EFFECT OF GASTROGRAFIN ON DIPHYLLOBOTHRIUM LATUM, TAENIA SAGINATA AND DIPLOGONOPOLUS GRANDIS INFECTION

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Received November 7 1988/Accepted May 8 1989

Abstract: The successful treatment of Diphyllobothrium latum, Taenia saginata and Diplogonoporus grandis infections with Gastrografin is herein reported. Eleven subjects (8 cases of D. latum, 2 of T. saginata and one of D. grandis infection) found to have tapeworm infection based on the history of discharge of gravid segments and/or positivity for tapeworm egg were first pretreated with barium enema procedure and were treated with 300 to 500 ml Gastrografin by duodenal manipulation. All cases who indicated the presence of the tapeworm as a radiolucent shadows were completely treated with Gastrografin. All tapeworms with scolex expelled were actively moving in the saline. The time of treatment (from 15 to 30 min) was shorter than that of other medical treatments. No side effects were observed. In the present study, the treatment with Gastrografin was found to be a satisfactory anthelmintic method against D. latum, T. saginata and D. grandis infection.

MATERIALS AND METHODS

This study consisted of 11 subjects; 8 cases with D. latum, 2 with T. saginata and one with D. grandis infection. All subjects were confirmed to have intestinal tapeworm infection by...
the following two criteria: history of discharge of gravid segments and/or positivity for tapeworm eggs in their stools and their anus.

The treatment was performed according to the methods of Waki et al. (1986) with some modifications. The routine treatment was as follows: The day before the treatment, the patient had restricted food intake, for example, Besbion (Fujisawa Pharmaceutical Co., Ltd.) and Boncolon (Ohtsuka Chemical Co., Ltd.), instead of ordinary meal. Thereafter, 250 ml of magnesium citrate (Magcorol, Horii Pharmaceutical Indus., Co., Ltd.) and 4 tablets of senna (Adjust-A, Kowa Co., Ltd.) were given to the patient at 8.00 p.m. and 11.00 p.m., respectively. On the day of treatment, the patient was kept fast until the treatment but isotonic drink such as Pokalisweat (Ohtsuka Pharmaceutical Co., Ltd.) was made enough, for the prevention of dehydration. The patient was kept in the bed for X-ray fluoroscopy. A duodenal tube was inserted through the mouth until the tip reached the flexura duodeno-jejunalis. Gastrografin (300 ml) was injected through the tube with a plastic disposal syringe (50 ml, Terumo Co., Ltd.) for 5 min. Under fluoroscopic monitoring, the worm was found as a radiolucent shadow descending in the intestinal lumen treated with Gastrografin. When the peristalsis of the intestine did not occur vigorously, the adequate volume of Gastrografin was added. When the parasite reached the anal side through the descending colon, the patient was forced to defecate. The moving worm with scolex was discharged with the stool.

RESULTS

Table 1 summarizes the clinical profiles and treatment regimen of the 11 patients. Of the 11 cases with intestinal tapeworm infection included in this study, 9 (81.8%) were male and 2 (18.2%) were female. Their age was ranged from 13 to 55 (41.5±10.9) years old. Using 300 to 500 ml Gastrografin, the entire tapeworm with scolex were discharged within 15 to 30 min. In all cases, the tapeworms were alive, unfragmented and moved actively in the saline.

Case 1, 2, 3, 5, 6, 8, 10 and 11 were D. latum infection occured by eating raw fish (salmon and trout). Case 4 and 9 were T. saginata infection occured by eating incompletely cooked beef meat. Case 7 was D. grandis infection, but the cause of this case was unknown.

Two cases (case 10 and 11) was not able to find out the tapeworm in X-ray monitor in the first treatment. In these cases, tapeworms were not discharged with their stool. But, 45 days after the treatment, the eggs of D. latum were detected from their feces by stool examinations. Two months after the first treatment, the second treatments were done. In these times, the tapeworms could be found out in X-ray monitor from both cases. These tapeworms were expelled with their stool and these cases were completely treated by the repeat of this method.

Figure 1 showed T. saginata (case 4) moving very actively in the ileo-caecalis portion and each proglottid of T. saginata was clearly described as a radiolucent region in this photograph. Figure 2 showed D. latum (case 5) revealing at the same region in Figure 1. Figure 3 showed the worm (T. saginata, case 4) recognized as a radiolucent region in the rectum before defecation. After this photograph, this worm was discharged through the anus (case 4). Figure 4 showed the entire shape of T. saginata (case 9). The scolex (arrow) of this worm was shown in this photograph.

In every case, the side effects of Gastrografin were not observed.
DISCUSSION

For the last 30 years, the intestinal parasite infection such as ascariasis, hookworm diseases, trichuriasis and clonorchiasis has been markedly reduced in Japan.

However, intestinal tapeworm infection is widely distributed in Japan, because the Japanese likes to eat raw fish (sashimi) and incompletely cooked beef meat which are the second intermediate host of D. latum, D. grandis and T. saginata.

In foreign countries such as USA, the Japanese style eating at sashimi and sushi bar where such dishes are served, is becoming popular as healthy foods. And these foods has often been suggested as a contributing factor to the spread of fish tapeworm infections in foreign countries.

Nakabayashi et al. (1984) and Waki et al. (1986) reported that the Gastrografin was a useful drug against T. saginata and D. latum infection. In their reports, they concluded that some physical relation between the parasite and the intestine were important for expelling the tapeworm.

