Received: 25.12.2012 / **Accepted:** 16.04.2013
DOI: 10.5137/1019-5149.JTN.7805-13.0

Intramedullary Spinal Cord Metastasis of Renal Cell Carcinoma 6 Years Following the Nephrectomy

Nefrektomiden 6 Yıl Sonra Renal Hücreli Karsinomun İntramedüller Omurilik Metastazı

Jun GAO, Yongning LI, Zhong YANG, Renzhi WANG

Peking Union Medical College Hospital, Chinese Academy of Medicine Sciences & Peking Union Medical College, Department of Neurosurgery, Beijing, China

Corresponding Author: Yongning LI / E-mail: lytynww@yahoo.com.cn

ABSTRACT

Intramedullary spinal cord metastasis is an uncommon manifestation of systemic tumor. We present a case of metastatic mass inside the thoracic spinal cord 6 years after nephrectomy because of renal cell carcinoma. The parenchymal lesion was resected totally and the histologic examination confirmed it as renal cell carcinoma metastasis. The patient's neurological function improved apparently until the intramedullary spinal cord metastasis recurred in situ later. The case shows that renal cell carcinoma has the possibility of metastasis into spinal cord even several years after nephrectomy. Any symptom of neurological deficit should alert to a possible intramedullary spinal cord metastasis.

KEYWORDS: Renal cell carcinoma, Spinal cord, Neoplasm metastasis

ÖZ

İntramedüller omurilik metastazı, sistemik tümörün nadir bir bulgusudur. Renal hücreli karsinom nedeniyle nefrektomiden 6 yıl sonra torasik omurilik içinde metastatik bir kitle olgusu sunuyoruz. Parankimal lezyona total rezeksiyon yapıldı ve histolojik inceleme renal hücreli karsinom metastazı olduğunu doğruladı. Hastanın nörolojik fonksiyonu intramedüller omurilik metastazı in situ olarak nüks gösterinceye kadar iyiye gitti. Bu olgu renal hücreli karsinomda nefrektomiden yıllar sonra bile omuriliğe metastaz olabileceğini göstermektedir. Herhangi bir nörolojik defisit belirtisi, olası intramedüller omurilik metastazı konusunda uyarıcı olmalıdır.

ANAHTAR SÖZCÜKLER: Renal hücreli karsinom, Omurilik, Neoplazm metastazı

CASE ILLUSTRATION

A 51-year-old man complained that he felt numbness underneath the nipple level with progressive weakness of both lower extremities for one month. A month ago, he had felt discomfort in his back that was exacerbated on movement. One week after the onset, he felt numbness in his both feet, and soon, the hypoesthesia level rose to the level of nipples. He felt somewhat weak in both feet but still walked by himself, and did not have any problems with urination or defecation in those days. In the third week, the weakness in his both legs progressed to paraplegia. Sphincter continence was preserved, though he had some difficulty with control. In the fourth week the condition deteriorated and the patient became completely non-ambulatory with indwelling catheter. He had undergone left nephrectomy because of renal clear cell carcinoma 6 years ago but he never gone for follow-up.

In the clinic he was found to have a spastic paraplegia of lower extremities with muscle strength of 2/5. Sensory examination revealed hypoesthesia of light touch and temperature sensation below the costal margin and absence of vibration and position in lower extremities bilaterally. Both patellar reflex and ankle reflex were hyperactive. Bilateral Babinski sign was positive. Magnetic Resonance Imaging (MRI) of the spine revealed a parenchymal lesion (17mm×8 mm) in the T4-5 spinal cord, showing hypointense signal on T1WI and hyperintense signal on T2WI, enhancing homogeneously with intravenous contrast. The lesion was located completely inside the spinal cord in all images (Figure 1A-C).

Because of the rapid progression of neurological deficit and history of renal cell carcinoma, the parenchymal lesion of the spinal cord was suspected of being a metastasis. The lesion was dissected carefully from the parenchyma and removed totally. The pathological diagnosis revealed metastatic renal cell carcinoma. Immunochemical staining results displayed AE1/AE3 (+), CD10 (+), EMA (+), P504 (+), RCC (+), Vimentin (+).

When the patient was discharged, he felt less leg weakness and numbness, had better movement control, defecation became normal, and dysuria improved although the catheter was kept. A postoperative MRI was performed and showed total resection of the intraparenchymal lesion (Figure 2A).

