Polyarteritis Nodosa Complicated by a Multiple Sclerosis Like Syndrome

H. WAISBURG, K. L. MELOFF and R. BUNCIC

SUMMARY: A case is presented of a 16-year-old boy with angiographically proven polyarteritis nodosa who developed a multiple sclerosis like syndrome affecting the brain stem and cerebrum. His serum demyelinated nerve in tissue culture. The case is reviewed in detail and the mechanism of myelotoxicity is discussed.

RESUME: Le cas d’un garçon de 16 ans avec polyarterité nodosa prouvée angiographiquement qui développe une sclérose en plaques touchant le tronc cérébral et le cerveau, est présenté. Le sérum de ce patient demyelinisait les nerfs en culture de tissu. Présenté en détail, ce cas sert de raison à une revue du mécanisme de myélotoxicité.

CASE REPORT

The patient, a boy of Italian descent, was well until July 1967, when, at the age of 11 years, he developed a sore throat, fever, vomiting, tenderness in the left upper abdominal quadrant and hematuria. On admission, he appeared acutely ill, pale and had periorbital edema. His abdomen was flat with marked guarding on the left side. A mass, interpreted as the left kidney, was palpable 5-6 cm. below the left costal margin. Blood pressure was 160/110. The pulse was 104/minute and regular.

From the Hospital for Sick Children, Toronto, Ontario, Canada.

Reprint requests to: Dr. K. Meloff, Neurology Department, Hospital for Sick Children, Toronto.
absent and cells and casts were absent.

About two weeks after admission, the patient developed brisk deep tendon reflexes in his lower extremities, bilateral upgoing toes and ankle clonus. These resolved spontaneously within a week. One month later, at the time of discharge, Hgb was 10.8 gm. %, ESR has fallen to 34 mm/hr. and platelet count was normal.

Over the next year he was examined monthly in the renal clinic. BUN, Hgb and electrolytes remained normal. The blood pressure fluctuated between 120/70 and 130/90 and 1+ to 2+ proteinuria persisted.

He was readmitted in June 1968, at age 12 years to evaluate the persistent left flank mass. The IVP was normal except that the left renal outline was slightly enlarged compared with the right. The renal angiogram was repeated. The aneurysms of the peripheral branches of the renal arteries were less prominent than previously. The lower pole of the left kidney did appear to be slightly small, perhaps secondary to scarring. He was discharged in July 1968.

In August, 1970, at age 14, he began to complain of periodic stiffness and tingling of his fingers. Eighteen months later, he was readmitted with a 48 hour history of sudden hearing loss on the left side, vertigo, nausea, vomiting and non-lateralized ataxia.

On examination he had a strong, right beating, spontaneous, horizontal nystagmus with rotary element; left lower motor neuron facial weakness; complete hearing loss on the left side; minimal pyramidal signs on the left side. An electroencephalogram was normal. The cerebrospinal fluid protein was 25 mg. %. Ice water caloric stimulation of the left ear produced no response. Audiometric studies revealed total left nerve deafness and a loss of the 4000 frequency tone in the right ear. The creatinine clearance was 65 mg/ml/m².

Within two weeks all the neurological signs and symptoms had cleared up except for the total deafness of the left ear. He was discharged and about six months later, in September, 1972, he had a sudden numbness and weakness of the left side of the body which cleared up in 48 hours.

In November of 1972, he was again admitted because of the sudden onset of severe left flank pain. On examination he was pale, the blood pressure was 140/100, and the pulse 96/minute. There was no cardiomegaly. In the 24 hours following admission the neurological status deteriorated. His mental status was intact but he developed the following signs: limited right eye abduction to about 50-60%, a dissociated nystagmus of the abducting left eye with slowed saccadic movements of the right medial rectus; bilateral jerky nystagmus on upward gaze. Cold caloric stimulation of the right ear, partially improved abdication of the right eye and produced a beating nystagmus in the left eye. These findings represented a right internuclear ophthalmoplegia with a partial right sixth nerve palsy and an intact right vestibular apparatus. Caloric stimulation of the left ear produced no response.

