

Acute abdominal pain during an Antarctic cruise — a case report

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ABSTRACT

A 21-year-old female crew member experienced a number of medical conditions during a summer cruise to the Antarctic Peninsula. At one point symptoms and signs strongly suggested acute appendicitis. She was monitored and treated conservatively on board and recovered uneventfully without surgery. Later she had a biliary colic attack and then an allergic reaction to the pain medication given. The pre-employment medical fitness certificate cannot always be trusted regarding previous history of allergies and medical conditions.

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Key words: acute appendicitis, conservative treatment, cruise medicine, pre-employment medical examination

CASE REPORT

A cruise vessel with 482 passengers and 397 crew members, including two nurses and one physician, was on a 16-day round-trip Antarctic cruise from Buenos Aires in January 2012, covering 4434 nautical miles (Figure 1). The highlights were Montevideo (day 2), Port Stanley (day 5), cruising the Antarctic Sound/ Peninsula (days 7–9), Ushuaia (day 11), cruising Cape Horn (day 12), and Puerto Madryn (day 14).

On day 5, a 21-year-old female crew member presented in the ship's Medical Centre with symptoms and findings of a urinary tract infection. Her recent pre-employment medical examination stated that she had no history of past illness or allergies, and all findings at that time were normal. A 5-day course of Sulfamethoxazole and Trimethoprim tablets was started and her urinary symptoms quickly subsided.

On day 9, cruising around Deception Island off the Antarctic Peninsula (63°51'5 S / 061°31'6 W; Figure 2), the sea was rough and early morning she was nauseous, vomited several times, and complained about diffuse abdominal pain. She was not pregnant and had no gynaecological symptoms. Her temperature was nor-

mal (36.9°). Vomiting and nausea subsided after Metoclopramide IM, followed by Meclizine by mouth. In the afternoon she was not nauseous, but she had more abdominal pain localized in the lower right abdominal quadrant. Her temperature was 38.2°; there was slight tenderness to the touch in the right upper quadrant and excessive tenderness at McBurney's point, but no clinical signs of peritoneal irritation. Her bowel sounds were audible. As appendicitis could not be ruled out, bed rest was ordered and she was kept on a liquid diet.

On day 10 she felt much better, her temperature was normal, but she was still very tender to the touch over McBurney's point, where there was some guarding, rebound and referred pain, and a positive psoas sign, suggesting localized peritoneal irritation. Her bowel sounds were sparse but audible. Her white blood count was normal, but her C-reactive Protein (CRP) was elevated: 64.1 (normal range 0–7.5) mg/l. Liver enzymes, amylase, and creatinine values were normal. Urine dip stick was now negative for blood, leukocytes, and nitrite. As appendicitis at this time was strongly suspected, a 7-day course of antibiotics (Amoxicillin + Metronidazole) by mouth was initiated.

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Figure 1. 16-day Cruise Itinerary

During the next 24 hours her clinical condition steadily improved, and on arrival in Ushuaia (day 11) she was afebrile, felt no pain when resting, but there was still distinct tenderness to the touch over McBurney's point and voluntary guarding, but no further signs of peritoneal irritation. Her white blood count remained normal, while CRP had decreased to 32.

On day 12 she was afebrile and asymptomatic. She went back to 'light work' as a waiter, and the next day her CRP was 7 mg/l.

On day 15 she had no abdominal pain, but had developed symptoms and signs of vaginal candidiasis. Antibiotics were discontinued, and she was treated with a single dose of Fluconazole by mouth.

In the evening of day 16 she was again in the Medical Centre, doubled up with 'excruciating pain', constant with periodic worsening, but now located in the upper right abdominal quadrant. She was afebrile, all available blood and urine tests were normal; there were no indications of infection. She had been celebrating her successful recovery with a large portion of ice cream when the pain suddenly hit. On further questioning she remembered similar but much weaker pain attacks in the past, and ultrasound examination had allegedly shown 'something' in her gallbladder. A standing abdominal X-ray was without any suspicious shadows in the upper right abdomen or other pathological findings. Ketoralac IV brought almost immediate and complete pain relief, but within minutes of the injection she experienced an allergic reaction with severe periorbital oedema and some subjective

respiratory distress. She recognized the symptoms from an incident years ago when she had taken 'aspirin'. She responded well to Promethazine IM and repeated small doses of epinephrine (adrenalin) SC and had recovered completely at the end of the cruise. The rest of her contract aboard was medically uneventful.

