The Effect of Domperidone on the Delayed Crop Emptying Rate Induced by Medium Chain Triacylglycerol in the Chicken

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Abstract The effect of domperidone, a dopamine D2-receptor antagonist, on the forward passage of the crop contents of chicks receiving 20% medium chain or long chain triacylglycerol was studied. Medium chain triacylglycerol significantly delayed the crop emptying of chicks compared with long chain triacylglycerol, though no significant effects were obtained by domperidone treatments. The present result suggested that the involvement of dopaminergic action was negligible in the delayed crop emptying rate induced by medium chain triacylglycerol in chicks.

Key words: Crop emptying rate, Medium chain triacylglycerol, Domperidone, Chicks

Materials and Methods

Day-old Single Comb White Leghorn male
Chicks (Hattori Hatchery, Ltd., Nagoya) were housed in wire-meshed cages. They received a commercial chick mash (Marubeni Shiryo Co., Tokyo) until they were selected. Before the start of experiment, the chicks were fasted overnight (about 14 h) with free access to water.

The birds (about 200 g) were singly treated with graded levels of domperidone (0, 0.2, 1 and 5 mg/kg body weight). Domperidone (Sigma Chemical Co., St. Louis, MO, U.S.A.) was dissolved in saline (0.85% NaCl) and was given orally by simultaneous injection into the tube of the diet, while diet intubation was done. Chickens received a single meal of the experimental diets in 7 ml slurry (diet (Table 1): water = 4:7) and the measurement of crop emptying rate was done after 3 h. The number of birds was 5 per treatment.

Crop emptying was examined by incision of the skin of crop and clamping the lower and upper crop junctions under light anesthesia with diethyl ether. The crop was then cut distal to the clamps, and crop content was removed and dried at 55°C for 24 h and weighed. Crop emptying rate was assessed by measuring the dry weight of a meal remaining in the crop and expressed as the relative weight of the crop content to the amount of food intubated.

The data were subjected to two-way analysis of variance (fat source × domperidone). Values are presented as means ± S.E.M. Statistical significance was assumed at P < 0.05.

Results and Discussion

Figure 1 shows the relative crop content of chickens after treatments with i.p. administration of graded levels of domperidone. A significant effect in fat source was determined, implying that the crop emptying rate was delayed by MCT compared with LCT. There were no significant effects of domperidone and interaction between fat source and domperidone.

The data obtained here were consistent with previous reports, because dietary MCT

Table 1. Composition of experimental diets (g/kg)

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>LCTa</th>
<th>MCTa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolated soybean protein</td>
<td>226</td>
<td></td>
</tr>
<tr>
<td>Mineral mixtureb</td>
<td>58.8</td>
<td></td>
</tr>
<tr>
<td>Vitamin mixtureb</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Choline chloride</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Inositol</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>L-Methionine</td>
<td>2.9</td>
<td></td>
</tr>
<tr>
<td>L-Threonine</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>Glycine</td>
<td>4.2</td>
<td></td>
</tr>
<tr>
<td>Cellulose</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Corn starch</td>
<td>402.4</td>
<td></td>
</tr>
<tr>
<td>Corn oil</td>
<td>200</td>
<td>20</td>
</tr>
<tr>
<td>Coconado RKc</td>
<td>0</td>
<td>180</td>
</tr>
</tbody>
</table>

a LCT, long chain triacylglycerol; MCT, medium chain triacylglycerol.
b Furuse and Okumura3).
c Coconado RK®, glyceryl tricaprylate (donated by Kao Corp., Wakayama).

Fig. 1. Relative crop content of chickens after oral administration of graded levels of domperidone simultaneously with diet intubation. Chicks were intubated with 7 ml slurry (diet: water = 4:7) and the measurement of crop emptying rate was done after 3 h. Values are means of 5 birds ± S.E.M. The result of analysis of variance: fat source, P < 0.001; domperidone, P > 0.05 and interaction, P > 0.05.
drastically delayed the crop emptying compared with LCT. However, the effect of domperidone was not observed in both fat sources. The range of amount of domperidone applied here was confirmed effective when administered orally in human\(^7\). It was clear that the delayed crop emptying induced by MCT was not influenced by dopaminergic nerves. Furthermore, gastrointestinal motility in the chicken may be different from the mammals, since not only MCT diet but LCT diet in the crop emptying was not influenced by domperidone. Dopaminergic action may not be important for the gastrointestinal motility in the chicken. The effect of other nervous system such as cholinergic and adrenergic action remains to be investigated in future.

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**References**