The pupils were normal in appearance and reactive to light. Corneal reflexes were present bilaterally. There was a complete right lower motor neuron facial palsy and total left sensorineural deafness. The rest of the cranial nerves were intact. Mild pyramidal signs were present on the left side of the body. The toes were upgoing bilaterally. Sensation for pain and touch was decreased on the right side of the body with a sensory level at C₄-C₅. Other sensory modalities were intact. Marked gait and truncal ataxia was present associated with severe dizziness, and a tendency to fall to the left with eyes open or closed.

He was treated with prednisone 60 mg. a day with marked improvement of his neurological status. At the time of discharge, four weeks later, he was left with a mild right facial palsy, a partial right sixth nerve palsy, a right internuclear ophthalmoplegia, mild truncal ataxia, a sensory level on the right at L₁ to L₂, bilateral upgoing toes and his old sensorineural hearing loss on the left side.

The nerve conduction velocity was slow in the lower limbs (30 m/sec.) and the brain scan was normal. The EEG showed diffuse disturbances of function in the post-central regions. The CSF protein was normal (27 mg. %) and the CSF protein electrophoresis revealed a normal pattern, with normal levels of gamma globulin. A vertebral angiogram did not indicate any vascular abnormality. The antinuclear factor was positive.

Myelinated cultures of rat cerebellum underwent a specific and characteristic pattern of demyelination in the presence of the patient’s serum. The neuroglia swelled, and the myelin sheaths became disfigured by fusiform swellings and broke away to small fat droplets.

In May, 1973, at the age of 16 years, he was again admitted after a sudden episode of loss of consciousness, followed by confusion, dysarthria, and a right flaccid hemiparesis. This clinical picture improved in 48 hours without treatment and seven days after the onset a brain scan was abnormal, showing an increased uptake in the territory of the left middle cerebral artery, suggesting a cerebral infarction.

DISCUSSION

The difficulty of establishing the diagnosis of polyarteritis nodosa has been stressed by many authors (Rose and Spencer, 1957; Griffith and Vural, 1951). Skeletal muscle biopsy confirms the specific vascular lesion in only 20 to 35% of cases (Maxeiner et al, 1952).

The kidney is involved in 80 to 100% of cases of polyarteritis in late childhood and adulthood. Aneurysm formation with rupture is sometimes the cause of death in these patients and usually occurs early. Several cases of polyarteritis nodosa have been reported in which perirenal and retroperitoneal hemorrhages were due to the rupture of a renal aneurysm (Weyer and Perry, 1935; Fort, 1948; McGrae, 1959; Horn and
Our patient had involvement of peripheral nerves, brain stem vestibular apparatus and cerebrum, and the symptoms and signs exacerbated and remitted affecting different parts of the nervous system at different times, mimicking multiple sclerosis.

The myelotoxic effect of the patient's serum on rat brain has been described in more than 60% of cases of multiple sclerosis (Bornstein and Appel, 1961; Bornstein, 1963). This myeloinflammatory effect apparently resides in the gamma 2 globulin (Appel and Bornstein, 1964). Antibrain antibodies have been seen in a variety of other conditions including Huntington's Chorea, presenile dementia, Hashimoto's thyroiditis, rheumatoid arthritis, systemic lupus erythematosus, viral encephalitis, Guillain-Barré syndrome, and experimental allergic encephalomyelitis (Kies et al, 1965). The destructive effect could be a "marker" of autoimmune disease or a non-specific effect due to production of antibodies in response to any form of brain damage.

To our knowledge, this is the first case of angiographically proven polyarteritis nodosa associated with a myelotoxic effect of serum on nerve in tissue culture.

The authors are indebted to Dr. Murray B. Bornstein, Professor of Neurology, Albert Einstein College of Medicine, for performing these studies and for reviewing the manuscript.

Dr. Bornstein's work is supported by National Multiple Sclerosis Society Grant No. 788 and N.I.N.D.S. Grant NS00735.

REFERENCES