He could walk with mechanical assistance and control the sphincter function well until similar symptoms appeared 3

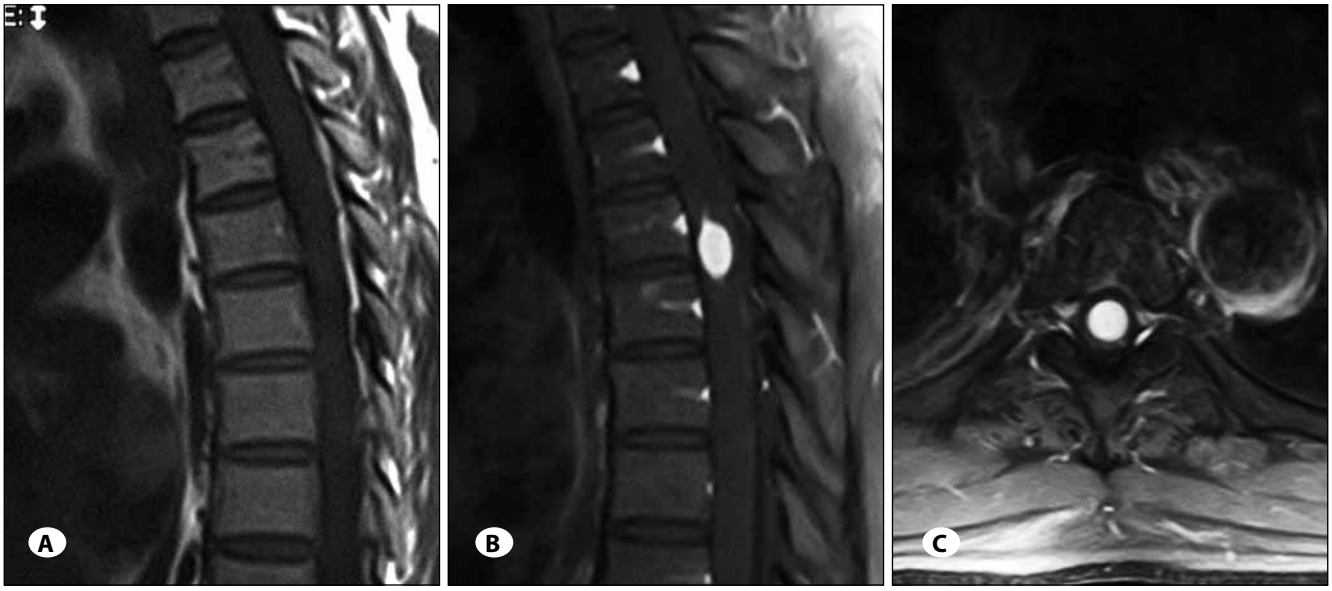

Figure 1: Non-contrast sagittal **(A)**, post-contrast sagittal **(B)** and axial **(C)** MRI sequences demonstrating an enhancing lesion arising inside the spinal cord.

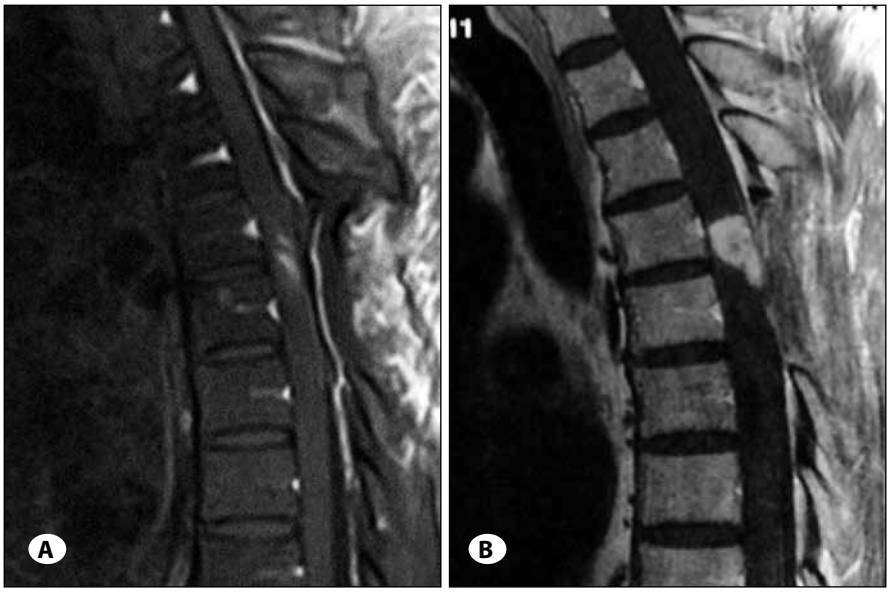

Figure 2: A) Sagittal post-contrast T1 MRI sequences demonstrating resection of the intraparenchymal lesion.
B) Sagittal post-contrast T1 MRI sequences demonstrating recurrence of lesion in-situ.

months after the operation. The MRI indicated recurrence of metastasis (Figure 2B). Under the patient's strong demands, a second operation was performed to debulk the tumor and alleviate the compression of the spinal cord. This time there was no obvious improvement of his function. The patient abandoned treatment and was discharged.

DISCUSSION

Intramedullary spinal cord metastasis (ISCM) is a rare condition with poor prognosis and a renal origin accounts for about 4% (3,8). To our knowledge there are several detailed reported cases in which the involved segments were the cervical, thoracic or lumbosacral cord (1,5,6,10).

