granulomas form around commonly iatrogenic material such as talc, sutures or other fibers that are large enough to preclude phagocytosis by a single macrophage. Immune mediated granulomas may be caused by numerous agents including bacterial and fungal organisms however it is possible that granulomas may be formed idiopathically.

3.1. Sarcoid-like reaction

Sarcoid-like reactions refer to the development of non-caseating epithelioid cell granulomas in patients who do not fulfill the criteria for systemic sarcoidosis. It has been reported that approximately 4–14% of cancer patients exhibit sarcoid-like reactions [3]. The sarcoid-like reaction was first described by Wolbach in 1911 [4] and has been reported in multiple different malignancies such as breast, rectal, cystic duct carcinoma [5] and in renal cell carcinoma [6,7]. Cancer associated sarcoid reactions have been observed in both patients with hematologic malignancies or solid tumors [8]. The etiologies of sarcoid-like reactions are not clear. A proposed theory focuses on soluble antigenic factors, shed by tumor cells or released in tumor necrosis in which these soluble factors are carried by lymphatic vessels to the draining lymph nodes, where they may induce a T cell mediated host response similar to a hypersensitivity reaction leading to the formation of epithelioid cell granulomas [9,10].

3.2. Features of sarcoid-like reactions

Histologically, the granulomas of sarcoid-like reaction are indistinguishable from those of systemic sarcoidosis. They usually consist of central focus of epithelioid cells admixed and surrounded by rim of lymphocytes [11]. Giant cells of both the Langerhans and foreign body type are common. Some investigators have reported epithelioid cell granulomas in lymph nodes accompanied by the sinus histiocytes [12]. Sarcoid like reactions are relatively infrequent directly at the tumor site and frequently occur in organs which can be reached by dendritic cells but without direct tumor involvement [9]. The pathogenesis is poorly understood, but the granulomatous inflammation has been related by an anti-neoplastic immune response [3].

Sarcoid reactions are characterized by the by T-zone in lymph nodes and composed of different inflammatory cells within the epithelioid cell granuloma and contain dendritic cells and T lymphocytes. Distribution and demarcation of the granuloma can be correlated with the ratio of CD4/CD8 cells. Thus, T cell mediated immune response and antigen dependent pathways are common for the formation of granulomas. This pathogenesis is the same are same for sarcoidosis and sarcoid-like reactions. In sarcoid-like reactions, CD8 cells are present more frequently when compared to the CD4 cells [13].

### Table 1

| Laboratory Test       | Results          |
|-----------------------|------------------|
| Hemoglobin            | 13.3 g/dl        |
| Hematocrit            | 47.7%            |
| White blood cells     | 7.7 K/ul         |
| Platelets             | 288 K/ul         |
| Sodium                | 140 mmol/L       |
| Potassium             | 3.7 mmol/L       |
| Chloride              | 105 mmol/L       |
| Blood urea nitrogen   | 13 mg/dl         |
| Creatinine            | 0.7 mg/dl        |
| Glucose               | 89 mg/dl         |
| Thyroid stimulating hormone | 0.61 μU/ml   |

**Fig. 1.** Computer tomography of the chest with contrast which showed enlarged mediastinal lymph nodes.
3.3. Sarcoid-like reaction in renal cell carcinoma

Incidence of lymph node metastasis of renal cell carcinoma is in-consistence ranging from 5% to 50% [14]. Only 5% to 8.8% of RCC cases have been reported to metastasize after limited hilar or regional lymph node dissection [15,16] and up to 38% with formal extended retroperitoneal lymphadenectomy [17]. The discovery of sarcoid-like reaction in the setting of renal cell carcinoma is rare with very few cases being reported in the literature. A few of such cases have been outlined in Table 2.

Sarcoid-like reaction was noted to primarily limited to the kidney except for one case reported by Bottone et al. in which the sarcoid-like granuloma was present in liver and abdominal lymph nodes [19]. Though the role of lymph node dissection is still controversial in the setting of RCC it is important to understand the drainage of lymph in and around the renal system. As lymphatic drainage of kidney is di...

Table 2
Cases of renal cell carcinoma with granulomatous sarcoid-like reaction.

| Clinical features | Renal tumor histology | Reference |
|-------------------|-----------------------|-----------|
| 60 y.o. M - left renal mass, lung nodules of clear cell adenocarcinoma with extensive SLR | Not microscopically examined | Moder et al. (1990) [18] |
| 55 y.o. F - Renal mass in kidney infiltrated by sarcoidosis, liver solid masses and abdominal lymph nodes consistent with sarcoidosis | Clear cell RCC with sarcoidosis | Bottone et al. (1993) [19] |
| 56 y.o. M - Renal mass | RCC with SLR | Cambell et al. (1993) [20] |
| 44 y.o. M - Renal failure with renal Mass | Papillary -type RCC with SLR | Marinides et al. (1994) [21] |
| 39 y.o. M - Renal mass | Clear cell RCC with sarcoidosis | Luci et al. (2002) [6] |
| 62 y.o. F - Renal Mass | Clear cell RCC with SLR | Kovacs et al. (2004) [7] |
| 72 y.o. M - Renal Mass | Sarcomatoid RCC with SLR | Piscioli et al. (2008) [21] |
| 44-65 y.o./SM - Renal mass | Clear cell RCC without SLR | Narasimhaiah et al. (2011) [22] |
| 62 y.o. M - Renal mass | Peritumor sarcoid-like reaction | Simon et al. (2012) [23] |
| 41 y.o. M - Renal cell mass | RCC with SLR within tumor | Burhan et al. (2013) [24] |
| 62 y.o M - Renal mass | Bone marrow sarcoid-like reaction | Timothy et al. (2014) [25] |

