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LETTER TO THE EDITOR

Isolated bronchiolitis obliterans: high incidence and diagnosis following terrorist attacks

Isolated bronchiolitis obliterans is an uncommon disease, and the prognosis tends to be less severe in idiopathic cases compared to those with who have bronchiolitis obliterans in the setting of connective-tissue disease or post lung transplant (Visscher & Myers, 2006). The pathogenesis of bronchiolitis obliterans appears to be related to a complex interaction between both alloimmune and non-alloimmune mechanisms.

It is well known that chemical agents have been used against military personnel and civilians during conventional warfare. For example, it has been estimated that up to 100,000 Iranians were exposed to chemical warfare agents during the 8-year Iraq–Iran war, and around 50,000 mustard gas-affected individuals are currently suffering from chronic respiratory complications (Khateri et al., 2003). After more than two decades of radiologic, histologic, spirometric and laboratory evaluations on these patients it has been found that bronchiolitis obliterans is the main cause of their symptom (Ghanei et al., 2004; Ghanei & Harandi, 2007; Ghanei et al., 2008; Ghanei et al., 2011).

Recently, in a descriptive case series in 80 US soldiers with dyspnea on exertion after inhalational exposures during service in Iraq and Afghanistan, had lung biopsies which showed the presence of bronchiolitis obliterans, which was hypothesized to be secondary to inhalational exposure (King et al., 2011). It is highly possible that the US soldiers like Iranian soldiers and civilians were exposed to similar chemical weapons, either used during the recent wars, or even due to toxins still around from previous fighting. Some toxins are able to persist in soil for 10 years and be re distributed by fire (Rosenblatt et al., 1995). Of note, even a single exposure to low doses of toxins like sulfur mustard, bis(2-chloroethyl) sulfide, can induce long-term respiratory consequences without warning and without a history of symptoms at the time of exposure. It is possible, therefore that these veterans encountered to same scenario as World War I and Iranian victims of chemical warfare.

Although, many of the US soldiers reported having been exposed to smoke from a fire in a large sulfur mine near Mosul, Iraq, during the summer of 2003, several of the soldiers reported having had no specific exposure (King et al., 2011). In such cases, King et al. hypothesized that massive exposure to respirable particulates similar to those that followed the collapse of the World Trade Center may have been responsible for the disease in the veterans as reported by Mann and colleagues. Mann et al. believe that many patients present at the World Trade Center on September 11 who have persistent dyspnea and deterioration of pulmonary function may have bronchiolitis obliterans despite an absence of abnormalities on CT of the chest (Weiden et al., 2010).

We believe that isolated bronchiolitis obliterans is more common than previously appreciated following massive respirable particle or toxic exposure. All three aforementioned settings can be related to terrorist attacks. In such circumstances the single and rare exposure of a large number of people appears to lead to an increased incidence of bronchiolitis obliterans (Le & Boen, 1995). Special attention should be paid to the clinical history when such attacks may have affected the individual patient. Even when the diagnosis is suspected, the diagnosis of bronchiolitis obliterans can be difficult and clues subtle. In some situations, e.g. low dose exposure to sulfur mustard, the occurrence and time of the exposure may not be appreciated by the patient, so careful questioning may be required. A high index of suspicion in this patient population is very important. Any respiratory complains in a patient with a previous history of such exposures should be considered potentially important and evaluated fully to diagnose bronchiolitis obliterans. If serial pulmonary function tests (PFTs) show a clinically meaningful evolving obstructive pattern, a high resolution computed tomography scan with expiratory views can be used to help confirm the diagnosis by revealing air-trapping or other small airway features of bronchiolitis obliterans (Gunn et al., 2008). Decisions regarding the need for invasive procedures such as visually assisted

thoracoscopic biopsy or open lung biopsy should be made considering individual patient risk and the potential utility of the results. It would seem most beneficial if a solid diagnosis would affect clinical management. (Martin & Chien, 2012). However, clues to pathogenesis should be sought and the treatment of these patients should be undertaken to prevent further lung deterioration (Mann et al., 2005; Ghanei & Harandi, 2007, 2011).

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