

Asthma, Posttraumatic Stress Persist After 9/11

BY MARY ANN MOON

Tens of thousands of people continue to have asthma and post-traumatic stress symptoms attributed to the Sept. 11, 2001, terrorist attack on the World Trade Center, a report in the JAMA.

Five to six years after the tragedy, an estimated 25,500 rescue/recovery workers, residents, office workers, and even passersby directly exposed to the particulates and fumes at the site have been diagnosed as having new-onset asthma. Even more—an estimated 61,000—have experienced symptoms indicative of PTSD, said Robert M. Brackbill, Ph.D., of the Centers for Disease Control and Prevention, and his associates.

The researchers assessed the long-term impact of the terrorist attack on health using information collected in the World Trade Center Health Registry, “the largest postdisaster exposure registry in U.S. history,” which tracks a cohort of about 71,000 of the estimated 409,000 people who were present during or immediately after the attacks. Asthma and posttraumatic stress (PTS) symptoms were two of the most frequently reported health effects.

A total of 46,322 members of the cohort surveyed in 2006-2007 were included in this analysis.

Applying the results to the entire set

of exposed persons yielded estimates that some 25,500 (range of 17,000-40,000) have developed postevent asthma and about 61,000 (range of 43,000-88,600) have developed symptoms of posttraumatic stress.

Asthma status was assessed via self-reported first lifetime diagnosis of asthma or reactive airways dysfunction. PTS symptoms in the cohort were assessed

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with the PTSD Checklist, a 17-item self-report instrument.

The overall postevent incidence of new-onset asthma was 10.2%. “The annualized rate of asthma diagnoses in the 4 months immediately following the attacks was at least 6 times higher than the estimated annual national adult rate of 0.5% for 2002, and in subsequent years it remained at least 2 times higher than national estimates,” the investigators noted.

Asthma rates were nearly as high among passersby who were exposed only during the collapse of the World

Trade Center towers as they were among people who returned to live or work near the site for months afterward, suggesting that symptoms often stemmed directly from exposure to the particulates and fumes released during the collapse itself.

Asthma symptoms were most evident among rescue/recovery workers and correlated with longer exposure at the site. However, asthma symptoms were also noted among residents and office workers, particularly those whose homes or work sites received a heavy coating of the dust generated by the collapse of the towers.

The data also suggested that asthma related to intense exposure to the dust cloud is more severe than is other asthma. “Respondents with asthma diagnosed after September 11 were more symptomatic, required more treatment, and reported a lower quality of life than those with asthma diagnosed before September 11,” Dr. Brackbill and his colleagues said (JAMA 2009;302:502-16).

The asthma incidence reported here is likely to be an underestimate, since the study excluded the 40% of new-onset asthma diagnoses in which the exact date of onset could not be determined. In most of those cases, circumstances suggested that the asthma was event related, the researchers noted.

Approximately 10% of the study co-

hort reported chronic PTS symptoms, and an additional 10% developed late-onset symptoms, highlighting the importance of ongoing mental health surveillance after disasters.

Rescue/recovery workers were the group most likely to have delayed PTS symptoms.

Long-term stress symptoms correlated with intense exposure to the dust cloud, injury during the disaster, and witnessing horror. The risk also was higher for people who lost a spouse, other family member, coworker, or acquaintance in the attacks.

However, postevent experiences were the strongest risk factor for long-term PTS, with people who lost their jobs and had poor social support being the most likely to suffer severe, prolonged stress.

“These findings confirm the general understanding that, over time, evaluation and treatment of individuals with long-term PTSD must address social factors that moderate predisaster and peridaster experiences,” Dr. Brackbill and his associates said.

“Our findings confirm that, after a terrorist attack, mental health conditions can persist if not identified and adequately treated, and that a substantial number of exposed persons may develop late-onset symptoms,” they noted.

No financial conflicts of interest were reported. ■

GENOMIC MEDICINE

Paving the Way for New Approaches to Asthma Care

Asthma is a complex or multifactorial condition in which genetic and environmental factors combine to cause disease in ways that are, as of yet, poorly understood.

Despite advances in diagnosis and treatment of asthma, the prevalence and severity of the disease have continued to escalate over the past 20 years. In 2007 an estimated 3.8 million children in the U.S. suffered an asthma attack or episode. In an era of health care cost containment asthma is estimated to incur about \$19.7 billion in direct and indirect costs to the U.S. economy. Patients, health care providers, employers, and insurers would all welcome improved approaches for risk prediction, prevention, and disease management.

One third of patients who have asthma have a family history of this condition, and a positive family history is a better predictor of asthma risk than currently identified genetic markers. This is at least in part because family history captures shared environmental risk factors (e.g. exposure to allergens and second-hand smoke), but is also because we are only now beginning to dissect the genomic underpinnings of the condition.

Although obtaining a family history is a rational first step to identifying at-risk

individuals, the positive predictive value conferred by a family history of a first degree relative with asthma is still quiet low (less than 40%).

Other clinical observations may also indicate a genetic predisposition to asthma, but the usefulness of such observations in predicting asthma risk is unproven.

An intriguing example comes from a study that examined the association between severity of RSV (respiratory syncytial virus) infection and asthma in 8,280 pairs of twins.

The study found evidence that hospitalization for an RSV infection is an indicator of a genetic predisposition to asthma and importantly that RSV infection did not appear to be causal of the asthma (Am J Respir Crit Care Med. 2009; 179[12]:1091-7).

Genomic discoveries, along with insights derived from molecular biology and immunology are changing the way we think about asthma.

Multiple lines of evidence suggest

that asthma is actually a group of diseases rooted in overlapping pathologies that affect the airways. Recent genome-wide association studies have identified a number of novel genetic markers contributing to asthma susceptibility.

One or more of these may eventually yield insights on new preventive measures or therapies.

For example, recent discoveries suggest that variations in the CHI3L1 gene encoding the chitinase-like protein YKL-40 are associated with asthma. These variations correlate with serum levels of the protein, which is thought to play a role in inflammation and asthma severity. Identification of variations in the CHI3L1 gene could represent a first step in creating novel asthma treatments targeting novel mechanisms of disease.

Genome-wide association studies also are being conducted to probe the pharmacogenomics of asthma drug responsiveness.

Multiple genetic variants in a wide va-

riety of genetic pathways have been associated with responses to the major classes of asthma drugs including bronchodilators, inhaled corticosteroids, and leukotriene inhibitors. One could easily envision the creation of inexpensive gene chips capable of simultaneously measuring hundreds genetic variations in an individual's DNA that may be predictive of asthma drug metabolism and responsiveness.

Clinical trials to examine the utility of pharmacogenomic testing as part of asthma care are ongoing.

What does this mean for your patients and your practice? On the horizon are more individualized approaches to risk prediction, prevention, diagnosis, and treatment of asthma. Integration of these advances for the individual along with public health strategies for populations offers the promise to diminish the burden of individual suffering as well as the societal economic toll of asthma in the decade to come. ■



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