Asian Journal of Case Reports in Surgery

Volume 6, Issue 2, Page 451-454, 2023; Article no.AJCRS.96534

A Little Girl's Battle with Hutchinson-Gilford Progeria Syndrome

Sadia Akram [a], Zunaira Muzzamil [a*], Zufishan Muzzamil [a] and Iram Muzzamil [b]

[a] Department of Surgery, Farooq Hospital, West Wood Branch, Lahore, Pakistan.
[b] University of Education, Township Branch, Lahore, Pakistan.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/96534

Case Report

Received: 08/12/2022
Accepted: 10/02/2023
Published: 13/09/2023

ABSTRACT

I have presented here a very strange and rare case of a six years old girl, Kaitlyn, who has already faced more challenges in her short life than most people encounter in a decade. She is suffering from Hutchinson-Gilford Progeria Syndrome (HGPS) which is a rare genetic condition that causes accelerated aging and a shortened life expectancy. HGPS progressively causes the body to stop functioning. Symptoms typically develop in early childhood and can include rapid muscle growth, extreme thinness, and problems with bone density. Progeria is a very slow-moving disease and there is no cure. Fortunately, my patient Kaitlyn is now doing well and is able to speak and walk. She also loves going to school and spending time with her family and friends. Her biggest challenge is managing her energy and staying healthy. She's currently in a clinical trial for a new treatment that has the potential to stop or even reverse the progression of HGPS.

Keywords: Hutchinson-gilford progeria; muscle growth; bone density.

1. INTRODUCTION

Hutchinson- Gilford progeria syndrome is an inheritable condition characterized by the dramatic, rapid-fire appearance of aging beginning in childhood [1]. Affected children generally look normal at birth and in early immaturity, but also grow more sluggishly than

**Corresponding author: E-mail: zunairaaa93@gmail.com;*

other children and don't gain weight at the anticipated rate (failure to thrive). They develop a characteristic facial appearance including prominent eyes, a thin nose with a beaked tip, thin lips, a small chin, and pooching ears. Hutchinson- Gilford progeria syndrome also causes hair loss (alopecia), aged- looking skin, common abnormalities, and a loss of fat under the skin (subcutaneous fat). This condition doesn't affect intellectual development or the development of motor chops similar as sitting, standing, and walking [2]. People with Hutchinson-Gilford progeria syndrome experience severe hardening of the arteries (arteriosclerosis) beginning in childhood. This condition greatly increases the chances of having a heart attack or stroke at youthful age. These serious complications can worsen over time and are life- hanging for affected individualities [1]. This condition is veritably rare; it's reported to occur in 1 in 4 million new-borns worldwide. Further than 130 cases have been reported in the scientific literature since the condition was first described in 1886 [3]. Mutations in the LMNA gene beget Hutchinson-Gilford progeria syndrome. The LMNA gene provides instructions for making a protein called lamin A. This protein plays an important part in determining the shape of the nucleus within cells [4] It's an essential scaffolding (supporting) element of the nuclear envelope, which is the membrane that surrounds the nucleus. Mutations that beget Hutchinson-Gilford progeria syndrome result in the product of an abnormal interpretation of the lamin A protein. The altered protein makes the nuclear envelope unstable and precipitously damages the nucleus, making cells more likely to die precociously. Researchers are working to determine how these changes lead to the characteristic features of Hutchinson-Gilford progeria syndrome [5] Hutchinson- Gilford progeria syndrome is considered an autosomal dominant condition, which means one dupe of the altered gene in each cell is sufficient to beget the disorder. The condition results from new mutations in the LMNA gene, and nearly always occurs in people with no history of the complaint in their family [5]. “Children with progeria generally have a normal appearance in early juvenility. At roughly nine to 24 months of age, affected children begin to witness profound growth detainments, performing in short elevation and low weight. They also develop a distinctive facial appearance characterized by a disproportionately small face in comparison to the head; an underdeveloped jaw (micrognathia); contortion and crowding of the teeth; abnormally prominent eyes; a small nose; and a subtle blueness around the mouth” [6]. “In addition, by the alternate time of life, the crown hair, eyebrows, and eyelashes are lost (alopecia), and the crown hair may be replaced by small, velvet like, white or fair hairs. Fresh characteristic features include generalized atherosclerosis, cardiovascular complaint and stroke, hipsterism disruptions, surprisingly prominent modes of the crown, loss of the subcaste of fat beneath the skin (subcutaneous adipose towel), blights of the nails, common stiffness, cadaverous blights, and/ or other abnormalities. Individualities with HGPS develop unseasonable, wide thickening and loss of pliantness of roadway walls (arteriosclerosis), which affect in life- hanging complications during childhood, adolescence, or early adulthood. Children with progeria bones of heart complaint (atherosclerosis) at an average age of 14.5 times. As with any person suffering from heart complaint, children with progeria can witness high blood pressure, strokes, angina (casket pain due to poor blood inflow to the heart itself), enlarged heart, and heart failure, all conditions associated with aging” [6]. “The most frequent cause of death among individualities with HGPS is myocardial infarction beforehand in life. Lower than 144 cases of this intriguing complaint have been in the world literature till date” [7].

