

**NOTES ON THE CLINICAL COURSE
OF MICROMERCURIALISM. A STUDY OF WORKERS
FROM THE MERCURY ELECTROLYSIS
OF SODIUM CHLORIDE DEPARTMENT**

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Heavy forms of mercury poisoning are ever less frequently encountered along with improving the labour conditions in industrial enterprises. Nowadays, micromercurialism produced by the continuous effect of low mercury concentrations, is the condition met with most frequently (1, 2, 7, 8, 9, 10). Clinically, it presents astheno-vegetative syndrome, manifested in varying degree, and isolated weakly pronounced symptoms of mercury intoxication (3, 4, 6, 7, 11).

We were enabled to observe under clinical conditions a series of 14 workers (9 men and 5 women) with evidence of micromercurialism. They have worked for periods ranging from 5 months to 3 $\frac{1}{2}$ years in a factory department for obtaining chlorine through sodium chloride electrolysis, where metallic mercury was employed as a cathode. According to data submitted by the hygiene-epidemiologic inspection, the concentration of mercury vapours in the air of the working place exceeded the maximum allowable concentration.

By age factor the affected workers were distributed as follows: 21 to 30 years — six patients, 31 to 40 — four, 41 to 50 — one, and above 50 — three. All the patients were subjected to a thorough clinical, laboratory and neurologic examination.

Results

The chief subjective complaints in the treated series of 14 patient with micromercurialism are enumerated in the enclosed table.

It can be seen from the table that most of the patients complain of headache, vertigo, increased irritability, uneasiness, general weakness and febleness, disturbed sleep (often, with cyclic nocturnal inversion), and occasionally, of tearfulness susceptibility, memory impairment, absent-mindedness. The clinical syndrome of «mercury erethism», described in older publications, was slightly pronounced in eight cases. Complaints of manifested in a varying degree vegetative disturbances, such as sweatings, excessive secretion of saliva (in two patients dryness in the mouth), frequent urination and disturbed defecation, heart disorders — tachycardia, opperession were particularly marked. Complaints of metallic taste in the mouth and other dyspeptic symptoms were recorded in nine cases, and gum bleeding — in seven. It is interesting to note that all women reported menstrual cycle disorders. Their complaints dated back from several months to one year, and in most of them showed intensification lately.

No	Subjective complaints	Patients with symptoms
1	Headache	9
2	Vertigo	7
3	Increased irritability, uneasiness	11
4	Tearfulness	4
5	Sleep disturbances	13
6	General weakness and feebleness	14
7	Memory impairment	3
8	Profuse perspiration	8
9	Weight loss	6
10	Frequent miction	5
11	Heart disorders — tachycardia, oppression	7
12	Hand tremor (tremor of spread fingers)	12
13	Numbness of the extremities	12
14	Metallic taste in the mouth	9
15	Bleeding of gums	7
16	Excessive secretion of saliva	7
17	Dyspeptic symptoms	9
18	Defecation troubles — constipation, diarrhea	5

The objective study of the cardiovascular system showed pulse lability with tachycardia susceptibility in four cases. Arterial pressure was within normal limits. The stomatologic examination disclosed hemorrhagic gingivitis in six patients. In one a blue line was observed along the border of the gum, in the front teeth area — marked in the upper gum. In none of the patients was Atkinson's symptom detected. The neurologic and vegetologic study of the patients disclosed characteristic changes. Vegetologic study included the following tests: orthoclinostatic test, Aschner—Danini's test, skin thermometry, the epinephrine test proposed by Groer and Hech and resorption time after McClure. Electroencephalographic study was also performed using an 8-channeled electroencephalograph, type Gallileo, with light and partly sound stimulation. Tremor of spread fingers, manifested in varying degrees, was recorded in 13 patients. In seven of them it was a matter of fine tremor, with high frequency and small range. In the other six patients the tremor was coarser, with lower frequency and greater range. In the same patients discrete discoordination manifestations in speech and handwriting (in three with speech dystonia for consonants) were present. The vegetologic testing gave us sufficient reason to accept vegetodystonia with sympathicotonia in eight of the cases, and vegetodystonia + parasympathicotonia — in the other six. EEG data in eleven cases point to a definite abnormality of tracings. On the whole, the bioelectric activity of the brain is with low voltage, slightly delayed, moderately desynchronized, with inert cortical response manifestations (light and sound alike). It is a matter of diffuse changes, by no means strictly localized, and correlated with the functional and neurokinetic disorders of bioelectric activity. This is in accordance with the findings described by most of the authors (3, 5, 6).

