CASE STUDY: TATUM

Delayed diagnosis due to patient’s sex and age at first serious infection

- Diagnosed in 2016 with autosomal recessive chronic granulomatous disease (CGD) at 14 years old
- Currently treated with ACTIMMUNE® and prophylactic antimicrobials

INDICATIONS AND USAGE
ACTIMMUNE® (Interferon gamma-1b) is indicated for reducing the frequency and severity of serious infections associated with chronic granulomatous disease.

Select Safety Information
ACTIMMUNE® is contraindicated in patients who develop or have known hypersensitivity to interferon-gamma, *E. coli*-derived products, or any component of the product.

Please see Important Safety Information on back and the enclosed ACTIMMUNE® Full Prescribing Information.

ACTIMMUNE® is FDA approved specifically for CGD patients. Learn more at ACTIMMUNEnet.com.
Case history

Tatum is a female with autosomal recessive CGD. During childhood, Tatum experienced unusual infections or infections that did not respond well to treatment. She was diagnosed with CGD in 2016 at age 14 during a 5-week hospital stay for her first serious infection.

One day after helping her father shovel woodchips, she developed flu-like symptoms, including severe headache, stomach pains, and vomiting. These symptoms continued for a week, at which point her family sought medical attention. She was sent home with a diagnosis of gastroenteritis.

Three nights later, Tatum spiked a fever of 105°F and developed accelerated and labored breathing. She returned to the family doctor the following morning. An exam revealed that Tatum’s blood-oxygen saturation was 82%. X-rays showed that her lungs were filling up with an unknown substance. A sputum culture showed Aspergillus, but it was dismissed as typical. Tatum was also developing a cough. The doctor admitted her to the hospital, where she was given supplemental oxygen.

Over the next 2 days, Tatum continued to experience high fevers at night, and her ability to breathe on her own steadily worsened. Tatum was intubated and transferred by helicopter to a larger medical facility. Nighttime fevers and difficulty breathing continued for another 3 days. Tatum was put in a medically induced coma during which her blood-oxygen saturation fell to 50%. After multiple failures with ventilators, she was placed on venovenous extracorporeal membrane oxygenation (VV-ECMO), followed by venoarterial (VA) ECMO.

Despite knowledge of Tatum’s exposure to mulch immediately preceding her illness, doctors overlooking CGD because of her sex and age at first serious infection.

With Tatum’s health worsening, doctors ordered numerous tests. Among them was a dihydrorhodamine (DHR) test for CGD. Tatum’s histograms showed decreased neutrophil oxidative burst, and she was diagnosed with autosomal recessive CGD. She was treated with steroids, extubated within 5 days of diagnosis, and was taken off supplemental oxygen one day after that.

Tatum spent 39 days in the hospital. Nineteen were in the ICU. She lost 22 pounds and required speech, physical, and occupational rehabilitative therapy. After discharge, Tatum was put on a regimen of ACTIMMUNE® and prophylactic antimicrobials. An avid athlete, Tatum spent 3 months on blood thinners for blood clots due to ECMO and was unable to play sports. She has since returned to all of the sports and activities she enjoys.

Patient data

ACTIMMUNE® in the treatment of CGD

In a clinical trial of patients taking ACTIMMUNE® vs placebo, ACTIMMUNE® demonstrated a:

- **67%** reduction in relative risk of serious infection (*P* = .0006)
- **64%** reduction in the total number and rate of serious infections, including recurrent infections (*P* < .0001)
- **67%** reduction in hospitalization days (*P* = .02)

In patients hospitalized during the trial, the average length of stay was 33% shorter for those treated with ACTIMMUNE® compared with those taking placebo (32 days vs 48 days, *P* = .02).

ACTIMMUNE® is the only FDA-approved product for CGD.

“Most patients in the clinical study also received prophylactic antibiotics.

“Serious infection is defined as a clinical event requiring both hospitalization and intravenous (IV) antibiotics.

Select Safety Information

The most common adverse events occurring with ACTIMMUNE® therapy are flu-like symptoms, such as fever, headache, chills, myalgia, or fatigue, which may decrease in severity as treatment continues and may be minimized by bedtime administration of ACTIMMUNE® Acetaminophen may be used to prevent or partially alleviate the fever and headache.

