

INTERNATIONAL FOUNDATION FOR ALTERNATING HEMIPLEGIA OF CHILDHOOD

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Alternating Hemiplegia: Progress Report

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During the period of January 1995 to July 1996, we clinically evaluated 8 children with alternating hemiplegia of childhood (AHC).

A. Database was designed to collect clinical, neuroimaging and laboratory findings and is available to all investigators involved.

B. Neuroimaging evaluation:

PET Studies

1. *FDG-PET* was performed, and areas of either focal or diffuse decreased cortical glucose utilization were demonstrated in all 8 children. One girl had two *FDG-PET* studies; one was performed during an attack and one was performed between attacks. The *PET* scan showed decreased glucose use between attacks, and increased glucose metabolism during an attack.

2. We also performed *Flumazenil PET* in four of the eight children. Decreased flumazenil binding was seen in all 4 children, in the same areas of the brain which showed abnormalities in use of glucose.

3. ^{11}C *a-Methyl-tryptophan PET*, is a new tracer developed in our Center to measure serotonin function in the brain. Drugs which affect serotonin are used to treat migraine, a condition that is believed by many to be related to alternating hemiplegia. One patient with AHC over the age of 18 years performed the

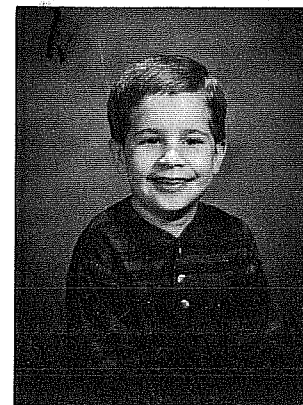
exam and the results demonstrated an altered pattern of serotonin in AHC and a variety of medications which affect serotonin could be tried in these children.

MRI Studies

4. *MRI* was abnormal in two children. One child showed left cerebral hemisphere atrophy and the other one showed a hypersignal in left lenticular nuclei. Our preliminary findings based on *PET/MRI* show that AHC may cause permanent structural abnormalities on *MRI* and focal or diffused cortical abnormalities on *PET*.

5. *Magnetic resonance spectroscopy (MRS)* was obtained in 8 children. The brain regions investigated include frontal lobe, motor cortex, temporal lobe, hippocampus, basal ganglia and cerebellum. The most common abnormality was located in the cerebellum, followed by basal ganglia, hippocampus

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Jayme Busby

Our son Jayme turned ten years old in May. He was diagnosed with AHC when he was about 16 months old. He started on Flunarizine soon afterwards. Presently Jayme is 44" tall and weighs 38 lbs. He is small for his age. He goes to public school. He is considered to be in a first/second grade class. He is in special education classes with some mainstreaming into art, P.E., lunch and computer lab. He has a teacher aid with him at all times. The school decided that. But I'm glad he is watched all of the time in case he has an episode ("limp"). If he goes limp at school the teacher lets him lie down for a while until he feels better. If he is limp on both sides they will call me and I go get him. It works out just fine this way.

Jayme's episodes have gotten better as he gets older. He takes 20 mg. of flunarizine each day. He has for two years or more. A lower dose wasn't helping him very much so Dr. Miller put him on 20 mg. each day and checked his lab work every three months and there were no problems or side effects.

Jayme has episodes about every week, but they last for 30 minutes or less now instead of days. He usually goes 6 or 7

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days before he has an episode. About once every three months he has an episode that lasts around 24-48 hours and is pretty bad, he is limp on both sides and has a lot of dystonic posturing.

Jayne has no other health problems other than AHC. He is a very happy and loving little boy. He has a twelve year old brother that he loves to fight and argue with. Jayme loves all of the kids in his class at school.

Too much excitement or stress can bring on an episode for Jayme. As he gets older though, less things stress him or excite him so much. Birthday parties and Christmas used to be bad for him, but now the excitement doesn't seem to bother him as much. There are no foods that bring on episodes, but there are medications that do. When he takes cold medicine or an antibiotic, he has a lot of episodes while on the medication. Too much walking and being outside still bring on episodes.

