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THE EFFECT OF NIFEDIPINE ON SECRETORY DIARRHEA IN MICE*

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SUMMARY: Yurdakök K, Diker Ş. (Department of Social Pediatrics, Hacettepe University Institute of Child Health, Ankara, Turkey). The effect of nifedipine on secretory diarrhea in mice. Turk J Pediatr 34: 103 - 105, 1992.

The aim of this study was to determine whether castor oil - induced secretory diarrhea in mice could be ameliorated by nifedipine, a calcium channel blocking agent in mice. Ten animals received nifedipine in a dose of 1 mg/ 30 g/ body weight and another ten animals received only distilled water via an orogastric feeding tube. Fifteen minutes after the administration of the drug or the distilled water, castor oil was given to all animals. The mean body weight loss was found to be higher in the control group than in the nifedipine treated group two hours after the administration of castor oil. These findings indicate that nifedipine may have a therapeutic role in castor oil - induced secretory diarrhea. *Key words: nifedipine, calcium blocking agent, secretory diarrhea, mice.*

Intracellular free calcium has an important role in active intestinal water and electrolyte transport and in intestinal motility[1, 2]. Raised intracellular free calcium is known to decrease intestinal sodium and chlorine absorption and stimulate active chlorine secretion while decreased levels of free calcium have an opposite effect[2]. The calcium influx across cell membranes also plays a major role in the contraction of intestinal smooth muscle[3]. The constipating effect of loperamide may be related to its calcium antagonist properties since verapamil and other calcium channel blockers have been reported to cause constipation[4-7]. Therefore, this study was designed to determine whether nifedipine, a calcium channel blocking agent, has any effect on castor oil - induced secretory diarrhea in mice.

Material and Methods

Twenty adult male albino mice each weighing 20 - 30g were used as study animals. The mice were randomly divided into two groups. Ten mice received a solution of 0.5 ml/ 30 g/ body weight in a single dose which contained 2 mg nifedipine (Nidilar^{R}) per 1 ml distilled water (1 mg nifedipine/ 30 g/ body weight) via an orogastric feeding tube. Ten animals, comprising the control group, received only 0.5 ml of distilled water /30 g/ body weight in the same manner as the study group. Fifteen minutes after the administration of nifedipine or distilled water, all the animals were given 0.6 ml of castor oil (Ricinor^{R}) through an orogastric feeding

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tube[5]. All the mice were weighed prior to and two hours after the administration of the castor oil. The results were expressed as a mean ± standard deviation and statistical analysis was carried out using the Student's *t* test.

Results

During the study diarrhea was observed in most of the animals in the control group (9/10) while only three of ten mice had wet, loose stools in the study group. The mean body weights in each group prior to and after the administration of castor oil were not found to be statistically different (Table I). However, the mean body weight loss was found to be significantly higher in the control group than in the group treated with nifedipine (1.53 ± 0.97 and 0.46 ± 0.37, respectively; $p < 0.02$).

TABLE I: Body Weight Changes in Both Groups

	Mean Body Weights (g)		
	Initial	Two Hours Later	Mean Body Weight Loss
Nifedipine (n: 10)	27.20 ± 2.64	26.75 ± 2.65	0.46 ± 0.37*
Placebo (n: 10)	27.63 ± 4.85	26.10 ± 4.44	1.53 ± 0.97*

* $p < 0.02$

Discussion

Due to its antimotility effect on colonic smooth muscle, nifedipine has been used to inhibit gastrocolonic response to food in patients with irritable bowel syndrome[8]. In addition, nifedipine has been shown to increase ileal water, and sodium and chlorine absorption in animals[9]. Another study has demonstrated that nifedipine reduces the intestinal fluid response to *E.coli* heat - stable enterotoxin in the suckling mouse[10].

Our findings show that nifedipine also has a weight - reducing effect on the castor oil - induced model of secretory diarrhea in mice. Therefore, nifedipine may have a potential therapeutic role in secretory diarrhea. Further clinical studies are needed to show if this drug can be used safely and effectively in the treatment of secretory diarrhea in animals as well as in humans.

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