

Outbreak Reports

A Cluster of Rhabdomyolysis Syndrome Resulting from Carp Consumption in Gongcheng Yao Autonomous County, Guangxi, 2016

Jinshui Zeng^{1,2,&}; Yinpin Liu^{3,4,&}; Huilai Ma²; Huihui Liu²; Yonghong Li³; Shunli Mo⁵; Yuqiao Qin⁵; Lijie Zhang^{2,#}

Summary

What is already known about this topic?

A common food that has been associated globally with rhabdomyolysis syndrome is freshwater fish including freshwater cod, barracuda, buffalo fish, and pomfret. However, cases caused by freshwater fish have been relatively rare in China.

What is added by this report?

In this investigation, a cluster of five cases of rhabdomyolysis syndrome were found that were linked to consumption of carp testes and eggs, one of the first carp-related rhabdomyolysis syndrome cases reported in China.

What are the implications for public health practice?

To avoid similar incidents, food safety education for local residents needs to be prioritized and implemented. In addition, case monitoring of rhabdomyolysis syndrome should be strengthened through more thorough collection of epidemiological data and monitoring of pathogenic foods.

Background

Rhabdomyolysis syndrome is a condition where skeletal muscle breaks down rapidly and results in symptoms including muscle pain, weakness, vomiting, and excessive creatine kinase (CK) levels in the blood. Five villagers in Ping'an village, Gongcheng Yao Autonomous County, Guangxi Zhuang Autonomous Region, experienced an onset of symptoms indicative of rhabdomyolysis syndrome including vomiting, backache, lumbago, and CK levels exceeding five times the normal range after dinner on November 7, 2016. This dinner is suspected to be the common exposure event for this cluster. In order to verify the incident and find the cause of the disease, a team of health professionals arrived at the scene for investigation on November 10.

Investigation and Results

The case definitions for this investigation were established as the following (*I*): suspected cases were those who had onset of systemic or local muscle pain, fatigue, brown urine, and other symptoms related to rhabdomyolysis syndrome with unknown specific-causes; clinically-confirmed cases were those with levels of CK at least five times higher than that of the normal range upper limit. The investigation team conducted case searches door-to-door in Ping'an village.

Five clinically confirmed cases were found, with an incidence of 5.1% (5/98). The main symptoms were onset of muscle soreness (5/5), vomiting (4/5, 1–3 times), brown urine (4/5), and fatigue (3/5). Clinical examination showed that CK increased more than 5 times (5/5, value is 1,389–4,073 U/L), leukocyte count increased (5/5), and myoglobin increased (4/5).

The first case occurred at 19:30 on November 7, and the last case occurred at 01:00 on November 8. The event lasted for 5.5 hours. The epidemiological curve's distribution suggested a point source exposure. There was no history of joint exposure except for dinner on the evening of November 7 for the 5 cases, which was then confirmed as the exposure event. The median incubation period from consumption to onset of symptoms was 5 hours (range: 0.5–6 hours).

On November 7, 2016, a total of 6 persons from two families consumed the hotpot containing carp, vegetables, and dumplings together. Patient A caught the carp in his own pond and prepared the carp while retaining the testes, eggs, and swim bladder, which are often consumed. Patient A then fried the parts of the carp with oil and then boiled them in a pot of water for ten minutes. Afterwards, the vegetables and dumplings were added to the pot to be boiled for five minutes. One person only consumed the vegetables and dumplings and did not fall ill, while the five others who consumed parts of the carp fell ill. In addition to these two families, patient A also shared the remaining

parts of the carp with two neighbor families consisting of nine addition people, but the neighbors prepared the carp separately and consumed only the fish's flesh. These additional nine people exhibited no related symptoms or disease.

Using a retrospective cohort study design, eating carp testes (RR=10.99, 95% CI: 1.70–71.28) and carp eggs (RR=6.00, 95% CI: 1.69–21.26) were found to be risk factors for the disease (Table 1). To study the relationship between CK value and food intake, the investigation team took photos of various carp meat samples weighing 10 g, 30 g, and 50 g to help patients recall their level of consumption before the onset of symptoms. The results showed that CK levels were positively correlated with total recalled intake of carp testes and eggs (Pearson correlation coefficient $r=0.98$, $p=0.04$) (Figure 1).

Further investigation of the external environment, i.e. the pond where the carp was raised, showed that

the water levels were extremely low and had accumulated high levels of algae. In addition, a large quantity of abandoned bait, fishing materials, pesticides, fertilizer, and other packaging bags were found in the vicinity. Samples from the pond and from the hotpot leftovers were collected, but due to a lack of hypothesis on pathogenic factors and direction for the investigation, a determination could not be made. However, the above samples were stored by Gongcheng County CDC for possible future testing.

