ALS Research at Penn State College of Medicine, Hershey Medical Center

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Zachary Simmons, MD

It has always been my strong belief that an ALS center should provide not only high-quality care for persons with ALS and their families, but also should serve as the focus for research. Of course, research can take many forms. *Basic research* is the term usually used for research conducted in a laboratory, not directly involving living patients. *Clinical research* refers to studies in which patients are direct participants.

We are currently conducting some fascinating basic research. I am fortunate to have as a collaborator Dr. James Connor, a noted neuroscientist in our Department of Neural and Behavioral Sciences who is studying Alzheimer's disease as well as ALS. He is assisted by Dr. Xinsheng Wang, a postdoctoral fellow. Small, preliminary studies by our group point to the possibility of an important role for iron, and reveal an increased likelihood of the presence of the gene for hemochromatosis (involved in iron regulation) in individuals with ALS compared to those without the disease. It is widely believed that one cause of ALS is "oxidative stress," and iron is involved in oxidative pathways. Further studies are in progress to confirm our findings and to attempt to determine the effect of this gene on the onset and progression of ALS. If iron is found to be a factor involved in causing ALS, treatments could perhaps be designed for those individuals with ALS who possessed this gene. However, there is much work to be done before we arrive at that point.

Gene profiling is another type of basic research being done by our group. This is a procedure in which gene "chips" are used to determine the level of expression for many genes in the tissues of our ALS patients. Those genes that are present in high amounts may code for substances which play important roles in ALS. The tissues that we test are made possible by our Tissue Donation Program which permits our ALS patients to donate brain and spinal cord tissue after death, to be used for research. We are extremely grateful to the individuals who have participated in this program by giving their "ultimate gifts."

We have an active clinical research program as well. Many of you are aware of our longstanding interest in the subject of quality of life (QOL) in patients with ALS and their caregivers, and of the roles of non-physical factors, including religion and spirituality, in determining QOL. We are in the process of developing an ALS-specific questionnaire that can be used to assess QOL in our patients. Such an instrument should be of great value as doctors

attempt to determine whether new treatments for ALS improve QOL, and as we look to identify what we as care providers can do to improve QOL in ALS. Our QOL studies represent a collaborative effort between two psychologists (Dr. Stephanie Felgoise at Philadelphia College of Osteopathic Medicine and Dr. Barbara Bremer at Penn State Harrisburg), our nurse Sue Walsh, and myself. A number of students are participating in these studies.

There are a number of other clinical research studies going on at present:

1. The VEST Device: Working with Dr. Robert Vender, a pulmonary medicine specialist at Hershey Medical Center, we are exploring the use of the VEST. This is vibrating device placed over the chest periodically. Our goal is to determine whether the use of a VEST helps ALS patients bring up their secretions better, and thus decreases the chance for pneumonia and hospitalization. Individuals who have recently been placed on BiPAP are offered the chance to enter this study.

2. Changes in Thinking in Persons with ALS: Although ALS is traditionally said to be an illness which spares the ability to think, recent research by others has shown that some individuals with ALS have some impairment of their thinking as well. A small, preliminary study of ours, done in collaboration with Dr. Anna Barrett of our Neurology Department, suggests that persons with ALS may lose their ability to recognize the emotional messages conveyed by facial expressions and tones of voice. We will be exploring that further.

3. Botulinum toxin in ALS: When injected into the salivary glands, Botulinum toxin may decrease saliva production. The inability to control saliva is a common problem in persons with bulbar ALS, resulting in drooling which may be embarrassing and may increase the risk of aspiration (fluid going into the lungs) and pneumonia. We are doing a study in collaboration with Drs. Milind Kothari and Kevin Scott of our Neurology Department in which we are performing these injections in those persons with ALS who have problems with controlling their saliva despite taking medications for this.

4. Motor control: We are about to begin a study in which we will be working with Dr. Mark Latash, a kinesiologist at Penn State in University Park. Dr. Latash is doing research into how individuals control hand movements. He has looked at how this changes with normal aging, and now wishes to study how this is affected by neuromuscular diseases.

This is an exciting time for research in ALS. I am grateful for the generous support we have received and will be receiving from the ALS Association (both the National Office and the Greater Philadelphia chapter), the Muscular Dystrophy Association, the Zimmerman Family Love Fund, Advanced Respiratory Inc, Allergan Inc, and from many of our patients. We are planning a symposium in November describing in more detail the ALS research at Penn State Hershey Medical Center. Announcements will be sent out well in advance of this event. I hope to see many of you there, asking questions, making comments, and urging us forward in our battle against this disease!