

PERFORATED DUODENAL ULCER. CLINICAL CASE OF MARITIME MEDICINE

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ABSTRACT	We report a favorable outcome of late diagnosed and operated (delayed for several days) perforated duodenal ulcer from the practice of medical support for the modern oil-tanker fleet. Main features of medical care for shipboard personnel are discussed as well.
Keywords:	maritime medicine; emergency surgery; acute abdomen; ulcer – complications, late diagnosis, delayed treatment.

INTRODUCTION

In connection with the choice of Russia's strategic course to master the Arctic and the Arctic shelf, the intensive development of water routes and coastal areas along the Northern Sea Route, questions of organization of health services in these difficult conditions for employees and the population inevitably raises in the agenda [1]. The analysis of the practical experience of similar work [2] shows weak readiness of medical personnel of all units of ambulance services and emergency specialized medical care to work effectively in order to save human lives at sea.

The aim is to draw attention to the exceptional working and living conditions of water transport employees, preventing conventional diagnostic and treatment schemes and algorithms at all stages from being performed.

Objectives: to demonstrate difficulties of medical care on board ships and production platforms, show specificity of healthcare in such unusual conditions on the example of emergency medical care of a patient with atypical clinical picture of duodenal ulcer perforation.

Clinical observation.

At 5:15 pm (Moscow time) on November 13, 2012 the services of 24/7 radio telephone medical consultation received a call from the captain of the tanker A-k in connection with a disease of a sailor M.

A 57-year-old male patient (born in 1955) considered himself sick over the last several days. He moved freely and independently self-cared, performed duties. The patient was concerned about the lack of appetite, thirst, unmotivated weakness, general fatigue, unpleasant feeling of "fullness" in the abdomen, decreasing in the lying position. There had not been defecation for the last 5 days. The simple examination, performed by the second officer, in charge of first aid and organization of care on board, revealed no specific findings and no scars on the anterior wall of the abdomen. The blood pressure (BP) was 120/70 mm Hg, the heart rate was 110 beats/min. The tanker went westwards through Danish channels, and was supposed to dock at the Port of Gothenburg, Sweden in a day.

The consulting physician suggested "abdominal catastrophe" (acute abdomen, R10.0) and recommended the following. The patient should lay to bed, no meals or drinks, continuous monitoring of the heart rate and blood pressure every 2 hours, with special attention to gases discharge, measuring the circumference of the abdomen at the level of the umbilicus, the amount of urine. The results of the observation had to be recorded, indicating the time of procedures. To conduct re-examination of the patient, carefully inspecting the abdomen, to palpate the anterior abdominal wall in order to reveal pain in its regions, to listen to abdominal sounds directly with an ear or using a stethoscope. Call back in 2 hours to discuss the results of observation.

The ship's captain was warned about the possible need for urgent hospitalization of the sailor to the onshore medical facility. He was offered to take a final decision upon the repeated consultation.

The repeated phone call was received 4 hours later, at about 9:00 pm (Moscow time). The heart rate was 107-110 beats per minute, blood pressure was 120/95 mm Hg, the circumference of the abdomen was 105 cm, no gas discharge. Auscultation of the abdomen was performed. The consulting physician recommended to palpate the anterior abdominal wall again and "listen" to the abdomen. He explained in detail the technique.

Thirty minutes later (around 9:30 pm) there was the next telephone session. The abdomen was tight, tense, painful in middle sections. Auscultation: "dumb" abdomen, no sounds except frequent indistinct heartbeats and rare splashes arising from shaking anterior abdominal wall.

The conclusion following the results of observation and re-consultations: the sailor V.M. born in 1955 had acute intestinal obstruction (*K* 56.7), and required urgent hospitalization for surgical treatment. It was recommended to ask nearest Maritime Rescue Coordination Centre of the emergency evacuation of V.M. according to the established international procedures (*MEDEVAC*). During a forced delay of the patient on board: strict bed rest, no meals or drinks, monitoring in accordance with previously issued recommendations. Initiation of antibiotic therapy (Ceftriaxone intramuscularly according to the instructions). In case of delayed evacuation for a period of more than 6 hours it was recommended to perform regular telephone consultations for corrections and possible additions to therapeutic

recommendations.

Over the next 30 minutes, the conclusion was confirmed by telephone to a representative of the shipowner company, the tanker changed its course at 12:00 pm (02:00 pm GMT) on November 14 and handed the sailor V.M. to a hospital in *Hjørring (Hjørring Hospital)* while passing the Danish Port of Skagen. There have been more than 20 hours between the first suggestions of a captain on the serious disease of the sailor and hospitalization.

After a short examination at the *Hjørring Hospital*, significantly complicated by the language barrier (the physician and the patient could communicate with each other only in English, not native to any one of the parties) the patient was transferred to the operating room with a diagnosis of acute intestinal obstruction, complicated by peritonitis (K 56.7, K 65.0) at about 06:00 pm (Moscow time). The midline laparotomy was performed. Operation: diffuse purulent peritonitis in the abdominal cavity, more than 3 L of purulent fluid with remnants of food, duodenal perforation, presumably of several days. The abdominal cavity sanitation, gastric resection in the amount of 2/3-3/4, gastro-jejunal anastomosis Billroth-II type were performed.

