

A SARS Primer

By Dr. Ward Reed

In February of 2003, an Italian physician working for the World Health Organisation (WHO) in Vietnam examined an American businessman who had contracted a type of pneumonia, previously unknown. This respiratory illness appeared to spread rapidly, with the potential to cause severe symptoms in those who contracted it.

The physician reported this outbreak to the World Health Organisation (WHO) and gave it the working name of severe acute respiratory syndrome, or SARS. Reports of this disease subsequently came from China, Hong Kong and Singapore. The physician, Dr. Carlo Urbani, later contracted the disease and died from it.

It was later shown that the disease is caused by a new species of corona virus. It now appears that SARS probably started in Guangdong Province in China in the fall of 2002. The virus causes a spectrum of illness, from asymptomatic infections to a mild cold, to severe life-threatening illness. Typically, SARS is seen in previously healthy adults from 25 to 70 years old. The incubation period may be as long as 10 days, but symptoms usually start two to seven days after contact with an infected individual.

Signs & Symptoms of SARS

Initially with SARS, a high fever is present, accompanied by muscle aches and fatigue. Sometimes the sick person has diarrhea. After two

to five days, the respiratory symptoms begin, ranging from a mild cough, to severe pneumonia that can cause death.

As of August 2003, WHO had reports of 8,422 probable cases, with 916 deaths from the disease. WHO reported recoveries in 7,442 cases, and 64 cases were listed as hospitalised. Slightly more than 1 in 10 of the individuals who were identified as contracting SARS in the 2002-2003 epidemic died from the disease or its complications.

SARS, once it progresses to the full respiratory syndrome, is quite serious: about 12 percent of those who have contracted it have died. Of the various therapies tried, none has been shown to be effective. Current medical treatment consists of supportive care.

How SARS Is Transmitted

In one respect, SARS is similar to other respiratory illnesses: it is usually spread from infected droplets in the air. The disease appears to differ from other respiratory viruses in two ways: it seems able to cause a more severe respiratory illness than some other viruses like influenza, and it may also spread through the gastrointestinal tract. These two factors have resulted in some patients being 'super spreaders' of SARS. Some who have the disease have been identified as having spread it to more than 100 other individuals. Many SARS cases have occurred in

healthcare workers who have cared for SARS sufferers.

Given that this disease is very dangerous, very contagious and is essentially untreatable, quarantine is the only means available to slow or stop it. In many countries, individuals arriving from areas affected with SARS will be screened for respiratory disease. The details of the screening vary widely from country to country, and even from locality to locality. The varied response to the 2002-2003 SARS epidemic showed that areas with the most stringent controls, such as Singapore, had the easiest time controlling the problem. Those with symptoms that could be consistent with SARS will usually be barred from leaving an endemic area, or they will not be allowed entry into a non-endemic area.

According to WHO, 30 countries and two administrative districts have reported SARS cases. Most cases have been travelers returning to their home countries. By mid-July, the U.S. Centre for Disease Control CDC had withdrawn all Travel Alerts and Travel Advisories. (Advisory = postpone all travel; Alert = a health concern exists, take precautions when traveling.)

Travel Plans

Should you be identified as someone who has been in contact with a patient, you will be placed in quarantine either before you leave an

area or immediately after arrival at your next stop. This quarantine period could last up to three weeks. Should you contract symptoms of a severe respiratory illness, you will be quarantined in the area where you became ill.

Medical evacuation of a patient with acute respiratory illness from a SARS area is essentially impossible. Should you choose to travel to a SARS-endemic area and contract the disease, DAN will work with our partners to find the best care available locally, but we will not be able to evacuate you.

The last case of SARS of the 2002-2003 epidemic occurred on July 25, 2003. This does not mean, however, that SARS is gone. What may be the first case of the 2003-2004 season occurred in a Singapore man on Sept. 10, 2003. This case may have been a laboratory transmission, but is being treated as a new case. The re-emergence of SARS is thought to be a likely event in the upcoming months. The first cases are, again, likely to emerge in China, and then spread. Public health workers worldwide are making preparations for the identification of new cases and control measures.

