

# Characteristics of Hereditary Angioedema Attacks Among Long-Term Prophylaxis Users

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## Abstract

- Rationale:** Although reductions in frequency of hereditary angioedema (HAE) attacks have been demonstrated with non-androgen long-term prophylaxis (LTP), many patients continue to experience attacks requiring on-demand treatment. We aimed to characterize HAE attacks among non-androgen LTP and on-demand treatment only users.
- Methods:** People with Type 1 or 2 HAE were recruited by the US Hereditary Angioedema Association to complete a 20-minute, self-reported, online survey between April and June 2023. Participants  $\geq 12$  years old, who had treated  $\geq 1$  HAE attack within the prior 3 months with an approved on-demand treatment were included.
- Results:** Respondents included 94 people with HAE (81% Type 1), mean age 39 years, 54% taking LTP (mean duration 14 months, 56.9% lanadelumab) at time of last attack. LTP users reported 13 HAE attacks (mean) in previous 12 months (same as on-demand only). Locations of last treated attacks were similar: abdomen (LTP 57%, on-demand only 63%), peripheral (LTP 20%, on-demand only 21%), and face/tongue and throat (on-demand only 16% and LTP 16%). 22% of LTP users and 9% of on-demand only users described their last treated attack as severe/very severe. Median attack duration was 2 days among LTP users and 1 day among on-demand only users.
- Conclusions:** Among HAE patients who had treated a recent attack, location and duration of the most recent attacks were similar between LTP and on-demand only users, however, numerically more LTP users reported their last treated attack as severe/very severe. Although non-androgen LTP treatments are effective in reducing HAE attack frequency, access to and education on the use of on-demand treatments remains important.

## Background

- HAE is characterized by unpredictable swelling attacks affecting cutaneous and submucosal tissues, which are often painful and debilitating
- Although reductions in frequency of HAE attacks have been demonstrated with non-androgen LTP, many patients continue to experience attacks requiring on-demand treatment<sup>1</sup>
- Attacks while receiving non-androgen LTP have not been well-described previously. We aimed to characterize HAE attacks among non-androgen LTP and on-demand treatment only users

## Methods

- The US Hereditary Angioedema Association recruited participants with Type 1 or 2 HAE between April and June 2023
  - Recruitment was stratified to include 50% of participants taking on-demand only and 50% receiving LTP plus on-demand
- Participants completed a 20-minute, self-reported, online survey that asked about their last treated HAE attack
- Participants were  $\geq 12$  years old and had to have treated  $\geq 1$  HAE attack within the prior 3 months using an approved on-demand therapy
- Respondents provided consent for their data to be used anonymously or in aggregate

## Results

Table 1. Participant Demographics

	Total (N=94)	On-demand Only Treatment (46%   n=43)	On-demand Only + LTP (54%   n=51)	Adults (85%   n=80)	Adolescents (15%   n=14)
Current Mean Age, (SD)	39.4 (17.4)	42.6 (18.7)	36.7 (15.8)	43.8 (15.0)	14.4 (1.5)
Mean Age of Diagnosis, Years (SD)	18 (12.6)	19 (12.7)	17 (12.5)	20 (12.5)	6 (4.1)
Gender					
Male	28%	23%	31%	21%	64%
Female	72%	77%	69%	79%	36%
Race/Ethnicity					
White	87%	91%	84%	89%	79%
Hispanic or Latino	9%	2%	14%	8%	14%
Black/African American	3%	2%	4%	3%	7%
American Indian or Alaskan Native	2%	2%	2%	–	14%
Asian	3%	5%	2%	4%	–
Other	1%	–	2%	1%	–
HAE Type					
Type 1	81%	79%	82%	81%	79%
Type 2	19%	21%	18%	19%	21%

- Respondents included 80 adults and 14 adolescents with an average age of 39 years (Table 1)
- The sample was predominately female (72%) and White (87%)
- At the time of their most recent treated attack, 54% of participants were on LTP, and 46% were using on-demand treatment only
- Most of the participants (81%) reported having Type 1 HAE

Figure 1. On-demand Therapy Used for Last Treated Attack

On-demand Therapy	On-demand Only Treatment (n=43)	On-demand Treatment + LTP (n=51)	Adults (n=80)	Adolescents (n=14)
Icatibant	65%	63%	66%	NA*
Recombinant C1 Esterase Inhibitor	18%	21%	16%	50%
Plasma Derived C1 Esterase Inhibitor	15%	14%	16%	50%
Ecallantide	2%	2%	3%	0%

\*Not approved for patients under 18 years old.