Table 1 Summary of the treatment with Gastrografin

<table>
<thead>
<tr>
<th>Case number</th>
<th>Age</th>
<th>Sex</th>
<th>Subjective symptoms</th>
<th>Gastrografin dosage</th>
<th>Total length of worm</th>
<th>Species of tapeworm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>48 y</td>
<td>M</td>
<td>soft stool</td>
<td>400 ml / 25 min</td>
<td>736 cm</td>
<td>D. latum</td>
</tr>
<tr>
<td>2</td>
<td>42 y</td>
<td>M</td>
<td>abdominal pain</td>
<td>400 ml / 30 min</td>
<td>506 cm</td>
<td>D. latum</td>
</tr>
<tr>
<td>3</td>
<td>39 y</td>
<td>M</td>
<td>abdominal discomfort</td>
<td>300 ml / 25 min</td>
<td>475 cm</td>
<td>D. latum</td>
</tr>
<tr>
<td>4</td>
<td>46 y</td>
<td>M</td>
<td>none</td>
<td>400 ml / 20 min</td>
<td>661 cm</td>
<td>T. saginata</td>
</tr>
<tr>
<td>5</td>
<td>41 y</td>
<td>F</td>
<td>abdominal discomfort</td>
<td>400 ml / 15 min</td>
<td>450 cm</td>
<td>D. latum</td>
</tr>
<tr>
<td>6</td>
<td>48 y</td>
<td>M</td>
<td>abdominal discomfort</td>
<td>500 ml / 15 min</td>
<td>225 cm</td>
<td>D. latum</td>
</tr>
<tr>
<td>7</td>
<td>55 y</td>
<td>M</td>
<td>tenesmus &amp; abdominal discomfort</td>
<td>400 ml / 15 min</td>
<td>273 cm</td>
<td>D. grandis</td>
</tr>
<tr>
<td>8</td>
<td>13 y</td>
<td>F</td>
<td>abdominal discomfort</td>
<td>300 ml / 15 min</td>
<td>708 cm</td>
<td>D. latum</td>
</tr>
<tr>
<td>9</td>
<td>42 y</td>
<td>M</td>
<td>abdominal discomfort</td>
<td>500 ml / 25 min</td>
<td>275 cm</td>
<td>T. saginata</td>
</tr>
<tr>
<td>10*</td>
<td>35 y</td>
<td>M</td>
<td>soft stool &amp; abdominal discomfort</td>
<td>450 ml / 15 min</td>
<td>600 cm</td>
<td>D. latum</td>
</tr>
<tr>
<td>11*</td>
<td>47 y</td>
<td>M</td>
<td>abdominal pain</td>
<td>340 ml / 23 min</td>
<td>890 cm</td>
<td>D. latum</td>
</tr>
</tbody>
</table>

*The data of these cases (case 10 and 11) were showed from the second treatment.
Figure 1  *T. saginata* (case 4) is clearly seen as a radiolucent shadows in the ileo-coecal segment.

Figure 2  *D. latum* (case 5) is observed in the ileo-coecal segment.
Figure 3 *T. saginata* (case 4) recognized as a long rediolucent shadow in the rectum before defecation.

Figure 4 *T. saginata* (case 9) as the whole shape with scolex (arrow). This worm was 275 cm in length.
In this study, we modified the treatment regimen and inserted dose of Gastrografin. Pretreatment in this method is based on the pretreatment of barium enema procedure. This procedure has an advantage that the feces in the intestinal lumen of the patients were less, and the initial dose of Gastrografin could be increased up to 300 ml from 100 ml used by Waki et al. (1986). According to this modified method, this drug is more effectively utilized.

Relatively new drugs such as paromomycin sulfate, niclosamide and praziquantel show a good curative efficacy (80~100%) in intestinal tapeworm infection (Salem and El-Allaf, 1969; Kihara et al., 1973; Paz, 1977). However, in almost all cases, tapeworms were destroyed with these drugs and scolexes of expelled tapeworms were not found in their discharged feces.

In this method, all cases who have confirmed the tapeworm as a radiolucent shadows in the intestinal lumen were successfully treated with Gastrografin. Case 10 and 11 had discharged the long fragment of tapeworm before the first treatment, so that these tapeworms were too small to be recognised by X-ray monitor at the first treatment.

As regards the time required for this treatment (from 15 to 30 min) it was shorter than that of other medical treatment.

It is concluded that the present method is more effective for treating these intestinal tapeworm infection than other vermifuged methods. Therefore, we recommended that Gastrografin should be a drug of first choice for the treatment of intestinal tapeworm.

ACKNOWLEDGEMENT

The authors wish to express their thanks to Dr. Isamu Sugawara for reviewing the manuscript and Drs. Akira Sano, Hideoki Noshi and Isamu Emi for their support and interest in this study.

REFERENCES

4) Paz, G. (1977): Treatment of taeniasis saginata with praziquantel (Embry 8440), Boletin Chileno de Parasitologia, 32 (1 & 2), 14-16
ガストログラフィンによる広範裂頭条虫、無鉤条虫、大複殖門条虫の駆虫効果

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荒木 恒治1・天野 博之2・辻井 正3

ガストログラフィンを用いて、広範裂頭条虫症（8例）、無鉤条虫症（2例）、大複殖門条虫症（1例）の条虫症、計11症例に駆虫を試み良好な駆虫効果が得られた。駆虫前日に前処置として、消化管注腸造影の前処置を応用し、腸管内の食物残渣や糞便を除去し、駆虫時のガストログラフィンと条虫体との完全に十分接触できる状態にまで処理しておき、ガストログラフィンを十二指腸ソルベイトでトライツ糖帯より300 mlから500 ml注入し、駆虫を行った。駆虫時、条虫体が透視下にて、透亮像として確認された症例は全例、駆虫後頭節を確認することができ、生きた状態で完全駆虫することができた。駆虫時間はわずか15分から30分で、駆虫を完了することができた。