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Iopamidol vs. Metrizamide Myelography: Clinical Comparison of Side Effects

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One hundred myelographies with iopamidol and 100 with metrizamide were performed in order to compare the side effects of the two contrast media after injection into the spinal subarachnoid space. All patients were observed for a follow-up period of at least 4 days. The most frequently observed side effect, headache, was more common, of longer duration, and more severe with the use of metrizamide than with iopamidol. Only neck pain was more common with iopamidol. More severe side effects such as meningeal irritation, psychoorganic syndrome, and epileptic seizures occurred only with metrizamide. The results seem to indicate a lower neurotoxicity and better patient tolerance for iopamidol than for metrizamide.

Many publications have dealt with the adverse side effects of metrizamide injected into the spinal subarachnoid space [1-15]. Among these side effects, headache is the most frequent, occurring in 10.5%-64% of subjects [2, 4-8, 11, 12]. According to some authors, headache is directly related to the contrast medium [2, 5, 12], while others attribute it to the lumbar puncture [16]. Other reactions, such as nausea, vomiting, leg or neck pain, and worsening of preexisting symptoms, vary in intensity and duration [2, 3, 5-8, 11, 12]. Meningeal irritation, hyperpyrexia, mental confusion, arachnoiditis, epileptic seizures, psychoorganic syndrome, and spinal epilepsy are reported less frequently [1, 3, 5, 8-11, 14, 15]. All these side effects are probably directly related to the action of the contrast medium on the central nervous system.

A few papers have reported the adverse side effects of iopamidol, a new nonionic contrast medium. It appears that the symptoms observed with the use of this agent are the same as those seen with other contrast media, but distinctly less severe and less frequent [17, 18]. We know of only one report comparing the side effects of metrizamide and iopamidol [19]. Its authors ascribe the higher frequency of headache after iopamidol myelography to the faster reabsorption rate of this agent. The present study compares the respective side effects of metrizamide and iopamidol in a large series of myelographies.

Subjects and Methods

One hundred myelographies with metrizamide and 100 with iopamidol were studied. Most (58%) of the examinations were saccularadulographies, followed by myelographies of the entire spinal column (23%) and cervical myelographies (19%). Lumbar puncture was used for the injection of the contrast media in most cases (79.5%), followed by upper laterocervical (12.5%) and sub-

occipital injection (8%). The amount of contrast medium administered was 8-20 ml (average, 10 ml), usually with an iodine concentration of 300 mg/ml. Most of the 200 patients (123 men, 67 women) were 40-60 years of age (range, 17-63). In order to avoid technical differences, all myelographies were performed by the same operator. Patients were observed for a follow-up period of at least 4 days by the same physician, except those who presented more severe symptoms and were followed until all symptoms ceased.

Results

Fifty-four patients studied with iopamidol and 29 with metrizamide had no adverse side effects. The remaining 117 patients had one or more postexamination symptoms, of which headache was most frequently observed (table 1). The incidence and severity of headache in relation to the spinal region examined are shown in table 2. Headache in myelographies with metrizamide was more frequent, of longer duration, and more severe than that observed after injection of iopamidol. Regardless of the contrast agent, severe headache occurred more frequently in patients who underwent myelographic study of two or more vertebral levels. There was no significant relation between the incidence and severity of headache and the total dose of iodine (table 3).

All other side effects except neck pain occurred much more frequently with metrizamide than with iopamidol (table 1). The most severe reactions were observed with metrizamide. A patient examined for lumbar and sciatic pain experienced meningeal irritation after metrizamide injection (total iodine dose, 3 g). Another patient had a grand mal seizure 2 hr after suboccipital injection of metrizamide (total iodine dose, 2.5 g). When the same patient underwent iopamidol myelography via lumbar puncture (iodine dose, 4.5 g) a few days later, no adverse effects were observed. Finally, six cases had a reaction pattern similar to the psychoorganic syndrome described by other authors. In one case the syndrome consisted of sleep difficulties with oneirism throughout the night after lumbar myelographic examination (iodine dose, 3 g). The other five cases experienced mental confusion lasting a maximum of 3 days. This symptom always arose immediately after the myelography, which was conducted for examination of the lumbar region in two cases and the whole spine in three. All five patients had received more than 3 g of iodine and two had a total dose of 4.5 g. In one of these two, the onset of symptoms was extremely acute and closely related to leakage of the contrast medium into the cranial cavity as a result of technical error. Electroencephalographic readings obtained during the first few hours after myelography performed in the lateral