Regardless of the histology, the average time between the diagnosis of primary tumor and ISCM occurrence was 13-21 months (4,9). This is also usually the case with most ISCM of renal origin whereas some occur several years later. Similar to our case suffering from metastasis 6 years after nephrectomy, Ateaque A reported a case with ISMC 11 years after nephrectomy and Fakih reported a case with ISMC 15 years after nephrectomy (2,6). Interestingly, ISCM can also be the first manifestation of occult renal carcinoma (1,5,10).

Weakness of extremities, especially lower extremities, is the most common symptom of ISCM arising from renal origin, followed by paresthesia, back pain, and incontinence (5,6,10). The distinguished feature of ISCM is rapid progression of

the symptom. Once the neurological deficit occurs, the dysfunction always exacerbates in several weeks unlike primary intramedullary tumors that typically progress slowly.

Without a specific sign on the MRI image, the intramedullary lesion cannot be differentiated from other disorders such as radiation myelitis, paraneoplastic myelopathy, or primary cord neoplasia (3). It has been suggested that positron emission tomography (PET), particularly with fluorine-18 fluorodeoxyglucose, could be used to detect ISCM, and especially those of renal or lung origin.

The adoption of any treatment should be decided according to the individual case and the patient's wishes must be taken into account (4). Radiotherapy has been regarded as the gold standard for ISCM with or without steroids to reduce edema (8) but its use has been limited to highly radiosensitive tumors such as small cell lung carcinoma or breast carcinoma. Unfortunately, renal cell carcinoma is a radioresistant tumor. In a series of patients who received radiotherapy for ISCM, the survival time for renal origin was the shortest (3 weeks) while it was 24 weeks for cases with a lung origin and 18.7 weeks for those with a breast origin (7). With the development of the microsurgical techniques and intraoperative electrophysiological monitoring, the risk of surgical complications has apparently decreased. It seems that there is a tendency to select microsurgery as the first line of treatment. In the recent detailed reports of operations for ISCM, all patients' neurologic function improved at various degrees although the prognosis was poor (5,6,10). Traditional chemotherapy was not feasible for ISCM because of the blood-cerebral barrier. Some new targeted inhibitors have been introduced for the treatment of renal cell metastasis.

Even if the tumor is resected totally, recurrent ISCM has been reported in the same localization in the following months (5,6). Our patient had recovered to become ambulatory with good control of sphincter function until 3 months after the first surgery. Because of the satisfactory result of the first operation, the patient strongly urged the neurosurgeons to perform another operation. However, there was little improvement as predicted after debulking the recurrent tumor.

CONCLUSION

Renal cell carcinoma can metastasize into the spinal cord even years after surgery. Any symptom of neurological deficit should alert the physician to intramedullary spinal cord metastasis. The management of ISCM should be decided individually, taking into account the patient's wishes. If the condition permits, surgery is an option to relieve symptoms and improve quality of life.

REFERENCES

1. Asadi M, Rokni-Yazdi H, Salehinia F, Allameh FS: Metastatic renal cell carcinoma initially presented with an intramedullary spinal cord lesion: A case report. Cases J 2:7805, 2009
2. Ateaque A, Martin JL, O'Brien C: Intramedullary spinal cord metastases from a hypernephroma 11 years following the diagnosis and treatment of the primary lesion. Br J Neurosurg 14:474-476, 2000
3. Connolly ES Jr, Winfree CJ, McCormick PC, Cruz M, Stein BM: Intramedullary spinal cord metastasis: report of three cases and review of the literature. Surg Neurol 46:329-337; discussion 337-338, 1996
4. Dam-Hieu P, Seizeur R, Mineo JF, Metges JP, Meriot P, Simon H: Retrospective study of 19 patients with intramedullary spinal cord metastasis. Clin Neurol Neurosurg 111:10-17, 2009
5. Donovan DJ, Freeman JH: Solitary intramedullary spinal cord tumor presenting as the initial manifestation of metastatic renal cell carcinoma: Case report. Spine 31:E460-463, 2006
6. Fakih M, Schiff D, Erlich R, Logan TF: Intramedullary spinal cord metastasis (ISCM) in renal cell carcinoma: A series of six cases. Ann Oncol 12:1173-1177, 2001
7. Hashii H, Mizumoto M, Kanemoto A, Harada H, Asakura H, Hashimoto T, Furutani K, Katagiri H, Nakasu Y, Nishimura T: Radiotherapy for patients with symptomatic intramedullary spinal cord metastasis. J Radiat Res (Tokyo) 52:641-645, 2011
8. Hrabalek L: Intramedullary spinal cord metastases: Review of the literature. Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub 154:117-122, 2010
9. Schiff D, O'Neill BP: Intramedullary spinal cord metastases: Clinical features and treatment outcome. Neurology 47: 906-912, 1996
10. Schijns OE, Kurt E, Wessels P, Luijckx GJ, Beuls EA: Intramedullary spinal cord metastasis as a first manifestation of a renal cell carcinoma: Report of a case and review of the literature. Clin Neurol Neurosurg 102:249-254, 2000