A very rare case of renal cell carcinoma metastasis to spermatic cord and a condensed literature review

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ABSTRACT

INTRODUCTION: Renal cell carcinoma (RCC) is proved to be the ninth most common malignancy. Two–third of the patients suffering from RCC will present metastases. Secondary metastases of RCC to spermatic cord are very rare.

PRESENTATION OF CASE: In this report we present the case of a patient with renal cell carcinoma with metachronous metastasis to the spermatic cord occurring two years after the initial diagnosis of the disease.

DISCUSSION: Our patient was treated according to EAU guidelines. The metastatic tumor was diagnosed accidentally, in contrast to the previous follow-up exams which show no disease in the meantime. Moreover, the histological examination of the spermatic cord tumor illustrated tumor thrombus. The former examination results along with the anatomical and embryological relations of renal and spermatic cord structures indicate a hypothesis about the mechanism of this metastatic route.

CONCLUSION: Our case is of great interest, since such cases are very few in the international literature. Therefore the presentation of this case as well as its implications should be made to the global surgery community.

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1. Introduction

Renal Cell Carcinoma (RCC) is a common malignancy which has the tendency to give metastasis via various lymphatic or vascular routes. Spermatic cord is a very unusual location for RCC metastasis, with only 30 cases being referred to the literature [1]. We present a rare case of a 76-year-old male patient with left spermatic cord metastasis from RCC two years after receiving radical left nephrectomy. Additionally, we provide a condensed literature review and try to identify the possible anatomical pathway of these metastatic routes. The work has been reported in line with the SCARE criteria [2].

2. Presentation of case

Five years ago, a 74-year-old male proceeded to our hospital due to urinary tract infection. The patients’ medical history as well as his family’s, were free by that time. He did not receive medication, and he presented normal cardiopulmonary function. The patient was neither a smoker nor obese. Clinical examination, blood and urine tests were normal, on the contrary to the ultrasound examination, which revealed a left kidney lesion. Further evaluation with MRI scan showed a rather large lesion enlarging the left kidney, without invading the renal capsule. (Photo 1) The renal parenchyma was altered, with obvious bleeding sites as well as infiltration of both left renal artery and a considerable part of inferior vena cava. These data suggested a diagnosis of renal cell carcinoma without lymph infiltration or other metastasis (T3BNO0M0 stage).

The patient received left radical nephrectomy with thrombectomy of IVC and left renal vein. The operation performed by an experienced team of skilled oncoligic surgeons and urologists. The postoperative course of the patient was uncomplicated and he was discharged on the 7th day. The patient did not receive postoperative adjuvant therapy. The case was examined and discussed in the Oncological Committee which is constituted by oncoligic surgeons, urologists, medical oncologists and radiotherapists. The patient’s follow-up included evaluation of renal function and cardiovascular risk factors, as well as chest, upper and lower abdomen CT scan in the 6th, 12th and 24th month postoperatively. The exams performed 6 and 12 months after the initial operation failed to reveal local recurrence or distant metastases.

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Two years after the initial operation, and before performing the annual follow-up exams, the patient presented a symptomatic swelling of the left inguinal area. A CT scan performed, but there was no imaging evidence of secondary metastasis. The patient was treated surgically. A left inguinal incision was executed and after detailed inspection of the entire area left orchiectomy took place.

The specimen received for histological examination included the testis (5 × 3 × 2.5 cm), the related epididymis, the spermatic cord (14 cm in length, 1–2.5 cm diameter), and the fibrous adipose mass (dimensions 2.5 × 1 × 1.5 cm) attached to the first third of the cord. (Photo 2) Macroscopically, the spermatic cord was shown fibrous and stiff with enlarged diameter and areas of brown color and hemorrhagic infiltration. Cross section of the spermatic cord revealed yellow-brown areas with fibrous and hemorrhagic infiltration.

The microscopic histological examination of the excised tissue showed multiple intravenous cancerous emboli in left spermatic vein, along the length of left spermatic cord. These cancerous emboli constitute cellular groups with morphological and immunohistochemical characteristics of clear renal cell carcinoma, which are compatible with the patient’s clinical history. Multiple lesions were spotted in the interstitial tissue of the spermatic cord with areas of necrosis and bleeding sites. Necrotic and bleeding sites were also present in the adipose tissue preparation attached to the first third of the cord. Epididymis and testis were free of disease.

The histological examination of the specimen indicated spermatic cord secondary metastasis from the primary pre-existing renal cell carcinoma.

The case was discussed in the Oncological Committee which decided that due to the advanced age of the patient along with the negative results of the new imaging tests, not to proceed to postoperative adjuvant therapy. The patient was followed-up with evaluation of renal function and cardiovascular risk factors, chest, upper and lower abdomen CT scan in the 6th, 12th, 24th and 36th month postoperatively. He was very cooperative and compliant, regarding to treatments and follow-up examinations. All follow-up exams until today were free of disease.