F – Female; M – Male; RCC – Renal cell carcinoma; SLR – Sarcoid like reaction.

---

Fig. 2. In clockwise fashion: Top left: Hematoxylin and eosin stain of biopsied lymph node showing granuloma 10x; top right: Hematoxylin and eosin stain of biopsied lymph node showing granuloma 40x; bottom right Diff-Quik of biopsied lymph node showing granuloma 40x; bottom left: Diff-Quik staining of biopsied lymph node showing granuloma 10x.
from right to left, right renal tumors mostly drain in the interaortocaval nodes and left sided tumors drain to post aortic and paraaortic nodes. Formation of a granulomatous reaction is not dependent upon the lymph node drainage but in fact, sarcoid-like reactions may be a marker of an immunologically mediated antitumor response of macrophages activated by T-lymphocytes [9].

Active granulomatous inflammatory conditions such as tuberculosis, sarcoidosis, Cryptococcus may cause accumulation of fluorodeoxyglucose (FDG) on PET scanning and may cause false positives in the setting of malignancy. FDG measurement on PET scanning provides quantitative data in the form of standardized uptake value (SUV). A value 2.5 SUV or greater has been used as cut off value indicative of malignancy though various inflammatory cells such as neutrophils and activated macrophages may also show increased uptake.

Clinicians should also take into consideration the possibility of true sarcoidosis in the setting of malignancy. Review of the literature has identified a moderate association between sarcoidosis and malignancies. In the setting of kidney cancer there appears to be a relative importance to differentiate between diagnosis of systemic sarcoidosis associated with malignancy and sarcoid like reaction. In the diagnostic workup certain characteristics favor one diagnosis over another. Granulomas isolated to the vicinity of tumor or to the draining lymph node of tumor are seen more commonly in sarcoid like reactions. In addition, presence of B-cells and sinus histiocytes in the granuloma air on the side of sarcoid like reaction over systemic sarcoid disease [27]. The entity of sarcoidosis in malignancy must be differentiated from sarcoid-like reaction as management and patient outcomes differ.

Our patient presented with a renal tumor, in which there was an abnormal uptake on PET scanning mimicking metastasis of RCC. After further diagnostics, the abnormal PET scan was found to be secondary to a sarcoïd-like reaction.

4. Conclusions

The discovery of sarcoïd-like reaction in the setting of renal cell carcinoma is rare with very few cases has been reported in the literature. In our case sarcoïd-like reaction was found in the lung and was found to be secondary to RCC, after other causes of granulomatous disease such as tuberculosis and sarcoidosis were excluded. It is important to know that these reactions may mimic metastatic disease.

Conflicts of interest

None.

Financial disclosure

None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.rmcr.2019.100847.