- The most frequently used initial on-demand treatment was icatibant (branded and generic) for both on-demand and LTP patients (Figure 1)

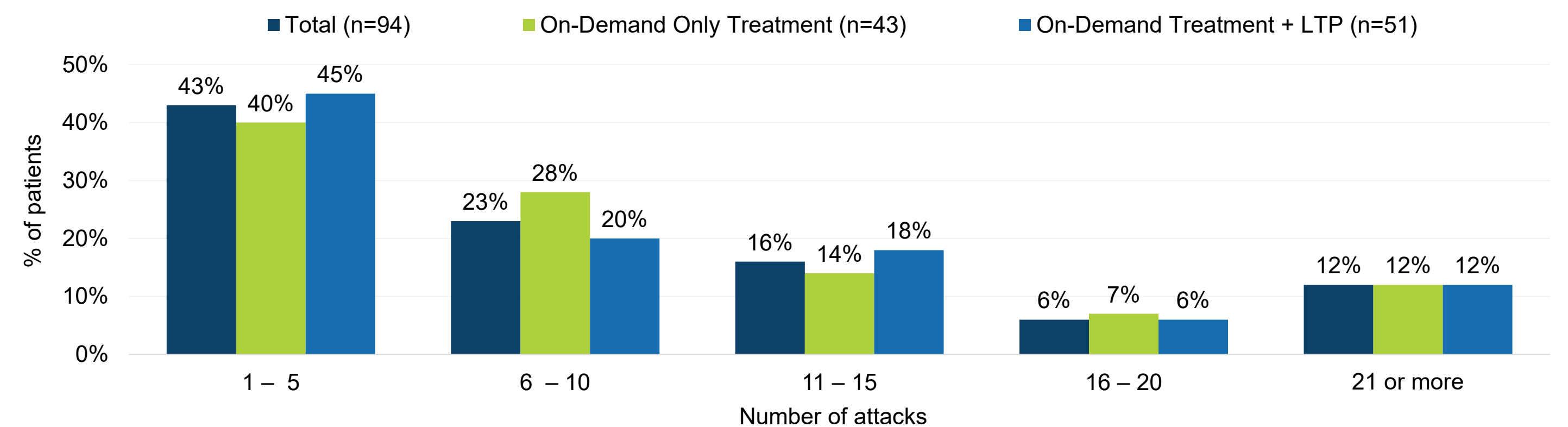
## Results

Figure 2. Long-Term Prophylaxis at the Time of Last Treated Attack (n=51)

Long-Term Prophylaxis	% of patients	Adults (n=43)	Adolescents (n=8)
Lanadelumab	57%	63%	25%
Subcutaneous Human C1 Esterase Inhibitor	24%	26%	13%
Bertralstat	14%	9%	38%
Intravenous Human C1 Esterase Inhibitor	6%	2%	25%

- Among those on long-term prophylaxis at the time of the last treated attack, lanadelumab was the most common treatment among adults, whereas adolescents were most often treated with bertralstat (Figure 2)

Figure 3. Number of HAE Attacks over Past 12 Months



- The mean (standard deviation [SD]) number of attacks was 12.5 (13.4) over the past 12 months (median [interquartile range (IQR)] = 6 [3, 16], with comparable attack frequency among those taking on-demand treatment only (11.3 [11.8]; median = 6 [3, 16]) and those taking LTP (11.6 [14.8]; median = 6 [3, 14]) (Figure 3)

Figure 4. Initial Site of Last Treated Attack

% of patients	On-demand Only Treatment (n=43)	On-demand Treatment + LTP (n=51)	Adults (n=80)	Adolescents (n=14)
Abdominal/stomach	60%	63%	57%	71%
Peripheral	20%	21%	20%	14%
Face/Tongue	10%	9%	10%	7%
Throat	6%	7%	6%	7%
Genitals	3%	–	6%	–

