Understanding congenital athymia

Information for healthcare providers

Not an actual patient.

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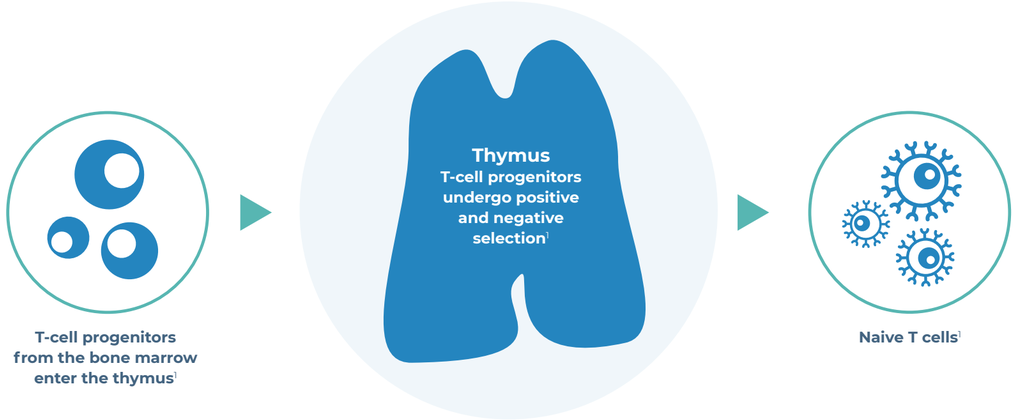
Congenital athymia is a rare immune condition that causes life-threatening immunodeficiency and immune dysregulation[1,2]

Congenital athymia is a primary immunodeficiency (PI) characterized by the lack of a thymus at birth, leading to an increased susceptibility to life-threatening infections and autoimmune conditions. Approximately 17 to 24 infants per year are born with congenital athymia in the US.[1,3,4]

The thymus is the only organ where T-cell progenitors can undergo positive and negative selection to become naive T cells.[1]



Congenital athymia has been associated with multiple conditions[1]

Congenital athymia has previously been referred to as complete DiGeorge anomaly, but has since been associated with other genetic conditions, congenital syndromes, and environmental exposures. These may include[1,2]:

- Complete DiGeorge syndrome (22q11.2 deletion syndrome)
- CHARGE* syndrome
- *FOXN1* deficiency
- Diabetic embryopathy

Scan the QR code to learn more about the diagnostic process for congenital athymia, or visit congenital-athymia.com/diagnosis

*Coloboma, heart defects, atresia of the nasal choanae, retardation of growth and development, genitourinary anomalies, and ear anomalies.

Early diagnosis is key to making the right supportive care decisions[1]

The sooner congenital athymia is detected, the sooner isolation and infection prevention measures can be initiated—and the less likely a patient will be treated with potentially inappropriate therapies.[1]