References

[1] A. Agrawal, S. Sahni, A. Iftikhar, A. Talwar, Pulmonary Manifestations of Renal Cell Carcinoma, Respiratory Medicine, (2015).
[2] G.N. Marinides, I. Hajdu, R.O. Gans, A unique association of renal carcinoma with sarcoïd reaction in the kidney, Nephron 67 (4) (1994) 477–480.
[3] J.B. Craun, K.P. Banks, M.N. Clemenshaw, R.W. Moren, Sarcoïd like reaction of neoplasia causing hypermetabolic thoracic adenopathy in setting of extrathoracic malignancy: report of two cases and a review of the differential diagnostic considerations, J. Nucl. Med. Technol. 40 (4) (2012) 231–235.
[4] S.B. Wolsbach, A new type of Cell Inclusion, not Parasitic, associated with disseminated granulomatous lesions, J. Med. Res. 24 (2) (1911) 243–258 7.
[5] D. Mereles, N. Ehiken, S. Kreuscher, S. Ghofrani, M.M. Hoepfer, M. Halan, F.J. Meyer, G. Karger, J. Buss, J. Juenger, N. Holzapfel, C. Ozipt, J. Winkler, F.P. Herth, H. Wihlens, H.A. Katus, H. Olschewski, E. Grunig, Exercise and respiratory training improve exercise capacity and quality of life in patients with severe chronic pulmonary hypertension, Circulation 114 (14) (2006) 1482–1489.
[6] S. Luceri, R. Rivolta, M. Fazi, L. Iorio, G.F. Rasciella, G. Merlino, R. Giordano, A. Redleri, Sarcoïdosis and clear cell carcinoma of the kidney: the sixth case? II G. Chir. 23 (3) (2002) 75–78.
[7] J. Kovacs, A. Varga, M. Besseneyi, S. Gomba, Renal cell cancer associated with sarcoïd-like reaction, Pathol. Oncol. Res. 10 (3) (2004) 169–171.
[8] R.M. Pujol, X. Matias-Guiu, M. Planaguma, J.M. de Moragas, Chronic lymphocytic leukemia and cutaneous granulomas at sites of herpes zoster scars, Int. J. Dermatol. 29 (9) (1990) 652–654.
[9] H. Brincker, Sarcoïd reactions in malignant tumors, Cancer Treat Rev. 13 (3) (1986) 147–156.
[10] R. Baseler, F. Birke, Histopathology of tumour associated sarcoïd-like stromal reaction in breast cancer. An analysis of 5 cases with immunohistochemical investigations, Virchows Arch. A Pathol. Anat. Histopathol. 412 (3) (1988) 231–239.
[11] G. Gorton, F. Liedell, Malignant tumors and sarcoïd reactions in regional lymph nodes, Acta Radiol. 47 (5) (1957) 381–392.
[12] B. Hogstedt, Sarcoïd-like lesions (epithelioid cell granulomatosis) of regional lymph nodes in association with carcinoma of the cervix, Acta Radiol. Ther. Phys. Biol. 7 (1) (1968) 12–16.
[13] A. Kurata, Y. Terado, A. Schulz, Y. Fujisaka, F.E. Franzke, Inflammatory cells in the formation of tumor-related sarcoïd reactions, Hum. Pathol. 36 (5) (2005) 546–554.
[14] D.G. Skinner, R.B. Colvin, C.D. Vermillion, R.C. Pister, W.F. Leadbetter, Diagnosis and management of renal cell carcinoma. A clinical and pathologic study of 509 cases, Cancer 28 (5) (1971) 1165–1177.
[15] A. Minervini, L. Lillas, G. Morelli, C. Traversi, S. Battaglia, R. Cristofani, R. Minervini, Regional lymph node dissection in the treatment of renal cell carcinoma: is it useful in patients with no suspected adenopathy before or during surgery? BJU Int. 88 (3) (2001) 169–172.
[16] J.P. Siminovitch, J.E. Montie, R.A. Straffon, Lymphadenectomy in renal adeno- carcinoma, J. Urol. 127 (6) (1982) 1090–1091.
[17] A. Agiels, S. Chepexas, K.M. Schrott, P. Hermanek, (Surgery of the kidney tumor), Chirurg 52 (9) (1981) 545–553.
[18] K.G. Modér, S.C. Litin, T.A. Gaffey, Renal cell carcinoma associated with sarcoïdlike tissue reaction, Mayo Clin. Proc. 65 (11) (1990) 1496–1501.
[19] A.C. Bottone, M. Labarbera, A. Asadourian, A. Barman, C. Richie, Renal sarcoïdosis coexisting with hypernephroma, Urology 41 (2) (1993) 157–159.
[20] F. Campbell, A.G. Douglas-Jones, Sarcoïd-like granulomas in primary renal cell carcinoma, Sarcoïdosis 10 (2) (1993) 128–131.
[21] F. Piolatto, P. Donato, L. Morelli, F. De Nonno, S. Licci, Renal cell carcinoma with sarcoïdoid features and peritumoral sarcoïd-like granulomatous reaction: report of a case and review of the literature, Int. J. Surg. Pathol. 16 (3) (2008) 345–348.
[22] D.A. Narasimhan, M.T. Manipadam, K. Answathan, S. Krishnamorthy, Renal cell carcinoma associated with granulomatous reaction, Saudi journal of kidney diseases and transplantation : an official publication of the Saudi Center for Organ Transplantation, Saudi Arab. 22 (6) (2011) 1211–1214.
[23] S. Ouettel, R. Albahine, R. Sabbagh, Renal cell carcinoma associated with peritumoral sarcoïd-like reaction without intratumoral granulomas, Diagn. Pathol. 7 (2012) 28.
[24] W. Burhan, Z. Al Rowaie, E. Rajih, M. Akhtar, Sarcoïd-like granulomatous reaction in renal cell carcinoma: report of a case with review of the published reports, Ann. Saudi Med. 33 (6) (2013) 614–618.
[25] T.F. Madden, S.J. Bacci, Diffuse bone marrow sarcoïd-like reaction associated with renal cell carcinoma, Skeletal Radiol. 43 (12) (2014) 1761–1766.
[26] A. Chopra, A. Nautiyal, A. Kalkanis, M.A. Judson, Drug-induced sarcoïd-like reactions, Chest 154 (3) (2018) 664–677.
[27] A. Chopra, M.A. Judson, How are cancer and connective tissue diseases related to sarcoidosis? Curr. Opin. Pulm. Med. 21 (5) (2015) 517–524.