Study Finds New Treatment for Spinal Muscular Atrophy Safe for Infants

Novel Treatment Shows Promising Results Against Rare, Lethal Genetic Disorder

Infants as young as five weeks old with the most severe form of spinal muscular atrophy (SMA) — a leading genetic cause of infant mortality — can be treated safely with nusinersen. This investigational treatment slowed progression of the disease, improved survival and in some cases demonstrated remarkable improvement in muscle function, according to research published online today by The Lancet.

"With nusinersen, these infants are not only living longer, but they're living better," said Richard S. Finkel, MD, lead author of the study and chief of neurology at Nemours Children's Hospital in Orlando, Fla. "SMA is no longer a death sentence for infants. This treatment is by no means a cure, but it is more than we've ever been able to offer these families before."

The multi-site, phase two, open-label trial of patients with infant-onset SMA targeted the SMN2 gene with a tiny fragment of DNA called an anti-sense oligonucleotide (ASO), injected directly into the spinal fluid of 20 participating infants. This ASO gets absorbed into nerve cells of the spinal cord and brain and promotes increased production of a critical protein that is deficient in babies with SMA. Not only was the series of nusinersen treatments delivered safely to these fragile babies, but in the majority of patients it was found to halt progression of the disease and in many cases improve motor function, sometimes enabling children to gain skills not seen in SMA Type 1 — sitting, rolling over and standing — as well as improving survival without dependence upon the continuous use of a ventilator.

An estimated one in 40 adults is a carrier of SMA, and one of every 11,000 babies are born with this genetic disease. SMA is typed by severity and age of onset. Babies born with SMA Type 1, the most severe form, are not expected to live until their second birthday without feeding and breathing support. SMA occurs from a defect in the gene responsible for producing Survival Motor Neuron (SMN), a protein critical for normal cell function. Nusinersen is designed to increase the production of this protein by modifying a closely related gene to compensate for the genetic defect.

Asher Camp of Lakeland, Fla., now age 3, was diagnosed with SMA Type 1 when he was six months old and began treatment a month later at Nemours Children's Hospital through this clinical trial. He and his family have seen remarkable development that they never thought would be possible when they received his diagnosis in 2013.

"This is a new day, a new era when rare diseases like SMA might just very well be cured in our lifetime. Miracles are happening. Asher's life is a miracle. Thanks to unbelievable funding for research, awareness, and patient advocacy, we can imagine a day when parents are no longer sent home on diagnosis day with a death sentence but rather sent home with hope for the future," said Asher's mother, Amanda Camp. "What if diagnosis day is a day when parents can still imagine their children crawling, walking, running and playing? Imagine the day Asher leaves his wheelchair behind. Imagine."

The study builds on the body of research supporting the effective use of nusinersen, one of the first therapies for SMA, developed by Ionis Pharmaceutical in partnership with Biogen. Biogen has submitted a nusinersen for approval in the U.S. by the Food and Drug Administration and in Europe by the European Medicines Agency. Both the Priority Review and Accelerated Assessment designations can reduce the standard review time. Biogen is also preparing for the potential launch of nusinersen, to be sold as Spinraza, possibly as early as the end of 2016 or the first quarter of 2017.

Dr. Finkel and his team are continuing to build on the safety profile of nusinersen through several ongoing clinical trials at Nemours Children's Hospital. NURTURE is an open-label, ongoing Phase 2 clinical trial in pre-symptomatic infants with SMA who are up to six weeks of age at time of first dose to determine whether treatment before symptoms begin would prevent or delay the onset of SMA symptoms. Additionally, Nemours Children's Hospital is now participating in the Biogen-sponsored expanded access program, to provide nusinersen treatment for patients with SMA Type 1 until the drug is approved by regulatory authorities and is commercially available.

Finkel, Richard S, et al. "Treatment of Infantile-onset Spinal Muscular Atrophy with Nusinersen: A Phase 2, Open-label, Dose-escalation Study." The Lancet (2016): http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(16)31408-8/fulltext. 6 Dec. 2016. Web.

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