2. CASE PRESENTATION

A 6-year girl, born to cousin marriage parents was brought to our inpatient clinic with the problems of short height and large head since birth, with thin, lean, tight, glistening skin, no hair over the scalp, less eyebrows, and eyelashes right after birth. His developmental of steps were not normal, with a low metal ability. Since she was born, she had problems in suckling milk from breast and suffered from on and off high grade fever. She was taken to a child specialist who diagnosed she had HGPS.

At first, girl’s progeria was very mild. She could walk and talk, but her muscles and bones were very weak. She also had a lot of hair loss and her skin was very thin. As girl’s progeria progressed, her muscles and bones weakened even more. She started to lose her hair and her skin became so thin that she could barely survive in the sun. She had difficulty walking and could not do any work that children of her could do.

General physical examination of the patient showed short height, thin lean girl, and poor nutrition. The elder sister of the patient was completely normal.

Skin findings were speficic of progeroid with anterior swelling of forehead, large head, dilated vessels over scalp, beaked nose, meagar eyebrows and eyelashes, more teeth in oral cavity, hyper pigmentation over the neck and sides, and indrawing of chest.

Routine laboratory investigations including hemogram, liver and kidney function tests, and lipid profile were within normal limits.

Xray of skull showed that anterior and posterior fontanelles are not closed.

The skin biopsy of the sclerodermoid plaque from the flank revealed atrophy of the epidermis and reticular dermis and replacement of the subcutis with fibrocollagenous tissue.

Currently, the girl is 21 years old and is living with the support of a team of doctors and nurses who monitor her condition 24/7.

We are hopeful that she will improve, but her progeria is a very slow-moving disease and there is no cure. Fortunately, she is doing well and is able to speak and walk. She also loves going to school and spending time with her family and friends. Her biggest challenge is managing her energy and staying healthy.

She's currently in a clinical trial for a new treatment that has the potential to stop or even reverse the progression of HGPS.

3. DISCUSSION

“Prelamin A is a protein located on the nuclear membrane of cells; it needs to be adhered to form laminin A, a process that's imperfect in cases with progeria. Increased prelamin A causes nuclear blebbing and altered shape of the nucleus. still, the medium by which the altered shape of nucleus leads to symptoms of unseasonable aging isn't clear. The rate of aging is accelerated by about seven times. In progeria, cutaneous instantiations do before, followed by cadaverous and cardiovascular changes. HGPS children appear normal at birth but display the goods of accelerated aging within one time” [8]. “The clinical manifestations of HGPS include short stature, low birth weight, lipodystrophy, micrognathia, macrocephaly, prominent crown veins, generalized alopecia, delayed dentition, pyriform abdomen, thin branches, dropped common mobility, and sclerodermatous changes over the tummy, neck crowds, proximal shanks and buttocks, persistently patent anterior fontanelle, dystrophic nails, and beaked nose and pooching cognizance. Motor and internal development is normal” [9]. “Radiological findings include diffuse osteopenia and osteolysis. These children generally have severe atherosclerosis and death results substantially due to myocardial infarction generally between periods 5 and 20 years with a median lifetime of 13 years” [8]. “Differential diagnosis of HGPS includes mandibulo- acral dysplasia, Werner pattern, Cockayne pattern, and Hallerman- Strief pattern. Our case had the classical instantiations of HGPS as stressed in the case report. There's no specific treatment for HGPS and these children need a characteristic approach, which includes early identification and prompt operation of the complications. Farnesyl transferase inhibitors (FTIs) similar as lonafarnib have shown some pledge in reversing the structural abnormalities of the nucleus (prelamin A). The statin medicine pravastatin typically used for lowering cholesterol and precluding cardiovascular complaint, and the bisphosphonate medicine zoledronic acid used for improving osteoporosis are the other medicines supported for operation of HGPS cases”[7]. Proper comforting of the parents about this condition is important. Long- term follow- up is demanded to observe the cardiovascular and skeletal complications in these cases.