DISCUSSION

Antarctica is one of the most remote and challenging environments on earth, and aeromedical evacuation is challenging even under optimal conditions. During the winter months Antarctica experiences continuous darkness and inclement weather with temperatures routinely below -50°C [1]. Evacuation in case of acute appendicitis is then impossible and surgery has been performed at the research stations. Some examples: In April 1961 a Russian doctor removed his own appendix under local anaesthesia [2, 3], and in July 2011 an appendectomy was performed by the station doctors at the American Amundsen-Scott South Pole Station [4].

During the summer months (November through February) weather conditions are far more agreeable, and cruise ship tourism has become very popular. Approximately 40,000 people visited Antarctica during the 2008–2009 summer season, representing a 400% increase relative to 14 years prior [1]. Hence, aero-medical evacuation strategies from the Antarctic region for individual patients and for mass casualty incidents are becoming more and more important.

Preferred treatment for appendicitis is emergency surgery within 24 hours. After the first 36 hours after the onset of symptoms, the risk of perforation is 16–36% and increases by approximately 5% per 12-hour period [5]. On day 9 of the cruise, our patient certainly had enough classic symptoms and signs of appendicitis to consider surgery. According to the guidelines for health care on cruise ships, first issued by the American College of Emergency Physicians (ACEP) in 1996 [6], ship's doctors are only required to be able to do 'minor surgery', so medical evacuations to surgical facilities whenever possible is the preferred approach when appendicitis is suspected. In this case the ship's physician was a board-certified surgeon with 40 years experience of evaluating acute abdominal cases. He had also previously performed an appendectomy at sea [7]. However, although possible, the lack of trained assistants, adequate anaesthesia, and proper tools made surgery on board an unappealing treatment alternative in this case. Instead the patient was monitored carefully aboard and given broad-spectrum antibiotics and only fluids by mouth.