Discussion

This cluster of rhabdomyolysis syndrome likely results from the consumption of carp. Consumption of the carp testes and eggs was associated with higher risk of disease, and because those who did not consume these parts of the carp did not exhibit disease symptoms, testes and egg consumption are likely risk

TABLE 1. Risk analysis between consuming different parts of carp and rhabdomyolysis syndrome in Ping'an village, Gongcheng Yao Autonomous County, Guangxi, 2016. (N=15).

Part of carp	Consumers		Non-consumers		Attack rate (%)		RR (95% CI)	Fisher's exact test
	Case	Total	Case	Total	Consumers	Non-consumers		
Flesh	5	12	0	3	41.7	0	Undefined	$p=0.510$
Swim bladders	2	4	3	11	50	27.3	1.83(0.46–7.25)	$p=0.560$
Testes	4	4	1	11	100	9.1	10.99(1.70–71.28)	$p=0.004$
Eggs	3	3	2	12	100	16.7	6.00(1.69–21.26)	$p=0.020$

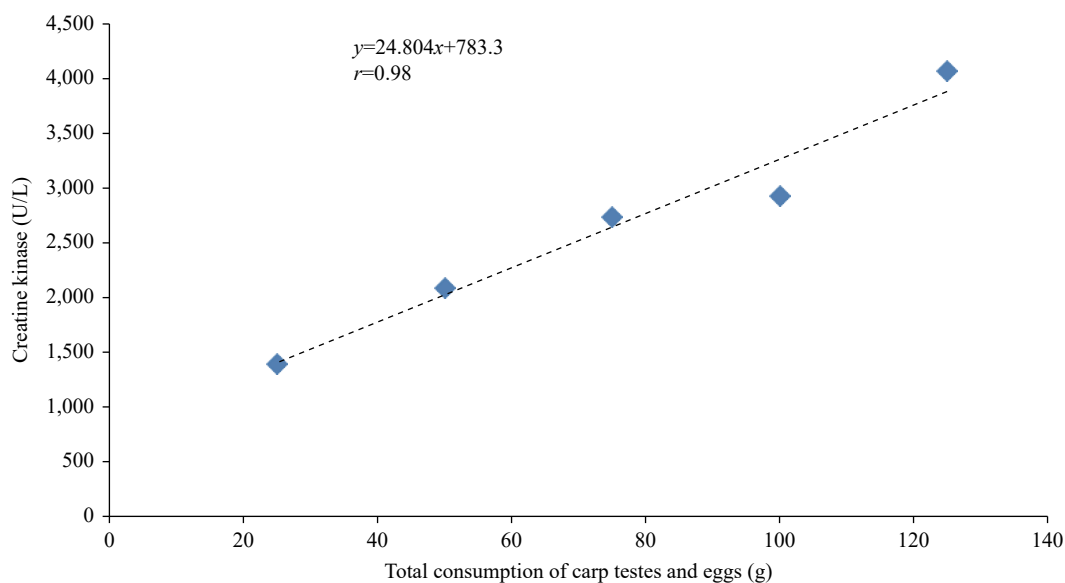


FIGURE 1. Analysis of the correlation between creatine kinase value of rhabdomyolysis syndrome patients and total recalled consumption of carp testes and eggs in Ping'an village, Gongcheng Yao Autonomous County, Guangxi, 2016.

* CI=Confidence Interval.

factors. Following the line of our investigation, the consumption of vegetables and dumplings in this event could also be excluded from consideration as risk factors.

Common foods causing rhabdomyolysis syndrome are often freshwater fish such as cod and barracuda in Baltic regions (2), buffalo fish in the United States (3), and the freshwater pomfret and “olho de boi” fish in Brazil (4–5). In China, the common food-related cause of rhabdomyolysis syndrome is crawfish (6–9), and cases caused by freshwater fish are relatively rare. A case of rhabdomyolysis syndrome caused by consuming freshwater pomfret had been reported in Guangdong province (10), but cases related to consumption of carp have not been previously reported. At present, the etiology and pathogenesis of food-borne rhabdomyolysis syndrome are not clear.

To prevent the recurrence of similar events, the following suggestions should be considered. First, food safety publicity and education of local residents should be prioritized and strengthened in order to advise against the consumption of carp testes and eggs. Second, case monitoring of food-borne rhabdomyolysis syndrome should be strengthened through the collection of more epidemiological data concerning pathogenic foods. Finally, common factors among all kinds of pathogenic foods need to be explored and determined in order to provide new ideas and methods for the study of pathogenic factors and pathogenesis of food-borne rhabdomyolysis syndrome.

* Corresponding author: Lijie Zhang, zhanglj@chinacdc.cn.

¹ Maoming Center for Disease Control and Prevention, Maoming, Guangdong, China; ² Chinese Field Epidemiology Training Program, China CDC, Beijing, China; ³ Guangxi Zhuang Autonomous Region Center for Disease Control and prevention, Nanning, Guangxi, China; ⁴ Western China Field Epidemiological Training Program, Beijing, China; ⁵ Gongcheng County Center for Disease Control and Prevention, Gongcheng, Guilin, China.

& Joint first authors.

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