If you plan on traveling internationally this winter or spring, you should be aware of the status of SARS in your destinations and intermediate stops. If in doubt, consult your local National Health Organisation. ☐



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started my first treatment in the recompression chamber. (It looks, by the way, like an iron igloo from the outside and a submarine from the inside.)

Once under way in a U.S. Navy Table 6 treatment, we "descended" rapidly. I could barely keep up with the sinus and ear equalisation as the operator dropped me to 18m of pressure (2.8 atmospheres) and the attendant fitted me with a hood that supplied 100 percent oxygen. This treatment lasted more than five hours, which included an extension of about 45 minutes while at depth because my symptoms had not subsided.

Just in case you're wondering, a U.S. Navy Table 6 is divided into time spent at 18m and 9m of pressure with a 30-minute ascent from 18m to 9m and from 9m to the surface. Oxygen is provided in fixed time periods during a treatment to prevent oxygen toxicity. The last two and a half hours of treatment are spent at 9m.

After a second Table 6 treatment and a neurological exam that showed normal results, I was released from the hyperbaric unit the following morning. Next, I took a "surface interval" from 7-11 a.m. and was subsequently released through the emergency room at about 5 p.m.

I spent the night in a hotel and had a follow-up examination on the following morning. During the previous 24 hours, I had experienced difficulty getting comfortable in the chamber: I was instructed not to cross my arms or legs (which would inhibit blood flow), and the collar on the oxygen hood was uncomfortable. I continued having residual effects,

mild tingling in my thumb and forefinger, in my right hand. These abated after a week.

The Discussion: Looking back on my injury, I have tried to reconstruct how I could have gotten bent. While being treated, my doctors discovered a possible culprit: I had a previously undiagnosed *PFO*, or *patent foramen ovale*. This is a hole in the wall that separates the upper chambers of the heart and directs blood away from the lungs while we are in the womb. (For more about PFO, see sidebar.) This opening usually closes at birth, but mine apparently never closed completely. This is a condition I share with many individuals, but it often remains undiagnosed. I learned from my doctors that it can become a problem for divers if it provides a gateway for nitrogen bubbles in the blood.

When I pulled the anchor, the straining could have caused bubbles to pass through my PFO and from there to my brain. I was very lucky to have recognised the symptoms, received oxygen and not had a stroke. Bubbles blocked blood flow to my motor area, like a blood clot would during a stroke. Breathing oxygen forms a gradient in blood and tissues, causing nitrogen to move out of bubbles, and thereby decreasing the bubble size.

I was medically prohibited from scuba diving until later, pending the results of my MRI and echocardiogram. The echocardiogram was to confirm the PFO, and it did. I was cleared to dive but with restrictions: no deeper than 30m, halve the allowed bottom time and

always use nitrox. I have resumed diving. All of what has happened to me has not fully sunk in; there will be an adjustment period for me mentally, of course. I want other divers to benefit from my experience, though.

Ascend slowly, avoid strenuous exercise after a deep dive and be aware of the unresearched effects of multiday repetitive-dive nitrogen saturation. If you dive a lot, BE CONSERVATIVE. Join DAN and get insured. ☐

What is a patent foramen ovale (PFO)?

The foramen ovale is an opening, or link, between the upper chambers (right and left atria) in the heart. Blood bypasses the lungs predominantly through a patent foramen ovale, or a foramen ovale that is open ("patent" means "open").

After birth, the foramen ovale closes, allowing blood to be pumped through the lungs for oxygenation. The foramen ovale is initially closed by a "flap valve," similar to a spring-loaded door.

People with patent foramen ovale are completely unaware of it, and will go through life completely free of any symptoms related to it. For a diver, however, it is theoretically important. Some divers, depending on their depth and duration of the dive, produce bubbles in their venous blood during and after decompression (ascent from the dive). These bubbles are small, usually relatively few in number, and do not give rise to any symptoms since they are trapped by the small blood vessels in the lungs and filtered out of the circulation.

While having a PFO does not guarantee bends, the absence of one does not grant immunity. Most cases of decompression illness occur in people without a PFO. Patent foramen ovale is only one of many possible risk factors, of which dive depth, bottom time and rapid ascent are the most common culprits.