As Jayme gets older, he knows his limits and he handles it real well. He knows play grounds are off limits and playing outside very long is a no-no. People feel sorry for him because he can't do these things, but Jayme knows they will make him go limp and he knows it's more fun to color or draw and play in the house than to go limp. He loves music and videos and he loves to draw and sing. Baths used to cause him to go limp, but they don't anymore.

Sometimes I can't believe our family has made it through ten years of AHC, but we have and we wouldn't trade Jayme for anything!!!

Bob and Donna Busby



Through parent involvement and doctors research, may we find the cure for Alternating Hemiplegia of Childhood in the near future.

From the Editor

New Families

I received a phone call from Lena Hermansson of Sweden in May. She had heard of the Foundation thru another parent in Sweden via her doctor. Lena has twin, 7 year old boys. Both are afflicted with AHC. They were diagnosed early and have been on flunarizine. One twin at age 2 suffered a major episode, leaving him with paralysis on the left side. It took nine months to learn how to walk. Use in the left arm is still limited. The other twin suffered a similar episode at age 5, and it took a year to learn how to walk again. He was left handed and has had to become right handed because his left arm has limited use also.

Lena would like to correspond with others. Contact her via E-Mail:
lena.hermansson@mbox200.swipnet.se.

John and Laura Nardone of Newburyport wrote to me in August. Their son Michael is six years old and was finally diagnosed with AHC about a year and a half ago. He has all the text book symptoms of AHC. However, last December he became ill with an upper respiratory infection. He was given antibiotics, but would not eat or drink anything and wanted only to sleep. He had to be admitted to the hospital because of dehydration. After 24 hours on IV fluid, he began to take a little nourishment on his own and was released.

However, other problems arose and Michael had to be hospitalized again. He experienced severe attacks while in the hospital and a series of tests were performed with no results. Because Michael was not able to feed himself well enough and his desired body weight was at 5%, the doctors decided to put a G-tube feeding line into his stomach and he was put on a diet of PediaSure.

Michael started to improve, so much that he was back in school after February vacation. He still has the G-tube and is able to eat small amounts of certain solid foods. He gets 5 cans of PediaSure a day and remarkably has had no episodes for the past six months. The only symptom that occasionally appears is drooling.

Laura welcomes any questions regarding

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Progress Report

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and motor cortex. The fact that the cerebellum is so frequently abnormal is an exciting new finding, and brings into perspective a totally different approach in uncovering the pathogenesis of AHC.

C. Laboratory investigation:

Blood samples were collected to measure glucose transporters in red blood cells in 5 children and decreased transport rate was found in only one child, who did not respond to the ketogenic diet.

D. Therapeutic evaluation:

Flunarizine showed the best results decreasing the intensity and number of hemiplegic episodes. Clinical trials with *ketogenic diet* or utilization of *dextromethorphan* did not improve symptoms in these children. Some children also take *benzodiazepine* and *chloral hydrate* to suppress the attacks.

These findings will be presented and discussed during the Child Neurology Society Meeting this month. This abstract was accepted for presentation by the Scientific Selection Committee of the Child Neurology Society. During this presentation, we will increase awareness of AHC to other child neurologists, and discuss other avenues of research and treatment. In addition, there may be patient referrals to us for evaluation.

E. New approaches:

1. New clinical trials must be evaluated regarding treatment. The fact that the calcium channel blocker *flunarizine* helps many patients with alternating hemiplegia suggests that other agents affecting calcium movement in the brain cells may also be useful such as *magnesium sulfate* that acts at the glutamate system of the brain that used calcium and *lamotrigine* that inhibits the release of glutamate.

2. Serotonergic innervation is highly observed in cerebellum that has been demonstrated to be the main region of abnormality in our MRS studies in children with AHC. Also, serotonin is the main neurotransmitter involved in the pathophysiology of migraine, a pathology that is often observed in familial history of patients with AHC. Based on these findings and the detection of abnormality in the thalamic region in one PET study performed with (¹¹C)*α*-methyl-tryptophan, we believe that further studies in children and in their relatives with migraine should be accomplished.

3. Further FDG, Flumazenil PET, (¹¹C)*α*-methyl-tryptophan and MRS studies between and during attacks, and a more detailed study of cerebellum are planned.