Apart from the disorders in the menstrual cycle already mentioned sporadic menorrhagia and more rarely oligomenorrhea, the obstetricgynecologic study failed to establish other changes.

Investigation of the urine (albumin, biliary pigments, sediment and specific weight) and blood picture (hemoglobin, erythrocytes, leukocytes with differential count) did not reveal variations from the normal values.

The studied biochemical indices include: colloidal stability tests — Weltmann, Maclagan and Burstein, blood bilirubin, cholesterol, total protein with proteinogram, reduced glutathione, blood urea, blood sugar, iron and copper microelements in the serum, the serum enzymes (transaminase, alkaline phosphatase, cholinesterase, ceruloplasmin), lactate dehydrogenase, glucose-6-phosphate dehydrogenase. The findings in all the subjects under study were within normal limits.

Urine investigation for mercury (basally) disclosed moderately increased values in twelve patients, ranging from 20 to 105 mcg/24 hours. However, following unitol provocation, the quantity of mercury in the urine showed a sharp rise in all the patients, and reached rather high values in nine — ranging from 950 to 1850 mcg for 24 hours.

The functional study of the kidneys — Zimnitski's test, urea and creatinine clearance — did not show changes.

X-ray study of the lungs yielded negative result in all the patients. In three patients with gastric ulcer the roentgenogram afforded indirect evidence of duodenal ulcer.

The electrocardiographic study failed to detect any changes.

Discussion and Conclusion

The clinical study of the patients shows that the astheno-vegetative syndrome with functional bioelectric activity disorders prove to be characteristic of the disease. Among the cases with heavier forms of astheno-vegetative syndrome, equally coarser tremor of the spread fingers, hemorrhagic gingivitis and high mercury values in the urine were established following unitol stimulation. Analogical changes were also found in several patients, with health state affected in advance, exposed to the effect of a toxic environment — two had organic diseases of the nervous system in the past history, and three — duodenal ulcer. In the same cases, following short-term exposure (3—9 months) to mercury vapours, the clinical picture of micromercurialism ensuing was more strongly pronounced.

The abrupt rise of mercury in the urine, recorded in most of the patients after unitol administration, indicates that the amount of mercury deposit in the organism is considerable. Transaminases, cholinesterase, ceruloplasmin and the other studied enzymes and biochemical indicators showed no changes at all.

Against the background of the above data, the conclusion is reached that apart from the other prophylactical measures, a strict professional screening proves mandatory — workers with chronic diseases of the nervous system and gastrointestinal tract (ulcers) should not be allowed to work in contact with mercury.

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К КЛИНИКЕ МИКРОМЕРКУРИАЛИЗМА. ИССЛЕДОВАНИЕ РАБОЧИХ ЦЕХА РТУТНОГО ЭЛЕКТРОЛИЗА НА НАТРИЕВОМ ХЛОРИДЕ

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РЕЗЮМЕ

При подробном клиническом исследовании 14 рабочих с данными на микромеркуриализм установлено, что для заболевания характерен астено-вегетативный синдром с функциональным нарушением биоэлектрической активности. У 6 больных этот синдром был выражен более сильно, имея в то же время и более крупный тремор пальцев, геморрагический гингвит и высокие величины ртути в моче после провокации с унитиолом. Такие более выраженные симптомы интоксикации были обнаружены и у больных с наличием в анамнезе заболеваний — двое страдали органическими нервными заболеваниями и трое язвенной болезнью. У них после непродолжительной экспозиции ртутных паров (3—9 месяца) возникла картина микромеркуриализма. Авторы приходят к выводу, что такие хронически больные не должны допускаться к работе, требующей контакта с ртутью.

Трансаминазы, холинэстеразы, церулоплазмин и другие ферменты и биохимические показатели не дали изменений.