The postoperative course on the first day was complicated by acute renal failure (N 99.0), urine output was not more than 400 ml per day. Hemodialysis had been performed since November 16 (day 2 after surgery) until December 11. On November 22 (day 8 after surgery), the patient was transferred to the *Ålborg Hospital*, as it had technical and human resources to assist the case. Self peristalsis of the patient was not restored neither in *Hjørring Hospital* nor in the *Ålborg Hospital*. The patient had stable hectic fever. The CT performed on November 23 (day 9 after surgery), revealed an abscess of the abdominal cavity (T81.4). The abscess was opened and drained on November 24, releasing about 400 ml of pus, followed by daily purulent discharge of 300 ml for a week. Intoxication postoperative psychosis developed on the background of septic conditions (T81.1, R57.2) (F05.8), hemoglobin level did not exceed 53 g/l, the patient regularly required respiratory support and continuous oxygen therapy (2 L/min). After a brief improvement, repeated drainage of purulent cavities, installation of extra drainages of larger diameter were performed on December 15.

In general, Danish doctors managed to cope with all the complications performing intensive treatment with the use and frequent change of newest antibiotics. The relative stabilization of the general condition of the patient occurred on December 28. The attending physician suggested the shipowner to consider patient's evacuation for the further recovery at home (town N.). The most important condition for organization of medical evacuation was transportation by air, lying on a stretcher with constant oxygen inhalation in the amount of not less than 2 L/min and accompanied by a physician. Accordingly, the specialized sanitary transport flight was required.

To assess the reasonability of measures and minimize health risks associated with the immediate evacuation, the shipowner company referred again to the radiotelephone service of medical consultations. Given the circumstances of the event, presented by medical documents (certificates, extracts from medical records) and personal experience of evacuation of the wounded and sick in different circumstances, the consulting physician formulated the following option.

The patient's condition remains serious, and evacuation in this condition should be performed if the delivery of necessary care on the spot is impossible (the lack of specialists in related disciplines and/or qualifications, equipment and others). In such cases, immediate evacuation to the nearest medical institution is organized, where it is possible to perform proper medical assistance. The term "immediate evacuation to destination" should not be understood literally. In the absence of war, natural disaster or catastrophes, we should make suitable economic and logistical assessment of options: the delivery of the required equipment and physicians to the place of treatment could be cheaper and easier, rather than transporting the patient. There is no objective evidence about the benefits of treatment in Russia at the place of residence, and there are no medical indications for immediate evacuation.

In the absence of proper medical indications there may be other circumstances justifying evacuation. In such cases, in order to minimize the risks associated with health, transportation of the patient can be planned and carried out under seven conditions: 1) no earlier than day 8 after surgeries on abdominal organs, 2) restored bowel functions (regular passage of flatus, sounds of peristalsis upon auscultation, independent defecation), 3) the absence of undrained purulent foci (normal body temperature for several days, laboratory parameters of leukocytosis close to normal), 4) no drains in the abdominal cavity, 5) no intestinal probe, 6) stable hemodynamics (stable blood pressure and pulse rate close to normal), 7) hemoglobin of at least 100 g/l, hematocrit less than 30% and the content of red blood cells not less than $3 \times 10^{12}/l$).

In addition, the evacuation of the sailor V.M. was discussed in the last days of December, i.e. on the eve of nationwide long Christmas holidays. Since the holidays are independent risks increasing in the number of deaths in any large hospital, it was recommended not to plan transportation of patients before the end of national holidays.

As a result, the patient was left for further treatment in the Danish hospital for 2 weeks and returned home in the middle of January, 2013 after complete stabilization. He arrived independently by ordinary flight, accompanied by relatives. After returning home, the patient was examined in a district health center, and completed treatment and recovery on an outpatient basis in a community medical organization.

We presented this observation not to discuss propriety of diagnostic and treatment tactics chosen by physicians at various stages of care. One of the main causes of late diagnosis and provision of surgical intervention was atypical clinical picture of duodenal ulcer perforation. The observed complications are quite natural and understandable both with delayed timing of the delivery of qualified care and the choice of the primary surgery. The main purpose is to draw attention to the specifics of maritime labor and features of health care on water transport. Working on ships implies very unusual risks associated with not only the direct impact of known harmful factors, but also special organization of transportation by water transport.

CONCLUSION

1. Despite all the advances in science and technology, the crew of a ship is "cut off" from the majority of usual benefits of modern civilization, guaranteeing the protection of life and health. The qualified medical assistance is rarely available at times and in the amounts necessary for the successful treatment of emergency diseases and injuries. There is no medical staff on merchant ships, a physician and a patient are separated by many hundreds and thousands of miles of sea, and often this distance cannot be overcome quickly. Even the direct contact with the Coast medicine does not always mean the availability of skilled care. There are language and cultural barriers.

2. The reported case demonstrates: in European coastal waters, where the shore is literally visible, emergency evacuation of a patient with a diagnosis of acute surgical diseases, and delivery to the hospital elongates for dozens of hours. Late hospitalization is a very important factor complicating organization of health care. This is not a defect, but a challenging feature of health care on water transport. And all kinds of stationary phases of emergency medical care for such an eventuality should always be prepared.

3. Maritime medicine is primarily non-standard medicine. Medical care on board ships can not be based on general orders and stereotypes. Recommendations and requirements widely known in the literature and familiar in medical community may rarely be performed in the marine environment, and the well-established algorithms which are successful in everyday life, carry the risk of serious complications.

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