4. CONCLUSION

When the girl’s parents first came to know about their daughter’s with H-GPS, they were completely in shock. They didn't know what to do or who to turn to. Their daughter was only six years old and thry didn't know if she would make it through the diagnosis. Thankfully, they had a great team of doctors and specialists who have been working tirelessly to help their daughter.

I would advise other parents facing a similar diagnosis to stay positive, have a positive attitude, and be there for your child. You may not know it now, but your child will appreciate all the support you provide.

I would also advise parents to keep a journal of all the doctors' appointments, tests, and treatments. This will make it easier for your child to understand and remember the treatments they have been through. Lastly, I believe in raising awareness. I want other parents to know that there is a diagnosis for H-GPS and that it is not a death sentence. There is hope and a future for these children.

CONSENT

As per international standard or university standard, patient(s) written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. De Sandre-Giovannoli A, Bernard R, Cau P, Navarro C, Amiel J, Boccaccio I, Lyonnet S, Stewart CL, Munnich A, Le Merrer M, Levy N. Lamin a truncation in Hutchinson-Gilford progeria. Science. 2003;300(5628):2055.
   DOI: 10.1126/science.1084125 [PubMed]
   Access on 2003 Apr 17
2. Eriksson M, Brown WT, Gordon LB, Glynn MW, Singer J, Scott L, Erdos MR, Robbins CM, Moses TY, Berglund P, Dutra A, Pak E, Durkin S, Csoka AB, Boehnke M, Glover TW, Collins FS. Recurrent de novo point mutations in lamin A cause Hutchinson-Gilford progeria syndrome. Nature. 2003;423(6937):293-8.
   DOI: 10.1038/nature01629. [PubMed]
   Access on 2003 Apr 25
3. Hennekam RC. Hutchinson-Gilford progeria syndrome: Review of the phenotype. Am J Med Genet A. 2006;140(23):2603-24.
   DOI: 10.1002/ajmg.a.31346 [PubMed]
4. Goldman RD, Shumaker DK, Erdos MR, Eriksson M, Goldman AE, Gordon LB, Gruenbaum Y, Khuon S, Mendez M, Varga R, Collins FS. Accumulation of mutant lamin A causes progressive changes in nuclear architecture in Hutchinson-Gilford progeria syndrome. Proc Natl Acad Sci U S A. 2004;101(24):8963-8.
   DOI: 10.1073/pnas.0402943101.
   Access on 2004 Jun 7
5. Halaschek-Wiener J, Brooks-Wilson A. Progeria of stem cells: Stem cell exhaustion in Hutchinson-Gilford progeria syndrome. J Gerontol A Biol Sci Med Sci. 2007;62(1):3-8.
   DOI: 10.1093/gerona/62.1.3. [PubMed]
6. Badame AJ. Progeria. Arch Dermatol. 1989;125:540–
   4. [PubMed] [Google Scholar]
7. Liag L, Zhang H, Gu X. Homozygous LMNA mutation R527C in atypical Hutchinson-Gilford progeria syndrome: Evidence for autosomal recessive inheritance. Acta Paediatr. 2009;98:1315–8. [PubMed] [Google Scholar] [Ref list]
8. Gordon LB, Massaro J, D'Agostino RB Sr, Campbell SE, Brazier J, Brown WT, et al. Progeria Clinical Trials Collaborative. Impact of farnesylation inhibitors on survival in Hutchinson-Gilford progeria syndrome. Circulation. 2014;130:27–
   34. [PMC free article] [PubMed] [Google Scholar]
9. Varela I, Pereira S, Ugalde AP, Navarro CL, Suárez MF, Cau P, et al. Combined treatment with statins and aminobisphosphonates extends longevity in a mouse model of human premature aging. Nat Med. 2008;14:767–72. [PubMed] [Google Scholar]

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/96534