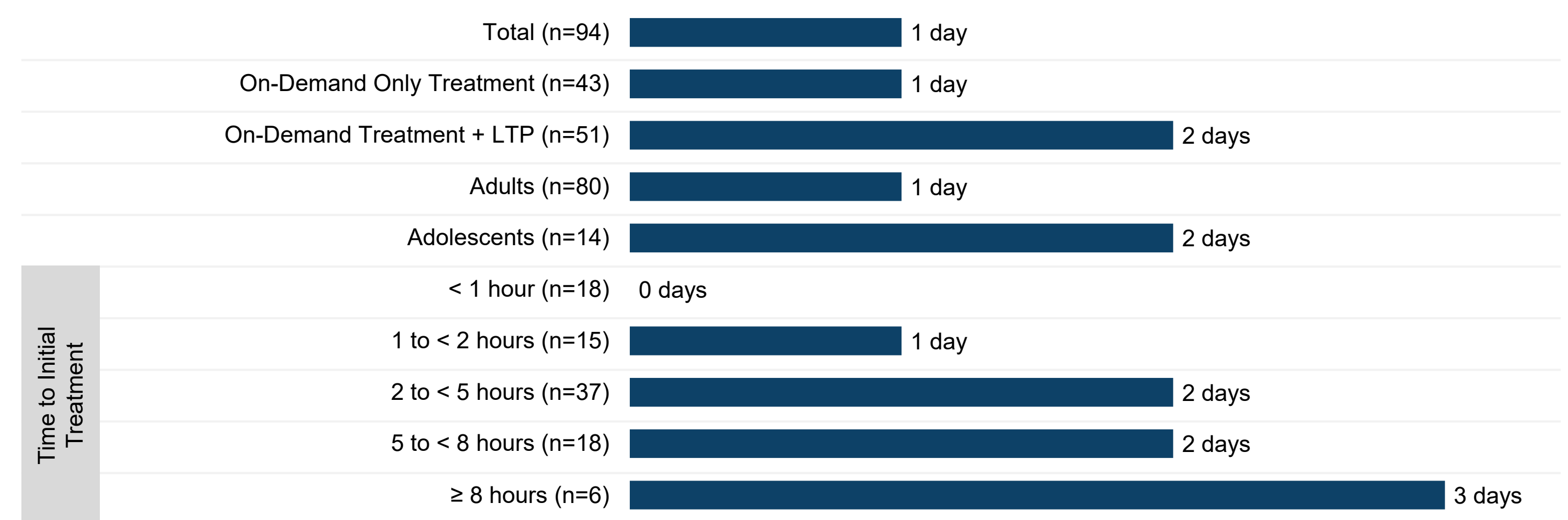
- The most common site of attack was the abdominal region (60%), followed by the peripheral area (20%), and face/tongue and throat (16%) (Figure 4)
- The locations of the last treated attacks were similar between on-demand and LTP patients: abdomen (on-demand only 63% and LTP 57%), peripheral (on-demand only 21% and LTP 20%), and face/tongue and throat (on-demand only 16% and LTP 16%)
- Symptoms spread from the initial site to another site in 28% of those receiving on-demand only (n=12) and 31% of those receiving LTP (n=16)

Figure 5. Attack Severity at the Time of Treatment

% of patients	On-demand Only Treatment (n=43)	On-demand Treatment + LTP (n=51)	Adults (n=80)	Adolescents (n=14)
Mild	29%	28%	29%	7%
Moderate	55%	63%	49%	50%
Severe	13%	7%	18%	36%
Very severe	3%	2%	4%	7%

- At the time the attack was treated, approximately half of the patients described the attack severity as moderate; this was true for those using on-demand only (63%) and long-term prophylaxis (49%) (Figure 5)
- 9% of on-demand only users and 22% of LTP users described their last treated attack as severe or very severe
- Adults were more likely to treat attacks at an earlier stage (mild; 33% vs 7%), while adolescents were more likely to delay treatment until attacks were severe (36% vs 9%)

Figure 6. Median Duration of Attack



- The median duration of HAE attacks was 1-2 days regardless of use of long-term prophylaxis (Figure 6)
  - Median attack duration was 2 days among LTP users and 1 day among on-demand only users
- Patients who waited longer to treat an attack, on average, experienced longer attack durations
  - Patients who treated within the first hour reported the median attack duration of 0 days, whereas attacks lasted over 2 days for those who waited 5 hours or more to treat

## Conclusions

- Among HAE patients who had treated a recent attack, the location and duration of the most recent attacks were similar between LTP and on-demand only users
- The majority of patients delayed treatment of their last attack until they were considered moderate; a smaller proportion waited until the attack was severe or very severe
- Earlier treatment was associated with a shorter attack duration, regardless of LTP use
- Although non-androgen LTP is effective in reducing HAE attack frequency, access to and education on the use of on-demand treatments remains important

## Disclosures

- In relation to this presentation, the authors declare the following, real or perceived conflicts of interest:
- Receipt of grants/research support: Timothy Craig: CSL Behring, Ionis, Takeda, BioCryst, BioMarin, KalVista Pharmaceuticals, Pharvaris, Intellia, Astra
  - Receipt of honoraria or consultation fees: Bob Geng: Amerimmune Allergy Testing, Inc., KalVista Pharmaceuticals, Inc., Pharvaris, Astra-Zeneca, BioCryst Pharmaceuticals, Regeneron/Sanofi, Zuvita Corporation, Pharming, and Shire/Takeda. Julie Ulloa and Sherry Danese: KalVista Pharmaceuticals. Sandra Christiansen: KalVista Pharmaceuticals, BioCryst, US HAEA Medical Advisory. Timothy Craig: CSL Behring, Ionis, Takeda, BioCryst, BioMarin, KalVista Pharmaceuticals, Pharvaris, Intellia, Astra
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  - Stock/shareholder: Vibha Desai and Paul Audhya: KalVista Pharmaceuticals
  - Vibha Desai and Paul Audhya are employees of KalVista Pharmaceuticals

## References

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