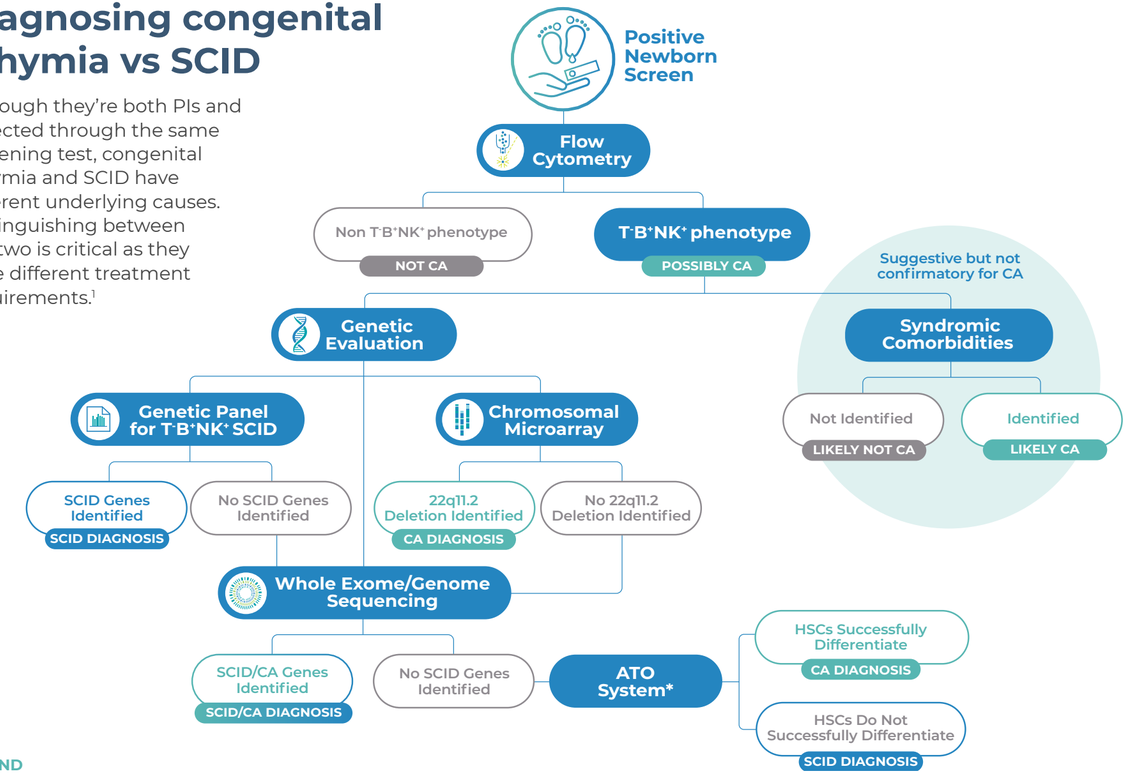
Newborn screening plays a crucial role in the early detection of congenital athymia[1]

T cell receptor excision cell circle (TREC) screening, a test mandated in all 50 states in the US, provides the first indication of naive T-cell deficiency, signaling a need for further testing.[1]

TREC screening may identify severe combined immunodeficiency (SCID) as well as congenital athymia.[1]

Diagnosing congenital athymia vs SCID

Although they're both PIs and detected through the same screening test, congenital athymia and SCID have different underlying causes. Distinguishing between the two is critical as they have different treatment requirements.[1]



LEGEND

CA	Congenital Athymia
SCID	Severe Combined Immunodeficiency
ATO	Artificial Thymic Organoid
HSC	Hematopoietic Stem Cell

Collins C, Sharpe E, Silber A, Kulke S, Hsieh EWY. Congenital athymia: genetic etiologies, clinical manifestations, diagnosis, and treatment. *J Clin Immunol.* 2021;41(5):881-895. doi:10.1007/s10875-021-01059-7

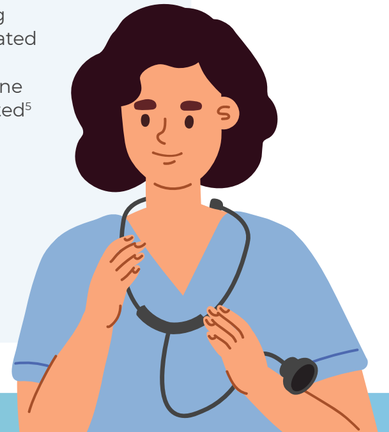
Patients with congenital athymia require vigilant care[1]

Isolation and infection prevention measures—in the hospital and at home—as well as prophylactic antimicrobials are critical to protect patients from potentially life-threatening infections.[1]

Supportive care in the hospital

Some best practices to consider for in-hospital procedure include[1,5,6]:

