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# Aseptic Meningitis Complicating Metrizamide Myelography

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Metrizamide is a newer contrast medium used predominantly in myelographic studies. Side effects, in general, have been minor after its use. Recently, a patient developed a purulent aseptic meningitis after metrizamide cervical myelography. The subsequent clinical picture and cerebrospinal fluid findings were indistinguishable from acute bacterial meningitis and form the basis of this report.

## Case Report

A 62-year-old man was admitted for right arm radicular pain and diplopia. Eight months earlier he had documented metastatic adenocarcinoma, primary site unknown, with pleural and skeletal involvement.

On physical examination, he was alert, well oriented, and afebrile. Pertinent findings included a supple neck, a left sixth cranial nerve palsy with questionable left retinal mass, and mild weakness of the right upper extremity. Laboratory data were normal except for a mild elevation of the alkaline phosphatase. Computed tomography (CT) demonstrated an enhancing lesion eroding the right frontal bone with destruction of the orbital roof. Electromyography and nerve conduction studies confirmed a C7-T1 radiculopathy. The spinal fluid before instillation of metrizamide (10 ml, 200 mg/1 ml) was normal with a glucose concentration of 77 mg/dl.

After the procedure, the patient complained of a headache. Within 24 hr he developed a temperature of 40°C, nuchal rigidity, and disorientation. A lumbar puncture showed grossly cloudy fluid with a white blood cell count of 14,000/mm<sup>3</sup>, 100% polymorphonuclear leukocytes, a protein concentration of 220 mg/dl, and a glucose concentration of 58 mg/dl with a peripheral blood glucose concentration before intravenous fluids of 185 mg/dl. Counterimmunoelectrophoresis, limulus lysate, and Gram stain of the spinal fluid were negative. A second CT scan was unchanged. Chloramphenicol, gentamicin, and nafcillin were begun empirically. The patient was alert and oriented 48 hr later with a temperature of 38.5°C. Another lumbar puncture revealed a white blood cell count of 650/mm<sup>3</sup>, 93% polymorphonuclear leukocytes, a protein concentration of 232 mg/dl, and a glucose concentration of 70 mg/dl. A peripheral white blood cell count was 21,000/mm<sup>3</sup> with 22% eosinophils. Cultures of the spinal fluid, blood, urine, and a sample from the same batch of metrizamide were negative and antibiotics were discontinued at 96 hr. The patient soon defervesced but eventually died several weeks later due to his underlying disease.

## Discussion

Metrizamide is a nonionic water-soluble contrast agent derived from metrizoic acid and glucosamine. The compound is absorbed from the subarachnoid space into the systemic circulation and has been regarded as inert [1]. Older contrast agents such as iophendylate are oil-based, can produce adhesive arachnoiditis, and therefore require removal at conclusion of the study. The properties of metrizamide obviate removal and arachnoiditis is extremely rare, although reported [2], after its use.

Headache occurs after metrizamide myelography in 29%–67% of cases and is generally not severe, but may persist several days. Fever, meningismus, toxic encephalopathy, seizures, elevated sedimentation rate, leukocytosis, and spinal fluid pleocytosis have been infrequently reported [1].

Gelmers [3] described striking meningeal irritation in 4% of 439 patients after metrizamide myelography. Temperature elevations exceeded 38.5°C in five patients. Cloudy spinal fluid with white blood cell of 2,000–8,000/mm<sup>3</sup> were observed, but glucose levels and differential white blood cell counts were not reported.

Kelly et al. [2] described a patient who developed headache, fever, nuchal rigidity, and muteness 1 day after metrizamide lumbar myelography. The spinal fluid contained a white blood cell count of 4,600/mm<sup>3</sup> with 87% polymorphonuclear leukocytes, a protein concentration of 960 mg/dl, and a glucose concentration of 17 mg/dl. Before the procedure, the spinal fluid was abnormal with the presence of red blood cells and an elevated protein; 12 weeks later the spinal fluid remained abnormal. Communicating hydrocephalus, Guillain-Barré syndrome, and arachnoiditis, which subsequently occurred in this patient, were also attributed to metrizamide. Viral serology and cultures were not reported.

Meningeal irritation accompanied by eosinophils in the spinal fluid after iophendylate myelography has been observed [4]. The appearance of a peripheral blood eosinophilia in our patient tends to point toward a similar hyper-

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sensitivity phenomenon. A Wright stain of the spinal fluid was unfortunately not performed.

Metrizamide's structural similarity to glucose is unique among contrast agents. Bertoni et al. [1] found that metrizamide is a competitive inhibitor of hexokinase at the first step in glycolysis. Impaired brain glucose metabolism may then be one mechanism responsible for some of its toxicity. Our patient's initial confusion and possibly compensatory peripheral hyperglycemia are consistent with this mechanism.

Bacterial meningitis after myelography is exceedingly rare but must be considered in cases like this. *Pseudomonas aeruginosa*, enteric Gram-negative bacilli, and *Staphylococcus aureus* have each been reported in meningitis after myelography [5].

Our case clearly demonstrates that a clinical presentation identical to bacterial meningitis may follow metrizamide myelography. Only in retrospect can this patient's illness be

attributed to a side effect of metrizamide. This diagnosis, of course, must remain one of exclusion.

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