

## **BRIEF COMMUNICATION**

# **Acute Appendicitis During 450-m Saturation Dive**

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Hothaus J. Acute appendicitis during 450-m saturation dive. *J Hyperbaric Med* 1987; 2(4):229–231.—During GUSI \*9\*, a 450-m dive in November and December 1986, a 42 yr-old, healthy male diver suffered from acute appendicitis after having recovered from a previous serious upper respiratory tract infection. Conservative therapy, with high doses of antibiotics, given in short, i.v. infusions, no food, and local cooling with ice proved to be effective treatment. The decompression profile was not changed and no decompression sickness resulted. After the dive a kiwi-shaped painful mass was found under the McBurney's point. Appendectomy was performed after a second attack of appendicitis. Problems of potential surgery in chambers and the role of diver medical technicians in such deep working saturation dives are considered and conclusions are drawn.

*appendicitis, deep saturation diving, conservative therapy*

During GUSI \*9\*, a saturation working dive to 450 m, a previously healthy, 42-yr-old diver complained of an acute onset of pain under the McBurney's point. He had been a saturation diver since 1977 with the Underwater Laboratory Helgoland. Since 1983 he had taken part regularly in deep working dives from 300 to 450 m (GUSI \*1\* to \*7\*). He never had any serious illness, but on 11 November 1986 he developed a serious upper respiratory tract infection with tonsillitis and shivering, but no fever. On 20 November, antibiograph of deep sputum revealed enterobacter aerogenes which were minocycline sensitive. Therapy with this compound was initiated. On 24 November, a productive bronchitis was still present with greenish sputum and pain in the right base of the lung, especially on deep breathing. Four days later, all symptoms were gone, except for rhinitis and headache.

On 1 December, the diver complained, while at 200 m, of a dull pain in the appendix region, and vomited his lunch. Leukocytes were normal and there were no other signs. The rectal temperature was 37.2°C and axilla 36.6°C. A surgical consultant was contacted together with a diving medicine specialist from Duke University Medical Center. Together, they developed the following treatment plan.

Local cooling of the appendix region with ice, 5 g Totocillin (a mixture of ampicillin and oxacillin) in short infusions every 12 h, and a second surgical opinion after 24 h. Medical care in the chamber, including i.v. drips, cooling,

and diagnostic assistance was performed by an experienced diving medical technician (DMT). No food was allowed and for liquids, only thin black tea.

At 21.30 h the rectal temperature had fallen to 36.7°C, cooling was stopped, and the diver allowed to sleep without sedatives. The diver woke up at 07.30 h the next morning free of pain, except when moving about, and felt better. The rectal temperature was 36.6°C and a further infusion of Totocillin was initiated. At 16.00 h there was no further pain, even on percussion. However, on standing up he felt nausea and at 18.30 h a third infusion of 5 g Totocillin was administered. By the third morning there were no adverse abdominal signs and symptoms. Flatulence was present, but no feces, and micturition was normal. A slow return to normal food was initiated with rice, porridge, soup, etc., at 135 m. The rectal temperature remained normal.

During Day 3 of treatment, decompression was continued between 200 and 135 m so as to reach the surface as quickly as possible. No decompression sickness occurred, and on 10 December all the divers left the decompression chamber. Medical evaluation of the sick diver revealed that there remained a painful kiwi-shaped resistance under McBurney's point, and an appendectomy was scheduled for January 1987. However, after a second episode of acute appendicitis in late December he was referred for surgery, which was performed.

The histopathologic report was as follows: 7-cm-long appendix, microscopic coprostitis, and relatively strongly developed lymphatic tissue in mucosa and submucosa. Lipomatous metaplasia and fibrosis in the submucosa, infiltrating also the inner muscularis propria, no florid inflammatory infiltrations in the depth, no atypias. In summary, coprostitis with lymphatic hyperplasia and signs of recovered appendicitis. No suspicion of malignancy.

Some initial conclusions and points for discussions may be made. This onset of appendicitis in a usually healthy man after a prior work history of over 500 d of saturation diving must be considered in conjunction with his prior decline in immunologic status after a severe upper respiratory tract infection and possible pneumonia, although the pulmonary x-rays after the dive were normal.

It is pertinent that a further possible case of appendicitis in a diver in an earlier GUSI saturation dive was less pronounced and not reported. Nevertheless, the appendix was later surgically removed and the diver has continued to dive without problems.

Diagnostic and therapeutic assistance by a DMT inside the chamber was of significant value. It is relevant that GUSI divers have DMT training and extensive training in practical nursing. For example, they obtained multiple hyperbaric blood samples during saturation dives.

The possibility of performing an appendectomy in the chamber under local anesthesia was considered. However, it was rejected for several reasons. First, surgery would be most difficult with infection of the wound, very probable because the chamber environment is commonly contaminated by pseudo-

monades. Further, operating on immunologically compromised tissue and the presence of thrombocytopenia remains a serious problem, not to mention the decompression characteristics of inflamed edematous tissue. Prophylactic appendectomy also seems unlikely as this could potentially initiate an ileus.

It would be interesting to know if others elsewhere have had any similar experiences.

Deep saturation diving, with no possibility of direct medical interference, must always retain an element of risk, especially for intercurrent infections. However, GKSS/GUSI can now look back to a total of 64 man dives in deep saturation dives from 300 to 600 m for a total of more than 1450 man dives with no significant medical or diving problems, but with considerable intercurrent pathology. All these cases were treated conservatively and safely.