Journal of Korean Medical Science
Vol 7, No. 2, 167-169 June 1992

Progressive Atypical Peripheral Neuropathy following Nephrectomy in a Patient with Renal Cell Carcinoma

Jong Sung Kim, M.D., and Jeong Hee Cho*, M.D.

Department of Neurology and Pathology, University of Ulsan, Asan Medical Center, Seoul, Korea*

Peripheral neuropathy or amyotropic lateral sclerosis can be associated with renal cell carcinoma. We report a 63-year-old male patient with renal cell carcinoma who developed an atypical, progressive neuropathy after nephrectomy.

Key Words: *Peripheral neuropathy, renal cell carcinoma*

INTRODUCTION

Although rare, paraneoplastic peripheral neuropathy or motor neuron disease can occur in the patients with renal cell carcinoma (Swan & Wharton. 1963: Buchanan & Makamud, 1973: Evans et al., 1990). These patients usually show neurologic improvement after the treatment of the underlying neoplasm. We report a patient with renal cell carcinoma who developed progressive, fatal neuropathy following nephrectomy.

CASE REPORT

A 63-year-old man was admitted to the department of urology, Asan Medical Center due to hematuria and right abdominal mass. Investigations revealed a right sided fetal head sized kidney tumor which extended into the inferior vena cava. He had a 10-year history of diabetes mellitus which had been well controlled by diet alone. A nephrectomy with inferior venacavotomy was done successfully in June 1990. Pathologic diagnosis was clear cell carcinoma with tumor embolism in the inferior vena cava. He was discharged without any problems.

After discharge, he began to complain of progressive weakness in his right arm and leg. However, he did not visit the hospital until Aug. 1990 when he was admitted to the department of neurology. Asan Medical Center. On admission, he was alert, but looked agitated. He had mild dysarthria, mild right facial palsy and hemiparesis. Sensory testing was normal. Reflexes were hyperactive in both arms, more so in the right side. Knee jerks were within normal limits; ankle jerks were decreased in both feet. Pathologic reflexes were not elicited.

Results of routine laboratory tests were normal except for mild anemia and mildly elevated blood glucose (FBS 118 mg/dl, PP2 234 mg/dl). RA factor and ANA tests were negative. Serum IgG, IgA and IgM levels were normal. There was no evidence of bony or pulmonary metastasis. Brain computed tomography (CT) showed no abnormalities. CSF study was rejected by the patient. The right sided weakness rapidly progressed and 7 days after admission, the left limb weakness became evident. Five days later, he began to complain about respiratory difficulty. Intermittent high fever was noticed. Neurologic examination revealed facial diplegia, severe dysarthria, dysphagia, flaccid quadriplegia, and decreased distal limb sensation in all sensory modalities. Chest PA showed findings of aspiration pneumonia.

Nerve conduction study showed moderately decreased motor and sensory conduction velocities in the bilateral median, ulnar, peroneal, posterior tibial and sural nerves. The amplitudes of compound motor action potentials and sensory action potentials were also moderately decreased. EMG showed fibrillations, positive sharp waves, and giant motor unit potentials in bilateral tibialis anterior, gastrocnemius, and right brachioradialis muscles. Fasciculations were occasionally detected in bilateral tibialis anterior muscles. Muscle biopsy of the right deltoid showed scattered angulated fibers without definite grouping. Biopsy of the right sural nerve showed occasional myelin digestion chambers and severely degenerated axons in both myelinated and unmyelinated nerve fibers. Electron microscopic examination of the nerve fibers also showed severe demyelination and axonal degeneration (Fig. 1). Seventeen days after admission, the patient

Address for correspondence: *Jong Sung Kim, Department of Neurology, Asan Medical Center, Songpa-Gu Pungnap-Dong 388-1 Seoul 138-040, Korea*

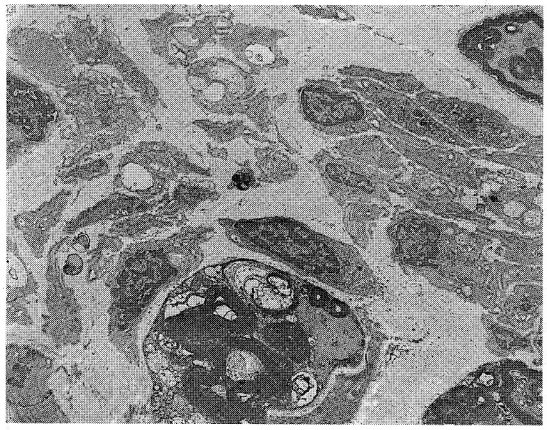

Fig. 1 A section of sural nerve showing axonal shrinkage, haphazardly arranged myelin sheaths, and increased interneurial collagen tissue (E.M. X3,800)

was discharged against medical advice, and died the following day.