CGD medical history and treatment intervention

2001
- Born

2007
- Salivary gland infection and abscess
  - Infection refractory to treatment
  - Salivary gland surgically removed

2012
- Severe sinus infection
  - Refractory to 2 courses of antibiotics
  - Resolved with steroids

2016
- Mulch pneumonitis caused by Aspergillus species
  - 39-day hospitalization
  - 19 days in ICU
  - 12 days on ECMO (5 days VV-ECMO, 7 days VA-ECMO)

2017
- Infected ingrown toenails
  - Posaconazole dose temporarily increased
  - Partially alleviated with steroid cream
  - Portion of toenails removed preventively

“*When you get to the hospital and you don’t know what’s wrong, your brain thinks about every single thing that has happened in the past 2 months. I talked with the doctors about the mulch and mold that she was in. The doctor said, ‘Mold can cause pneumonitis in people with a particular genetic disorder, but she’s too old to have that.’”

—JUSTIN, father of Tatum

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Indications and Important Safety Information

**INDICATIONS AND USAGE**
ACTIMMUNE® (Interferon gamma-1b) is indicated:

• For reducing the frequency and severity of serious infections associated with Chronic Granulomatous Disease
• For delaying time to disease progression in patients with severe, malignant osteopetrosis

**IMPORTANT SAFETY INFORMATION**

**CONTRAINDICATIONS**
• In patients who develop or have known hypersensitivity to interferon-gamma, *E. coli*-derived products, or any component of the product

**WARNINGS AND PRECAUTIONS**
• ACTIMMUNE should be used with caution in patients with:
  – Pre-existing cardiac conditions, including ischemia, congestive heart failure, or arrhythmia
  – Seizure disorders or compromised central nervous system function; reduce dose or discontinue
  – Myelosuppression, or receiving other potentially myelosuppressive agents; consider dose reduction or discontinuation of therapy
  – Severe renal insufficiency
  – Age <1 year

• Monitoring:
  – Patients begun on ACTIMMUNE before age 1 year should receive monthly assessments of liver function. If severe hepatic enzyme elevations develop, ACTIMMUNE dosage should be modified
  – Monitor renal function regularly when administering ACTIMMUNE in patients with severe renal insufficiency; accumulation of interferon gamma-1b may occur with repeated administration. Renal toxicity has been reported in patients receiving ACTIMMUNE

• Pregnancy, Lactation, and Fertility:
  – ACTIMMUNE should be used during pregnancy only if the potential benefit outweighs the potential risk to the fetus
  – Use of ACTIMMUNE by lactating mothers is not recommended. ACTIMMUNE or nursing should be discontinued dependent on the importance of the drug to the mother
  – Long-term effects of ACTIMMUNE on fertility are not known

**DRUG INTERACTIONS**
• Concomitant use of drugs with neurotoxic, hematotoxic, or cardiotoxic effects may increase the toxicity of interferons
• Avoid simultaneous administration of ACTIMMUNE with other heterologous serum protein or immunological preparations (eg, vaccines)

**ADVERSE REACTIONS**
• The most common adverse experiences occurring with ACTIMMUNE therapy are “flu-like” symptoms such as fever, headache, chills, myalgia, or fatigue, which may decrease in severity as treatment continues, and may be minimized by bedtime administration of ACTIMMUNE. Acetaminophen may be used to prevent or partially alleviate the fever and headache
• Isolated cases of acute serious hypersensitivity reactions have been observed in patients receiving ACTIMMUNE
• Reversible neutropenia, thrombocytopenia, and elevations of AST and/or ALT have been observed during ACTIMMUNE therapy
• At doses 10 times greater than the weekly recommended dose, ACTIMMUNE may exacerbate pre-existing cardiac conditions, or may cause reversible neurological effects such as decreased mental status, gait disturbance, and dizziness

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**References:**

Visit ACTIMMUNEhcp.com to learn more about ACTIMMUNE®

ACTIMMUNE® is distributed in the US by Horizon Pharma USA, Inc. October 2018 P-ACT-00561

Please see the enclosed ACTIMMUNE® Full Prescribing Information.