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TABLE 1: Type and Incidence of Side Effects after Iopamidol vs. Metrizamide Myelography

Side Effect	Contrast Agent	
	Iopamidol (n = 100)	Metrizamide (n = 100)
Headache	29	43
Nausea and vomiting	10	22
Worsening of preexisting symptoms	6	15
Leg pain	6	8
Neck pain	8	3
Lumbar pain	1	7
Psychoorganic syndrome	...	6
Dizziness	4	5
Fever	1	3
Change in blood pressure	1	3
Meningism	...	1
Epileptic seizures	...	1

TABLE 2: Incidence and Severity of Headache According to Contrast Agent and Investigated Region

Contrast Agent: Vertebral Region Investigated	No. (%) with Headache			
	Mild	Moderate	Severe	Totals
Iopamidol (n = 100):				
Cervical only (n = 21)	2 (9)	1 (5)	...	3 (14)
Lumbar only (n = 54)	16 (30)	4 (7)	...	20 (37)
Two or more regions (n = 25)	4 (16)	...	3 (12)	7 (28)
Metrizamide (n = 100):				
Cervical only (n = 17)	1 (6)	6 (35)	1 (6)	8 (47)
Lumbar only (n = 62)	10 (16)	6 (10)	9 (14)	25 (40)
Two or more regions (n = 21)	4 (19)	3 (14)	3 (14)	10 (47)

TABLE 3: Incidence and Severity of Headache According to Contrast Agent and Total Dose of Iodine

Contrast Agent: Total Dose of Iodine (g)	Severity of Headache			Total No. (%) With Headache
	Mild	Moderate	Severe	
Iopamidol (n = 100):				
2.5 (n = 12)	3 (25)	2 (17)	...	5 (42)
2.5-3.5 (n = 53)	9 (17)	4 (7)	1 (2)	14 (26)
3.5 (n = 35)	8 (23)	...	2 (6)	10 (29)
Metrizamide (n = 100):				
2.5 (n = 28)	3 (11)	1 (4)	4 (14)	8 (29)
2.5-3.5 (n = 56)	9 (16)	6 (11)	11 (19)	26 (46)
3.5 (n = 16)	3 (18.7)	3 (18.7)	3 (18.7)	9 (56)

Note.—Percentages are given in parentheses.

decubitus position showed slow-wave activity on the side the patient lay on during the examination. This slow-wave activity became diffuse in the hours that followed, and electroencephalograms remained abnormal for over 5 days.

Discussion

The results seem to indicate a better patient tolerance for iopamidol than for metrizamide, independent of the amount of contrast

medium injected and the extent or region of the spine examined. This observation is supported by the large number of patients who showed no side effects after iopamidol myelography: 54, in contrast to 29 among those who had received metrizamide. Even headache, the most common side effect reported in both groups, was more frequently observed, of longer duration, and more severe after metrizamide (43%) than after iopamidol (29%). Similar differences between the two groups were observed in reported frequency of the less common symptoms such as nausea, vomiting, leg pain and worsening of preexisting symptoms, with the single exception of neck pain, which occurred more frequently after injection of iopamidol. At present, we can offer no plausible explanation for this. The most remarkable result seems to be the absence of the so-called psychoorganic syndrome as a reaction to iopamidol, although this syndrome was observed in six cases after injection of metrizamide. Moreover, one patient in the metrizamide group experienced meningeal irritation and one had a grand mal seizure. In these two cases, however, we had administered doses of contrast medium slightly higher than those recommended in the literature [20, 21]. On the other hand, slightly higher amounts of iopamidol were well tolerated and always produced images of excellent quality.

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