DISCUSSION

In this case, the flaccid quadriplegia, distal sensory changes and findings of muscle and nerve biopsies clearly indicated that the patient had a severe peripheral neuropathy. Since the symptoms were associated with renal cell carcinoma, and other causes for the neuropathy such as toxin, inflammation or collagen diseases were ruled out by the history and laboratory tests, paraneoplastic peripheral neuropathy seems justified. Unfortunately, we could not perform CSF study to rule out the possibility of the root involvement of the cancer cells. However, biopsy findings of severely damaged axons and myelins in a relatively short period of time stand strongly against that possibility. Although he had a long history of diabetes mellitus, it was a mild one, and the relentless worsening of the patient's symptoms was not compatible with diabetic neuropathy. Therefore, our case seems to belong to the second type of the paraneoplastic neuropathy described by Croft et al. (1987), namely, acute or subacute, severe peripheral neuropathy.

However, there are several unusual findings in this case. First, the onset of the symptoms was quite asymmetrical; right sided facial palsy and right hemiparesis were found initially, which prompted us to investigate brain CT for possible metastatic brain tumor. The possibility of CT-negative brain stem ischemia seems remote since the mode of onset of the right limb weakness was not abrupt but slowly progressive until the left hemiparesis became evident about two months later. Another unusual observation was the fact that at the time of admission (that is till about two months after the onset of the symptoms), there was spasticity rather than flaccidity at least in the upper extremities. These findings, along with severe bulbar symptoms, atrophied distal limbs, and fasciculations detected by EMG in both tibialis anterior muscles made us think about motor neuron disease. As the neurologic symptoms progress, however, flaccid paralysis, typical of peripheral neuropathy overwhelmed the patient's symptoms; muscle biopsy revealed the scattered angulated fibers, and nerve biopsy showed severely damaged axons and myelin sheaths.

Although autopsy was not performed, the atypical presentation of our patient strongly suggests that our patient may have had pathologies in the cord, brain stem and/or cerebrum in addition to peripheral nerves. In this respect, our patient most resembles the interesting case reported by Buchnan and Malamud (1973). Their patient who had suffered a renal cell carcinoma developed muscle wasting, fasciculation, distal sensory change, and asymmetric spasticity. Autopsy showed asymmetrical cord and medullary lesions in addition to peripheral neuropathy.

Finally, the most interesting finding in this case was that our patient developed probable paraneoplastic syndrome only after nephrectomy. There were reports of paraneoplastic syndromes, be it peripheral neuropathy or motor neuron disease, which were improved by the treatment of underlying malignancies (Swan & Wharton, 1963; Buchanan & Malamud, 1973; Sipila et al., 1982; Evans et al., 1990). Our case is unusual in that the opposite occurred. This again is reminiscent of the patient reported by Buchnan and Malamud (1973). Although their patient showed ultimate neurologic recovery, he showed initial neurologic deterioration after nephrectomy: further development of the intellectual dysfunction and spasticity.

There are several possible etiologies for the development of paraneoplastic syndromes, namely, toxin secreted by tumor, competition for essential substrate with tumor, opportunistic infection, and immunologic alteration (Bruyn, 1979; Posner, 1989). The first three seem unable to explain the rapid progression of neurologic signs seen in our case or initial neurologic deterioration of Buchanan and Malamud's case (1973), both of which immediately followed nephrectomy. These two case reports suggest that the behaviour of the paraneoplastic neurologic syndromes could be variably influenced by the complex imbalance of the immunological system caused by underlying mali-

gnancies.

REFERENCES

Buchanan DS, Malamud N: *Motor neuron disease with renal cell carcinoma and postoperative remission. A clinico-pathologic report. Neurology 23:891-894, 1973.*

Bruyn GW: *Carcinomatous polyneuropathy. In: Vinken PJ, Bruyn GW, eds. Handbook of clinical neurology Vol. 38, New York, North -Holland publishing company, 1979.*

Croft PB, Urich H, Wilkinson M: *Peripheral neuropathy of sensory-motor type associated with malignant disease. Brain 90:31-66, 1967.*

Evans BK, Fagan C, Arnold T, et al: *Paraneoplastic motor neuron disease and renal cell carcinoma: improvement after nephrectomy. Neurology 40:960-962, 1990.*

Posner JB: *Neoplastic syndromes involving the nervous system. In: Aminoff MJ, eds. Neurology and general medicine. New York, Churchill Livingstone, 1989.*

Sipila R, Leinonen H, Juntunen J: *Paraneoplastic polyneuropathy associated with a carcinoid tumor of the cecum. Acta Med Scan 212:183-185, 1982.*

Swan CH, Wharton BA: *Polyneuritis and renal carcinoma. Lancet 2:383-384, 1963.*