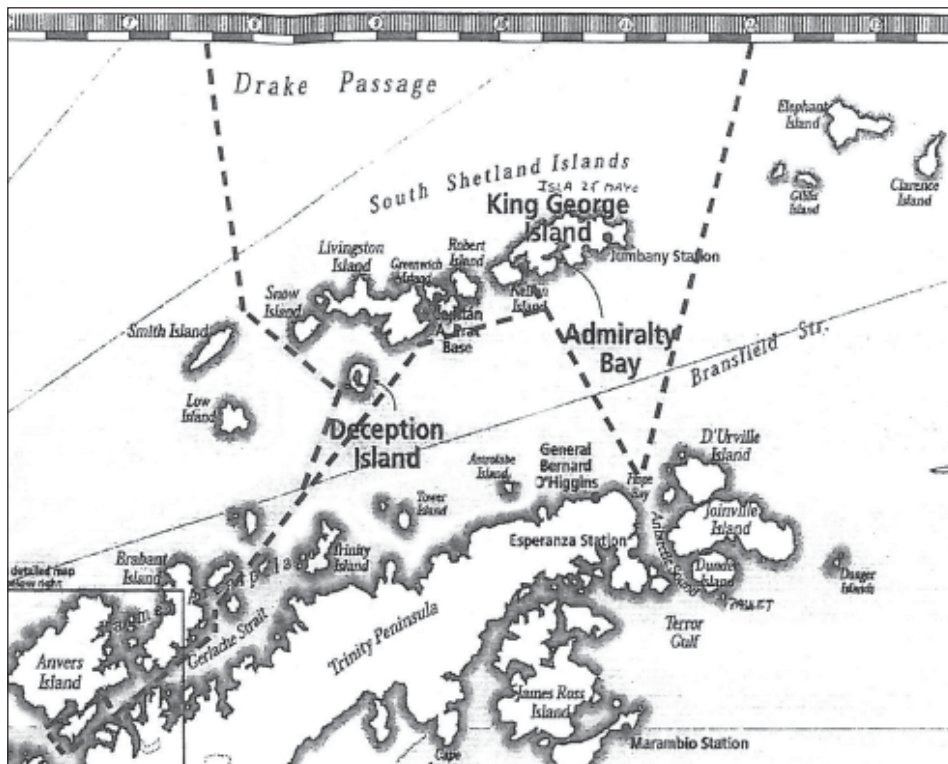


Figure 2. Cruise Itinerary along the Antarctic Peninsula

On day 9, the ship was near Deception Island and had passed the southernmost point of the voyage (Figure 2). The scenic part of the Antarctica cruise was almost over, and the ship was about to head for Ushuaia, approximately 600 nautical miles and 45 hours away at normal speed. At maximum speed for the area and prevailing weather conditions, the vessel could reach port 11 hours earlier, but at no point during the remainder of the voyage did the patient's steadily improving condition call for an increase in speed, and on arrival in Ushuaia admission to the local hospital did not seem decisive for further treatment.

A similar case of suspected appendicitis on a slower expedition vessel has been reported from the same area [8]. A 37-year-old male biologist presented with a 2-day history of right hemi-abdominal pain, and the ship's doctor didn't feel that his patient could afford the luxury of waiting for 3 days, and diverting the ship would mean to abort a very expensive cruise for the passengers. With coordinated efforts of the captain, the expedition leader, the medical insurance company, and the US expedition office, they were able to arrange an evacuation the following day. The patient was brought ashore by Zodiac to the Chilean Air Force base on King George Island (Figure 2) and

was transported to a dirt landing strip, followed by a two-hour flight by fixed wing aircraft to the hospital in Punta Arenas, Chile.

In our case, the same sort of medical evacuation would certainly be work-intensive, time-consuming, and expensive, but it would not have interfered much with the cruise schedule; at most it would have brought some extra excitement to the Antarctic adventure, as would a helicopter evacuation from the ship to the base. Instead, antibiotic and supportive treatment was started, and already the next day the patient's condition had improved to the extent that surgery was no longer an urgent option. In fact, her recovery and normalisation of pathological findings were so quick that most likely the added antibiotics did not make any difference. So either the appendicitis resolved spontaneously, possibly helped by the continued treatment for her initial urinary tract infection, or the symptoms were caused by self-limiting mesenteric adenitis, an exclusion diagnosis that can only be verified during surgery.

Researchers from the Royal Netherlands Navy [9] reviewed studies on conservative treatment of acute appendicitis and included 5 publications in their overview [10-14], one of which [14] was later retracted by the editors since significant portions had been

published elsewhere [15]. For these reports, the success rate was 91% (88–95) with a risk of relapse within 12 months of 16% (5–37). The researchers concluded that if appendectomy cannot be performed within 12 hours, appendicitis can be safely and effectively treated conservatively. Based on the 5 studies and on ‘expert opinion’, they recommended use of a third-generation cephalosporin and an imidazole derivative (2 days IV and 10 days orally) [9]. Such treatment should, however, be initiated in cooperation with a tele-medical assistance service if there is no doctor aboard.

An American review concluded that in some cases antibiotic treatment may fail, and there is a risk of recurrence, but surgically treated patients, including those with the potential for spontaneous resolution and those with a normal appendix, are subjected to the risks of operative morbidity and mortality [16]. When evacuation from a moving ship is necessary to reach a surgical facility, further risk factors can be added, like extra stress and disturbed bed rest as well as various transport hazards to the patients, the rescuers, the helicopter/rescue vehicles, and the ship.

Despite her successful recovery, our patient did not have a good cruise. The antibiotics caused uncomfortable fungal vaginitis, celebration of her recovery with ice cream triggered a biliary colic attack, and the pain treatment caused an incapacitating allergic reaction. A non-steroidal anti-inflammatory drug, Ketoralac, is contraindicated in patients allergic to aspirin [16]. These events emphasize that the pre-employment medical fitness certificate is not necessarily a document to be trusted regarding previous history of allergies and medical conditions.

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