

Barbel cholera, a rare but still possible food-borne poisoning. Case report and narrative review

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Summary. The gastro enteric toxic effects of the barbel eggs have been described up to two centuries ago, but deliberate or serendipitous ingestion of this fish product still occur, often eliciting a gastrointestinal syndrome usually known as barbel cholera. Barbel cholera is a self-limited gastrointestinal diarrheic syndrome that develops 2 to 4 hours after ingestion of the eggs, lasting up to 12-36 hours, nearly always complicated by vomiting and severe abdominal pain. The disease is usually self-limited, and the prognosis is thus benign even without hospitalization and medical treatment. Rarely, however, barbel cholera may be complicated by massive diarrhea, and the patients can develop bradycardia, oligo-anuria, and eventually hypovolemic shock. In this article we describe a rare case of barbel cholera, highlighting both the diagnostic difficulties in identifying it, and the importance of obtain an accurate history, focused on recently ingested food, thus addressing the clinical management on supportive treatment, expecting symptoms' improvement usually within 36 hours. (www.actabiomedica.it)

Key words: barbel cholera, barbus fish, barbel eggs, food borne poisoning, gastroenteritis, Emergency Department

Introduction

The genus *Barbus* includes several species of freshwater fishes from the *Cyprinidae* family, that also includes minnows, chubs, and carps. The five European species of *Barbus*, and mainly *Barbus barbus* or *Barbus fluviatilis*, also known as common barbel, are often fished and their flesh eaten. The gastro enteric toxic effects of the barbel eggs have, however, been described up to two centuries ago (1), and are also well acknowledged in popular culture (i.e., the Provençal proverb “*Never eat eggs of fish whose name begins with b...*”). Nevertheless, occasional cases have been reported in international literature, particularly among subjects with a migration background, presumptively due to the misclassification of barbel eggs with those of other fishes belonging to the *Cyprinidae* family (2, 5-6). As such, unfortunately,

deliberate or serendipitous ingestion of barbel eggs still occur, often eliciting a gastrointestinal syndrome usually known as barbel cholera (1-4). Barbel cholera is a self-limited gastrointestinal diarrheic syndrome that develops 2 to 4 hours after ingestion of the eggs, lasting up to 12 hours (with at least one reported case who lasted 36 h), and nearly always complicated by vomiting and severe abdominal pain (5). The disease is usually self-limited, and the prognosis is thus benign even without hospitalization and medical treatment. Rarely, however, barbel cholera may be complicated by massive diarrhea, and the patients can develop bradycardia, oligo-anuria, and eventually hypovolemic shock. Interestingly, anti-diarrheic drugs (e.g. loperamide) display limited, if any, effectiveness (5, 6).

The mechanism underlying barbel eggs toxicity remains largely unknown, but recent data are

now available. Female of *Barbus* usually spawns up to 12,000 eggs per kilogram of body weight immediately after her upriver migration (May to July depending on the geographical regions), and only unfecundated eggs are associated with signs of intoxication. Recent studies have shown that a series of at least 25 different fatty acids, mainly represented by a mixture of polyunsaturated fatty acids (PUFA), are involved. They include a high percentage of arachidonic, docosahexaenoic, and eicosapentaenoic acids, whose hemolytic and cytotoxic activities have also been proven in toxicity assays on mice (2, 6).

Due to the aforementioned characteristics of the disorder, it is difficult to suspect barbel cholera without a thorough history, focused on recently ingested food.

In this article we describe a rare case of barbel cholera, highlighting both the diagnostic difficulties in identifying it, and the importance of obtaining detailed information about recent meals.

Case report

An otherwise healthy 32-year-old woman presented to the Emergency Department (ED) of the University Hospital of Parma, in Northern Italy, with massive diarrhea and vomiting. The physical examination was unremarkable, and her vital signs were stable. Blood tests displayed a significant neutrophil leukocytosis (white blood cell [WBC] count: 17,620 cells/ μ L; 94% neutrophil granulocytes), without other signs of systemic inflammation (C-reactive protein [CRP]: 2.8 mg/L). Her diet history revealed that, around 4 hours before the symptoms' onset, she had consumed an undefined quantity of fish eggs extracted from a fish that her husband had collected in a nearby river (i.e., Taro river, a small river in the Po valley) around 2 hours before cooking and eating it. Her husband had eaten only the flesh of the fish, avoiding consuming the eggs, and he was steadily asymptomatic. The husband, who defined himself as an expert fisherman, confirmed us that the fish was a barbel (*Barbus* spp.). As such, we suspected an acute food-borne poisoning: as the patient had a migrant background from Western Europe, being unaware of the potential human toxicity of barbel eggs, we focused our clinical suspects on barbel

cholera. Therefore, we decided to monitor her in our Observation Unit, limiting the medical treatment to guaranteeing a stable hydro electrolytic balance.

Symptoms spontaneously improved, and progressively resolved within 9 hours from their onset, and WBC count also dropped to 14,990 cells/ μ L (T ingestion + 9 hours), and then to 10,280 cells/ μ L (T ingestion + 24 hours; 71% neutrophil granulocytes). Other blood tests (i.e., ALT, CPK, gamma-GT) steadily remained in normal range during the whole observation period. She was subsequently monitored on an outpatient basis for a 4 days follow-up after the initial ingestion, not displaying new problems.

Discussion

Barbel cholera occurs within hours after the ingestion of unfecundated eggs of common barbel (1, 5-6). Interestingly, even small amounts of barbel roe appear able to elicit the full clinical pattern of barbel cholera (2). It is important to understand that, since eggs chemical composition, rather than a bacterial contamination, is responsible of the gastrointestinal symptoms, other people eating the flesh of the same fish, but avoiding their eggs, are not at risk for barbel cholera, exactly as happened in our case report (2, 5).

The symptoms of this disorder are very unspecific, and without a thorough history, focused on recently ingested food, the Emergency Physicians (EPs) may easily miss the diagnosis (5, 6). In our case also, without the accurate report of the previous consumption of fish eggs, presumptive diagnosis would have focused on other food-borne disorders. As the majority of cases of barbel cholera have been defined as self-delimited, with significant improving of the symptoms within 12 hours from the initial ingestion, inappropriate diagnosis may elicit medical therapies including antibiotics and antiemetic drugs, whose efficacy in counteracting gastrointestinal symptoms has been extensively questioned based on the available evidence (5,6). In other words, in cases of suspected food-borne diseases, the history focused on recently ingested food is the cornerstone of an appropriate, cost-effective medical therapy (6).

In conclusion, EPs should consider barbel cholera in the differential diagnosis of patients with massive

diarrhea, abdominal pain, neutrophil leukocytosis, and often without other signs of systemic inflammation (namely CRP), and without signs of liver function impairment. When barbel cholera is suspected, EPs should obtain an accurate history, focused on recently ingested food, and address the clinical management on supportive treatment, thus expecting symptoms' improvement usually within 36 hours.

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