EFFECT OF CHOLINERGIC AGENTS ON SURVIVAL OF MICE AFTER ACUTE MICROWAVE IRRADIATION

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UDC 617-001.21-02:538.3]-092.9-085.217.32

Administration of cholinomimetics (pilocarpine, neostigmine, cytisine) immediately after microwave irradiation (62 ± 5 mW/cm^2, λ = 12.5 cm, 15-16 min) increased the survival rate of the irradiated mice by 1.2-1.3 times; after administration of cholinolytics fewer of the irradiated mice survived.
KEY WORDS: *cholinolytics; cholinomimetics; microwave irradiation.*

In the treatment of lesions following microwave irradiation there are many unsolved problems [1, 3].

The effect of various cholinomimetics and cholinolytics on the survival of mice irradiated with microwaves was studied.

EXPERIMENTAL METHOD

Male albino mice (1134) weighing 22-26 g were irradiated with microwaves λ = 12.5 cm) from the dorsal aspect by a contact method [2] with the "Luch-58" apparatus at an intensity of 62 ± 5 mW/cm^2 for 15-16 min. About 10% of the mice died "under the beam."

Immediately after irradiation the animals were given a single injection of muscarinic (M-) and nicotinic (N-) cholinergic drugs: acetylcholine hydrochloride (0.5-20 mg/kg), carbachol (0.01-1 mg/kg), and neostigmine (0.005-0.5 mg/kg), the M-cholinomimetic pilocarpine hydrochloride (1-50 mg/kg), the M-cholinolytics atropine sulfate (10-100 mg/kg), scopolamine hydrobromide (10-400 mg/kg), and aprophen* (1-100 mg/kg), the N-cholinomimetics cytisine (0.5-10 mg/kg) and lobeline hydrochloride (1-100 mg/kg) and N-cholinolytics tetraethylammonium (0.1-40 mg/kg), benzohexonium (10-500 mg/kg), pachycarpine hydriodide (0.1-50 mg/kg), pirilen† (1-100 mg/kg), and azamethonium bromide (0.5-100 mg/kg). Acetylcholine, lobeline, and azamethonium were injected subcutaneously and all the other substances intraperitoneally in a volume of 0.5-1 ml/100 g body weight.

Each dose of each drug was tested on 12-16 mice. Control animals received the corresponding volumes of solvents (isotonic NaCl solution or distilled water) immediately after irradiation. Survival of the mice was determined 3 weeks after irradiation.

EXPERIMENTAL RESULTS

The survival rate of the irradiated mice was 47-52%. After injection of pilocarpine in a dose of 10 mg/kg, neostigmine in a dose of 0.05 mg/kg, and cytisine in doses of 1 and 5 mg/kg it was increased by 1.2-1.3 times ($P < 0.05$). When other cholinomimetics were used no increase in survival rate was observed. Administration of M- and N-cholinolytics

*2-Diethylaminoethyl-2,2-diphenylpropionate hydrochloride.
†Pempidine tosylate.

Vladivostok Medical Institute. (Presented by Academician of the Academy of Medical Sciences of the USSR V. V. Zakusov.) Translated from Byulleten' Éksperimental'noi Biologii i Meditsiny, Vol. 81, No. 3, pp. 285-286, March, 1976. Original article submitted July 24, 1975.

over a wide range of doses was followed by a decrease in the survival rate of the irradiated mice ($P < 0.05$). High-intensity microwave irradiation evidently damages the parasympathetic portion of the nervous system.

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