3. Discussion

RCC was the ninth most common malignancy in Europe in 2008 [3]. One-third of RCC patients have already secondary metastases by the time of the diagnosis, while another third will be diagnosed with metastatic disease after the treatment of a clinically localized renal tumor [4]. Most common metastases sites are found in lung (45.2%), bone (29.5%), lymph nodes (21.8%), liver (20.3%), adrenal (8.9%) and brain (8.1%) [5]. Extremely rare sites of RCC metastases have also been presented in the literature. These rare metastatic sites can be located in ocular (19 cases until 2011), parotid gland (26 cases until 2011), nasal and paranasal cavities (50 cases until 2011) and tongue (28 cases until 2011) [6].

Spermatic cord tumors are unusual, while metastatic tumor of the spermatic cord is very rare. The most common metastases to the spermatic cord derive from stomach (70.4%), colon (28.9%), pancreas (15.8%), large bowel (13.2%) and rectum (7.9%). A correlation between the part of the colon, in which the primary tumor is sited, and the side of the spermatic cord metastasis, has been identified. The ascending colon and cecal cancers seem to usually create metastasis to the right spermatic cord, while the descending colon and sigmoid cancers to the left spermatic cord [7]. Bladder, lung and brain have also been reported to involve such metastases [8].

In a detailed research of the relative literature we found that only 30 cases of RCC metastasis to the spermatic cord have been reported [1]. In 1995, Fournier et al. described two cases and presented a
Table 1
Review of literature of metastases from RCC to spermatic cord.

| First Study Author | Year | Patient age | Metachronous/ Synchronous | Primary RCC site | Staging of primary RCC | Spermatic cord metastasis | Histology of spermatic cord metastasis | Management |
|---------------------|------|-------------|---------------------------|-----------------|------------------------|--------------------------|----------------------------------------|------------|
| Fournier            | 1995 | 44          | Metachronous (30 months later) | Left            | T3b                    | Left                     | Clear cell                            | Radical nephrectomy, orchietomy          |
| Fournier            | 1995 | 57          | Metachronous (44 months later) | Right           | T3a                    | Right                    | Clear cell                            | Radical nephrectomy, orchietomy          |
| Fallick             | 1997 | 62          | Synchronous               | Left            | T3a                    | Left                     | Clear cell                            | Orchietomy, radical nephrectomy and Interleukin-2 Radial nephrectomy, orchietomy |
| Datta               | 2001 | 46          | Metachronous              | Left            | ND                     | Left                     | Clear cell                            | Radical nephrectomy, orchietomy          |
| Singla              | 2002 | 42          | Metachronous (18 months later) | Left            | ND                     | Left                     | ND                                    | Radical nephrectomy, orchietomy          |
| Hicks               | 2003 | 55          | Synchronous               | Right           | T3b                    | Right                    | Clear cell                            | Radical nephrectomy, orchietomy          |
| Viswaroop           | 2004 | 43          | Metachronous (2 months later) | Left            | T3b                    | Left                     | Clear cell                            | Radical nephrectomy                     |
| Pascal Samaniego    | 2007 | 68          | Synchronous               | Right           | T3b                    | Right                    | Papillary                             | Radical nephrectomy, orchietomy          |
| Mohammad Ilyas      | 2008 | 60          | Metachronous (9 months later) | Right           | T3b                    | Right                    | Clear cell                            | Radical nephrectomy, orchietomy          |
| Correa              | 2009 | 57          | Synchronous               | Left            | T3a                    | Left                     | Clear cell                            | Radical nephrectomy, orchietomy, sunitib malate Radical nephrectomy, orchietomy |
| Mohammadi           | 2011 | 57          | Metachronous (36 months later) | Left            | ND                     | Left                     | Papillary                             | Radical nephrectomy, orchietomy          |
| Tran                | 2011 | 55          | Metachronous (7 months later) | Left            | T3b                    | Left                     | Clear cell                            | Radical nephrectomy, orchietomy, excision of hemiscrotum and inguinal canal |
| Pirola              | 2016 | 67          | Metachronous               | Left            | ND                     | Right                    | Clear cell                            | Radical nephrectomy, orchietomy          |
| Present case        | 2017 | 74          | Metachronous (24 months later) | Left            | T3b                    | Left                     | Clear cell                            | Radical nephrectomy, inguinal orchietomy |

review of the literature including another 17 cases mentioned previously [9]. At the same time two other cases that had been reported in the Japanese literature were not included in Fournier’s report. This makes a total of 19 reported cases by 1995 [1,9]. Since then, 12 additional ones have been detected including the present. The data of all cases are presented in Table 1. In addition, most of spermatic cord metastasis mentioned present left ipsilateral metastasis, whereas only 4 out of 31 incidences present right ipsilateral metastasis. This fact may involve higher possibility of spermatic cord metastases when RCC is diagnosed at the left kidney. A case of a metachronous bilateral metastasis from the left kidney to the right spermatic cord has been also indicated [9].

