

9/11 World Trade Center Lung Disease Continues to Haunt

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As we mourn the 10th anniversary of the WTC attack atrocity we should remember that for many people, first responders, reporters, forensic specialists and local residents, the physical pain and suffering still continues to haunt them on a daily basis.

In a recent study published in the New England Journal of Medicine, (N Engl J Med 2010; 362:1263-1272 April 8, 2010), entitled "Lung Function in Rescue Workers at the World Trade Center after 7 Years" the authors concluded "Exposure to World Trade Center dust led to large declines in FEV1 (lung function) for FDNY rescue workers during the first year. Overall, these declines were persistent, without recovery over the next 6 years, leaving a substantial proportion of workers with abnormal lung function."

This recent study was only looking at the long-term lung function effects of the people who were exposed to the smoke. Thousands of tons of toxic debris, resulting from the collapse of the Twin Towers, became airborne and consisted of more than 2,500 identified contaminants. Analysis of the ash showed that approximately 50 percent of it was non-fibrous material and construction debris, largely pulverized concrete which, with its high alkaline pH, is very irritating to lung tissue. About 40 percent of the dust was glass and other fibers another 9.2 percent was identified as cellulose; and almost 1 percent of the ash was shown to be the extremely toxic carcinogen asbestos, as well as detectable amounts of lead, mercury and many other toxins. There were also high levels of dioxin and Polycyclic aromatic hydrocarbons from the fires which burned for three months following the attack.

Many of the dispersed substances (asbestos, crystalline silica, lead, cadmium, polycyclic aromatic hydrocarbons) are carcinogenic; other substances can trigger kidney, heart, liver and nervous system damage. The particle size is also important with over 35 percent of the dust grains being smaller than a human hair is wide and thus able to penetrate into the deepest levels of the lungs and cause the most damage. The smaller particles also dissolve easier and allow their toxins to be absorbed into the blood stream and potentially cause systemic damage.

If we ONLY look at lung function issues we see that there are several phases that occur which, of course, leads to different treatments. In the days and weeks immediately following the collapse, the inhaled ash caused inflammation to the sensitive lung tissue. This is also the period of the greatest absorption of toxins into the blood stream. During this time, detoxification to get the dissolved toxins out of the blood and the use of bronchodilators and mucolytics to help get mucus, with the trapped dust particles, out of the lungs was of paramount importance. Preventing further exposure was critical which, for many people, was all but impossible. As time marched on by the inflammation, if not aggressively dealt with, led to progressive damage to the lungs. As the immune system tried to destroy the grains of dust, minerals and metals with the release of proteolytic enzymes and reactive oxygen species, the resulting inflammation gradually caused scar tissue to form as the body tried to wall off and isolate the debris.

Now, here we are 10 years later with scar tissue that physically restricts the movement of the lungs and, to add insult to injury, doesn't participate in the critical exchange of CO2 and oxygen gases which further leads to shortness of breath and decreased stamina. For most people who were exposed to the toxic ash, the body is STILL trying to repair and remodel the damaged lung tissue through a secondary inflammatory process. This causes the lungs to become acutely sensitive to anything else that would cause inflammation, like begets like. Thus, this secondary inflammation predisposes the lungs to the development of new respiratory allergies, which are also an inflammatory process.

New onset respiratory allergies are problematic because they perpetuate inflammation and cause an increase in the amount of mucus that is produced which only further exacerbates shortness of breath while increasing the risk of secondary infections. Messy! Now, in this late phase of lung damage there are still things that can be done to help ameliorate the excess mucus secretion and inflammation.

Mucus is secreted in increased amounts in response to lung irritation. To help the body deal with it more efficiently you MUST first make sure that you are well hydrated. In general drinking ½ oz of water per pound of body weight per day is a good starting point. Next, there is a derivative of the amino acid Cysteine, called N-acetylcysteine or N-acetyl-L-cysteine (abbreviated NAC), which is a very good mucus liquefier and is wonderfully helpful in thinning the mucus so the lungs can more easily get rid of it. Taken in sufficient quantity three times per day it goes a long way in reducing the risk of secondary infection and relieving shortness of breath caused by congestion.

The chronic inflammation, exacerbated by the reaction to inhaled allergens, can be reduced with a combination of Quercetin and essential fatty acids. Quercetin is widely distributed in nature and is found in many foods and herbs including include black and green tea, capers, apples, onions, especially red onions, red grapes, citrus fruit, broccoli and a number of different berries, to name but a few sources. As a supplement taken three times per day, in sufficient quantity, it is a great anti-inflammatory which has even been shown to help with pollinosis (an excessive reaction to pollen exposure). The essential fatty acids, along with vitamin E, not only help with the inflammation but also help make the lung tissue more flexible.

An over reaction to inhaled allergens and irritants leads to the release of histamine which, on the one hand aids the immune system in combating inhaled infective agents but, on the other hand leads to a runny nose, watery eyes and an increased production of mucus. Anti-histamine drugs have their place when things are particularly onerous but over time can have a wide range of unwanted side effects. Nettle is a good, natural, anti-histamine which is usually safely tolerated even over extended periods of time. Again, taken three times per day in sufficient quantity it is very helpful in reducing the effects of histamine even when the pollen and mold counts are quite high.

Other useful treatments include IV therapy with Vitamin C, which is an anti-oxidant and anti-inflammatory vitamin and Magnesium which acts as a natural bronchodilator. Together they support the immune system and make it much easier to manage the chronic lung damage that has occurred. During an exacerbation of symptoms Glutathione nebulizer treatments are great for reducing inflammation and improving lung function. Dietary changes are also helpful in reducing inflammation and allowing for easier control of the mucus.

Last but NOT LEAST we come to progressive desensitization to neutralize allergic reactions and thus the inflammation that they cause. Intra-dermal skin testing allows us to identify allergens that further stress the lungs and weakens the immune system. Once the offending agents have been identified, using progressively increasing doses of the antigen will down regulate an over exuberant immune response without suppressing the immune system. Together these treatments can significantly improve the quality of life.

Sometimes, bronchodilators, anti-histamines and even steroids may still be necessary if confronted with over whelming levels of pollen, mold or dander. These drugs may be life saving but they do little to manage the chronic damage and support the healing process from exposure to the WTC toxic ash.