- Beginning reverse isolation with laminar airflow (LAF) as soon as the patient is diagnosed. These rooms follow strict protocols that include dedicated clean spaces for staff and visitors to properly sterilize; heavily monitored ventilation; handwashing; and wearing masks, gowns, and gloves[1]
- Ensuring that all blood is irradiated before transfusions and testing that it is seronegative for cytomegalovirus (CMV)[5]
- Instructing the mother to stop breastfeeding her infant to prevent potentially transmitting CMV[1]
- Starting patients on[1,6]:
  - Prophylaxis for *Pneumocystis jirovecii*
  - Immunoglobulin replacement therapy
  - Antibiotic, antimicrobial, and antifungal prophylaxis
- Not administering any live or inactivated vaccines until the underlying immune disorder is corrected[5]



Supportive care in the home

It may be important for caregivers to understand the reasons for supportive care and to know what they can do inside and outside the home to help protect their child. Current medical literature recommends that caregivers follow strict at-home protection measures, including[1,4,5]:

- Limiting or restricting visitors in the home[1]
- If possible, homeschooling other children in the family and/or working from home[5]
- Having a “sick plan” in place for when a member of their household feels ill
- Educating those around them about the severity of the diagnosis and that special precautions and isolation are needed to protect their child[1]
- Showering and changing clothes any time they leave and return home[1]
- Washing hands frequently[1]
- Wiping down any items, such as groceries, brought into the home
- Obtaining protective supplies like masks, gowns, and gloves[1]

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CONNECT is here to help

Enrolling your patients in the Enzyvant CONNECT® Patient Support Program will give their caregivers access to **educational resources** and, if eligible, **financial assistance** as they navigate the congenital athymia journey. Enzyvant CONNECT is available to patients with any type of insurance—including commercial plans, Medicare, or Medicaid—as well as patients who are underinsured or have no insurance coverage.

Dedicated care team

- The Support Liaison will help your patients' caregivers understand their child's diagnosis
- The Access Specialist can help caregivers navigate insurance benefits and financial assistance

Access to exclusive resources

- Document organizer
- *Sadie's Search*, a storybook written specifically with your patient in mind
- Interactive T-cell progress tracker
- Activity book
- And more!

Co-pay program

- The Enzyvant CONNECT® Commercial Co-Pay Program can help caregivers of eligible commercially-insured patients in the US and US territories
- They may receive co-pay assistance for medication-related out-of-pocket costs for a treatment for congenital athymia

Call 844-ENZCNCT (844-369-2628) today to connect your patients and their caregivers to personalized support. Support is available Monday–Friday, 8:00 AM to 8:00 PM ET.

Scan the QR code to enroll your patients, or visit EnzyvantCONNECT.com/get-started

Enzyvant and Enzyvant CONNECT are not responsible for treatment decisions or timing for treatment.

References: 1. Collins C, Sharpe E, Silber A, Kulke S, Hsieh EWY. Congenital athymia: genetic etiologies, clinical manifestations, diagnosis, and treatment. *J Clin Immunol.* 2021;41(5):881-895. doi:10.1007/s10875-021-01059-7 **2.** Markert ML, Gupton SE, McCarthy EA. Experience with cultured thymus tissue in 105 children. *J Allergy Clin Immunol.* 2022;149(2):747-757. doi:10.1016/j.jaci.2021.06.028 **3.** Immune Deficiency Foundation. Patient & family handbook for primary immunodeficiency diseases. 6th ed. 2019. **4.** Hsieh EWY, Kim-Chang JJ, Kulke S, Silber A, O'Hara M, Collins C. Defining the clinical, emotional, social, and financial burden of congenital athymia. *Adv Ther.* 2021;38(8):4271-4288. doi:10.1007/s12325-021-01820-9 **5.** Gupton SE, McCarthy EA, Markert ML. Care of children with DiGeorge before and after cultured thymus tissue implantation. *J Clin Immunol.* 2021;41(5):896-905. doi:10.1007/s10875-021-01044-0 **6.** Markert ML. Defects in thymic development. In: Sullivan KE, Stiehm ER, eds. *Stiehm's Immune Deficiencies: Inborn Errors of Immunity.* 2nd ed. Elsevier; 2020:357-379.