Tumor thrombus formation occurs in 5%-15% of all RCC cases [1,6]. Venous clot may involve renal veins or the inferior cava and extend intraluminally into the right atrium in 1% of cases [10]. In our case, nacreous emboli and thrombus were found into inferior vena cava and removed during the time of the RCC diagnosis. However, 2 years after the initial treatment, a cancerous thrombus was spotted in the left spermatic vein too, which premises of retrograde vein flow. Similar cases of RCC involving intra-vein tumor clots have
been also described in the past, in Japanese, French and English literature [11].

The exact pathophysiological mechanism and the anatomical route for this metastasis have not been defined yet. Possible routes of spermatic cord metastasis from RCC may include retrograde spermatic vein flow from the renal vein, hematogenous and lymphatic spread [12]. Retrograde spermatic vein flow seems to be the most probable way of spread, especially for a left sided tumor [13]. The anatomical differences between left and right renal and spermatic vein drainage, which come after several changes during the development of the embryo may have a critical role to this theory.

The embryo has three major venous systems that are developed by the fifth week, and fulfill different functions: (1) the vitelline veins carrying blood from the yolk sac to the sinus venosus, (2) the umbilical veins, originating in the chorionic villi and carrying oxygenated blood from the placenta to the embryo, and (3) the cardinal veins, draining the body of the embryo proper [14]. Moreover, a number of, bilaterally symmetrical at first, veins are also formed during the 5th to the 7th weeks: (1) the subcardinal veins, which mainly drain the kidneys, (2) the sacrocardinal veins, which drain the lower extremities, and (3) the supracardinal veins, which drain the body wall of the intercostals veins, by taking over the functions of the posterior cardinal veins [11]. By the 7th and 8th weeks, the subcardinal veins become connected to each other with numerous median anastomoses and form lateral anastomoses with the posterior cardinals. All these venous systems are initially bilaterally symmetric [15]. However, formation of the vena cava system initiates a radical remodeling to these veins, so that the blood from the left side is channeled to the right side [14,15].

The anastomosis between the subcardinal veins and the supracardinal veins form the renal veins. Once the anastomotic part of the left supracardinal vein and the left supracardinal vein itself are formed, the latter regresses, except for its distal portion [14]. The distal parts of both supracardinal veins remain to form the left and right spermatic vein. The right subcardinal vein becomes the main drainage channel and develops into the renal segment of the inferior vena cava [14,15] (Fig. 1).

These embryologic changes result to left spermatic vein ending to left renal vein before they empty to IVC, whereas right spermatic vein and right renal vein empty to IVC separately. Furthermore, because of the junction of the left spermatic vein with the left renal vein at a right angle, in comparison to the right system; left spermatic vein is characterized of larger length and of higher venous pressure. As a result to these, if cancer thrombus is formed into left renal veins, it is easier to spread to the left spermatic vein, even without IVC thrombus, whereas the right spermatic vein premises of IVC thrombous extension [14,16].

In our case, patient was treated according to EAU last guidelines. At first, he was diagnosed with left renal cell carcinoma with inferior vena cava and left renal vein infiltration. No metastases were found at that time. EAU suggests radical nephrectomy and complete thrombectomy, irrespective of the extent of tumor thrombus at presentation time. In addition, EAU guidelines indicate that there is no currently evidence that adjuvant therapy offers a survival benefit to patients with III stage disease. This is why patient went under follow-up program without postoperative adjuvant therapy. However, in spite of the fact that patient did all of the appropriate follow-up examinations, these failed to prove this metastases.
Two years later, our patient presented with a mass derived from left inguinal area. The mass was removed and histological examination proved that it was a metachronous metastasis to ipsilateral spermatic cord. Although patient was adherent to the follow-up schedule, the follow-up exams were incapable of detecting the metastases. Once again, the case was discussed in the Oncological Committee. Due to the negative results of the new imaging tests and advanced age of patient, it was decided not to proceed to postoperative adjuvant therapy. The patient is under follow-up examinations to date and he is free of disease.

4. Conclusions

Renal Cell Carcinoma metastasis to the spermatic cord is a very rare entity. Our patient, in spite the fact that he received treatment and postoperative surveillance according to EAU guidelines, follow-up examinations failed to prove the metastases. The spreading route and the anatomical differences between right and left spermatic vein, in association with the fact that this kind of metastasis is mostly detected on the left side, imply a strong correlation with the venous drainage of the cord. Surgeons worldwide should be aware and highly alerted in cases of RCC, especially when they are located on the left side.

Conflict of interest

The authors declare no competing interests.

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Ethical approval

Ethical approval has been exempted by our Institute.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

Ioannis Tsouknidas – Data collection; wrote the paper.
Nikolaos Tasis – Data collection; wrote the paper.
Charalampos Kokkinos – Surgeon, performed the operation.
Helen Trihia – Pathologist who examined the specimen.

Dimitrios Filippou – Wrote and corrected the paper.
Panagiota Skandalakis – Corrected and approved the paper.
Theodore Troupis – Corrected and approved the paper.

Registration of research studies

Our work is not a result of a study research. Our work is a case report.

Guarantor

Tsouknidas Ioannis, MD.

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