Gas May Have Harmed Troops, Scientists Say

By IAN URBINA

WASHINGTON, May 16 — Scientists working with the Defense Department have found evidence that a low-level exposure to sarin nerve gas — the kind experienced by more than 100,000 American troops in the Persian Gulf war of 1991 — could have caused lasting brain deficits in former service members.

Though the results are preliminary, the study is notable for being financed by the federal government and for being the first to make use of a detailed analysis of sarin exposure performed by the Pentagon, based on wind patterns and plume size.

The report, to be published in the June issue of the journal NeuroToxicology, found apparent changes in the brain’s connective tissue — its so-called white matter — in soldiers exposed to the gas. The extent of the brain changes — less white matter and slightly larger brain cavities — corresponded to the extent of exposure, the study found.

Previous studies had suggested that exposure affected the brain in some neural regions, but the evidence was not convincing to many scientists. The new report is likely to revive the long-debated question of why so many troops returned from that war with unexplained physical problems. Many in the scientific community have questioned whether the so-called gulf war illnesses have a physiological basis, and far more research will have to be done before it is known whether those illnesses can be traced to exposure to sarin. The long-term effects of sarin on the brain are still not well understood.

But several lawmakers who were briefed on the study say the Department of Veterans Affairs is now obligated to provide increased neurological care to veterans who may have been exposed.

In March 1991, a few days after the end of the gulf war, American soldiers exploded two large caches of ammunition and missiles in Khamisiyah, Iraq. Some of the missiles contained the dangerous nerve gases sarin and cyclosarin. Based on wind patterns and the size of the plume, the Department of Defense has estimated that more than 100,000 American troops may have been exposed to at least small amounts of the gases.

When the roughly 700,000 deployed troops returned home, about one in seven began experiencing a mysterious set of ailments, often called gulf war illnesses, with problems including persistent fatigue, chronic headaches, joint pain and nausea. Those symptoms persist today for more than 150,000 of them, according to the Department of Veterans Affairs, more than the number of troops exposed to the gases.

Advocates for veterans have argued for more than a decade and a half that a link exists between many of these symptoms and the exposure that occurred in Khamisiyah, but evidence has been limited.
The study, financed by the Department of Veterans Affairs and the federal Centers for Disease Control and Prevention, is the first to use Pentagon data on potential exposure levels faced by the troops and magnetic resonance imaging to scan the brains of military personnel in the exposure zone. It found signs of brain changes that could be due to exposure, showing that troops who had been exposed at higher levels had about 5 percent less white matter than those who had little exposure.

White matter volume varies by individual, but studies have shown that significant shrinkage in adulthood can be a sign of damage.

The study was led by Roberta F. White, chairman of the department of environmental health at the Boston University School of Public Health. Dr. White and other researchers studied 26 gulf war veterans, half of whom were exposed to the gases, according to a Defense Department modeling of the likely chemical makeup and location of the plume. The researchers found that troops with greater potential exposure had less white matter.

In a companion study, the researchers also tested 140 troops believed to have experienced differing degrees of exposure to the chemical agents to check their fine motor coordination and found a direct relation between performance level and the level of potential exposure. Individuals who were potentially more exposed to the gases had a deterioration in fine motor skills, performing such tests at a level similar to people 20 years older.

Dr. White says this study and the results of research from other studies provide “converging evidence that some gulf war veterans experienced nervous system damage as a result of service, and this is an important development in explaining gulf war illnesses.”

Phil Budahn, a spokesman for the Department of Veterans Affairs, said the research required further examination.

“It’s important to note that its authors describe the study as inconclusive,” Mr. Budahn said, adding, “It was based upon a small number of participants, who were not randomly chosen.”

Dr. White said she did not describe her study as inconclusive, though she said it would be accurate to call it preliminary.

Lea Steele, a Kansas State University epidemiologist and the scientific director of the veterans department’s advisory committee on gulf war illnesses, said she thought the study was extremely important. Dr. Steele said that gulf war illnesses had been described by their symptoms, but that until now scientists had struggled to find physiological conditions that corresponded with those symptoms.

But the new research, Dr. Steele said, used previously nonexistent brain scanning technology to, essentially, “look into the brain to evaluate the difficult-to-characterize problems affecting gulf war veterans.”

Thus, she said, it is “the first to demonstrate objective indicators of pathology in association with possible low-level sarin-cyclosarin exposures.”

Dr. Daniel J. Clauw, professor of medicine and director of the Chronic Pain and Fatigue Research Center at
the University of Michigan, said that while the study indicated that the veterans had not imagined their illnesses, more research was needed.

“Future studies need to compare the results of brain scans of gulf war veterans with individuals with chronic pain and other symptoms who were not deployed to the gulf war before concluding that any changes are due to wartime exposures,” Dr. Clauw said.

For more than five years after the explosions at Khamisiyah, the Pentagon denied that any American military personnel had been exposed to nerve gas. Confronted by new evidence in 1996 and 1997, it acknowledged that up to 100,000 troops might have been in the path of the plume and exposed to low-level doses that produced no immediate effect. In 2002, it released a report saying the exposures had been too low to have caused a long-term adverse effect on health.

Now, the government is straining to handle the health and rehabilitation needs of soldiers returning from the current wars in Iraq and Afghanistan, and lawmakers say they are concerned that veterans facilities will soon need to provide brain scans and treatment to soldiers from the 1991 war who learn of the new research.

On May 2, after learning about the research, Senators Patty Murray, Democrat of Washington, and Christopher S. Bond, Republican of Missouri, wrote the Defense and Veterans Affairs Departments, asking about their plans for outreach and expanded benefits for exposed troops.

The new research, the senators wrote, finally provides “comfort to the thousands of gulf war veterans who have fought for answers and now know that there is a ‘significant association’ between gulf war illnesses and nerve agent exposure in Khamisiyah, Iraq, in 1991.”

The Pentagon has not decided whether to inform veterans about the possibility of a link between exposure and brain damage.

Dr. Michael E. Kilpatrick, deputy director of the Force Health Protection and Readiness Initiative at the Defense Department, said that while Dr. White’s study represented an important finding, he did not believe that his department would send letters to potentially exposed veterans alerting them of it.

The impact of the study was limited, Dr. Kilpatrick said, because it did not establish a direct causal connection between sarin exposure and gulf war illnesses, and it depended on Defense Department data that was at best an estimate and at worst a guesstimate of exposure levels by troops.

“But I’m sure we will be talking with members of Congress about it in deciding how to go forward,” said Dr. Kilpatrick, who has handled much of the department’s work on Khamisiyah and troop health issues.

In 2005, the Pentagon notified about 100,000 gulf war veterans who had been exposed that a study showed a link between brain cancer and gas exposure. Ms. Murray said the Pentagon needed to send similar letters about the new research, expressing concern that many veterans might not know that something might be wrong with them.