Crayfish-related Haff disease rhabdomyolysis; diagnosis supported by bone scintigraphy

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Abstract

A number of people suffered rhabdomyolysis caused by eating crayfish in China and the final diagnosis was a rare disease called Haff disease. *In this study*, we present a 26 years old man with a history of severe muscular soreness for whole body after eating crayfish and this status lasted for about 3 months. *Blood analysis showed significant increase* in serum creatine kinase and lactate dehydrogenase. The pathology of left biceps brachii muscle revealed rhabdomyolysis. Technetium-99m-methylene diphosphonate (^{99m}Tc-MDP) whole body bone scintigraphy showed increased uptake of nearly all muscles, especially those of proximal extremities. The diagnosis was Haff disease supported by histology and clinical characteristics. *In conclusion*, this case report shows that using bone imaging supports the diagnosis of Haff disease and locates the sites of rhabdomyolysis.

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Introduction

Crayfish is a bottom-feeder freshwater fish, and it is widely natively distributed in many parts of the world (Fig. 1). A number of people in China suffered myalgia and muscle weakness after eating crayfish in 2010. This illness is known as Haff disease [1]. Haff disease, was first reported along the Baltic coast in 1924 as an unexplained rhabdomyolysis in a person who ate fish 24h before the onset of illness [2]. Outbreaks of diseases with the characteristics of Haff disease were described in Sweden, Soviet Union, United States and Brazil [3-5], but the incentives of them were not crayfish. Recently five Haff disease cases associated with the ingestion of crayfish were reported in 2010, in China [1]. Haff disease is still a rare clinical syndrome with unknown etiology. Palytoxin, a toxin found in marine fish and supposed to be a motivation to rhabdomyolysis, may serve as a model for further studies. The diagnosis of Haff disease is mainly based on clinical manifestations, fish consumption within 24h before the onset of symptoms and rhabdomyolysis, which can not be explained otherwise.

There has been no paper describing the incidental uptake of bone tracers like technetium-99m-methylene diphosphonate (^{99m}Tc-MDP) in muscular tissue of patients who were diagnosed with Haff disease. Here we present a case of Haff disease, which occurred in 2010. Bone scan by ^{99m}Tc-MDP was implemented to help define the diagnosis and assess the range of muscles affected by rhabdomyolysis.

Figure 1. Picture of crayfish.

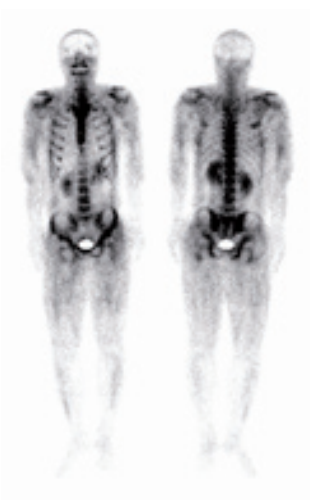

Figure 2. Whole body bone scan revealed diffusely intense symmetric bilateral soft tissue uptake, especially in the proximal extremities. There was no abnormal focal skeletal increased or decreased uptake.

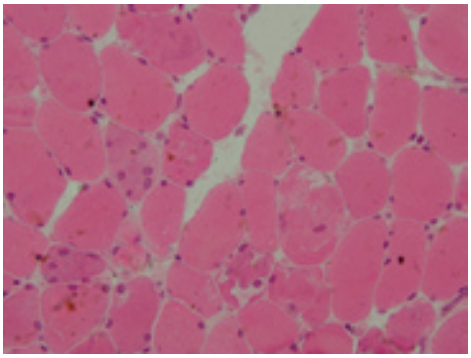

Figure 3. Histopathology H&EX200.

Description of the case

A 26 years old male presenting with myalgia and muscle weakness was led to several hospital admissions. Physical examination disclosed the decreased muscle strength. Laboratory tests showed elevated levels of creatine kinase (CK; 27174U/L; normal range: 25-130U/L) and lactate dehydrogenase (LDH: 1033 U/L; normal range: 80-285U/L), with nearly normal renal function. The patient had eaten crayfish, and had no history of injury, drug or alcohol consumption. Bone scintigraphy was performed to evaluate the involved muscles. Images were obtained using a two-head gamma camera (Infinia, GE, USA) with high resolution and low energy collimator, 256X256 matrix and 15cm/min speed. A dose of 740MBq of ^{99m}Tc MDP was administered intravenously, and 2h later, a planar whole body image was obtained (Fig. 2). Imaging revealed diffusely intense symmetric bilateral soft tissue uptake, especially in the shoulder girdle, psoas iliac muscles, and gluteofemoral muscles. No skeletal abnormality was observed. The pathology of left biceps brachii muscle showed that many fibers displayed rhabdomyolysis. Considering the clinical symptoms, histopathology (Fig. 3), laboratory tests and epidemiology in China, Haff disease caused by crayfish was diagnosed.

Discussion

Rhabdomyolysis is a clinical syndrome of skeletal muscle breakdown with concomitant release of muscle cell contents, which is the main characteristic of Haff disease. Rhabdomyolysis can be caused by many factors including trauma [6], overexertion [7-9], alcohol [6], drugs [6, 9-12], heat stroke [13], infection [14], lithotomy position [15], cold exposure [16] and others. The underlying mechanism of rhabdomyolysis in Haff disease is not clear. We think that crayfish may contain a toxin that may cause injury the muscle cell membrane.

It is suggested that muscles absorb denaturated proteins from radiopharmaceuticals. These proteins are bound with mitochondrial calcium, which is increased in the damaged muscle cell [7, 10, 14, 17-19]. Rhabdomyolysis caused by trauma is presented in bone scintigraphy with localized asymmetric increased tracer uptake while non-traumatic rhabdomyolysis has a diffuse and symmetrical pattern [11-13, 20], as in Haff disease. Thus, bone scintigraphy can be helpful in defining rhabdomyolysis, can localize the impaired muscles and evaluate the severity of the disease.

In conclusion, this case report shows for the first time, that bone imaging supports the diagnosis of Haff disease and locates the sites of rhabdomyolysis.

The authors declare that they have no conflicts of interest.

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