The following is an abstract that Dr. Chugani is presenting at the Child Neurology Society Meeting this month. It is a condensed version of what you have just read. I realize it is very technical for parents and lay persons, but I wanted to publish it for you.

ALTERNATING HEMIPLEGIA OF CHILDHOOD: CLINICAL FINDINGS, BRAIN GLUCOSE METABOLISM, AND GLUCOSE TRANSPORT STUDIES Ednea A. da Silva*, Diane C. Chugani, Harry T. Chugani. Children's Hospital of Michigan, Wayne State Univ., Detroit, MI.

Alternating hemiplegia of childhood (AHC) is a neurological disorder with unclear etiology. We report 9 patients (5 males, 4 females; ages 1.3 to 19.11 years) with alternating hemiplegia of childhood (AHC) who were studied with 2-deoxy-2(¹⁸F)fluoro-D-glucose positron emission tomography (FDG-PET). In 5 children, hemiplegic episodes started during the newborn period and in 4 during the first year. All were developmentally delayed. Two children showed persistent hemiparesis between attacks. MRI showed left cerebral hemisphere atrophy in one child. FDG-PET demonstrated areas of decreased cortical glucose utilization in 7 children involving perirolandic region (n=1); right somatosensory region

(n=1); left frontal and parietal (n=1), left temporal and parietal (n=1), right parietal and temporal (n=1); left frontal and parietal (n=1), left temporal and parietal cerebral hemisphere (n=1). One girl had two FDG studies; between attacks PET showed right parieto-temporal hypometabolism; during an attack of right hemiplegia PET showed increased glucose metabolism of left frontal and bilateral prefrontal cortex and decreased glucose metabolism in left parietal and bilateral temporal cortex. Glucose transport in red blood cells in 5 children showed decreased transport rate in one child, who did not respond to the ketogenic diet. AHC appears to be an inborn metabolic condition leading to hemiplegic episodes which may cause permanent structural abnormalities on MRI and focal or diffuse cortical abnormalities on PET.

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Editor

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Michael. (508) 462-3948.

Neal and Karen Jackson have been using a magnetic mattress pad. It has been used to treat arthritis and they decided to try it on their son. They have seen some changes in the last six months in reduction of dystonia. Call Karen and Neal for more information. (713) 280-8028.

Please, please send in your permission forms. If you cannot find yours, let me know and I will send a new copy.

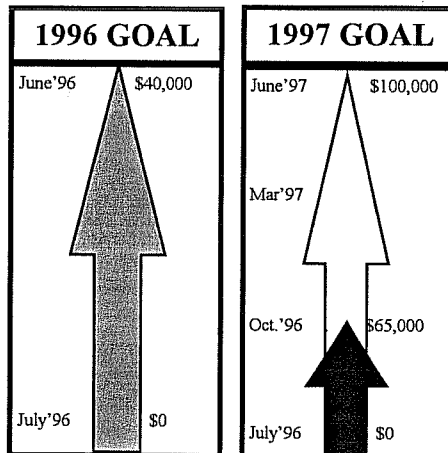
Dr. Chugani Needs Our Help

Dr. Chugani, to continue with the current research project for this next year, *needs patients*. Please consider participating in the research. Write or call:

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Fundraising Efforts

Richard George has been at it again!! The Rock'n Blues Festival was a great success!! \$60,000!! Thank you to the sponsors of the festival Coke, Budweiser, WRIF and NW Airlines. The Wisyanski's and the Tasi's have also raised funds again!! Their annual appeal letter went at the end of August and returns have been \$5,400!!! Contact Richard regarding any fundraising ideas. He is a source of information. (888) 557-5757 (toll-free number). Remember, United Way is an important source of funds. Now is the time to submit pledge cards. Encourage family, friends and co-workers, etc. to pledge to the IFAHC, c/o Greg Wisyanski, 409 Buckingham Ave., Milford, CT 06460



Up Coming Conferences

Neal Jackson will be attending the NORD Annual Membership Conference in Texas, September 27-28.

Ray Baker will be attending the Child Neurology Society Meeting being held also September 26-28.

Lynn Egan will be attending the Epilepsy Society meeting in San Francisco in December 1996.

We will be handing out our current newsletter, brochure and grant proposal to generate interest in future research for AHC at the above conferences.



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