Pediatric basal cell carcinoma burden and management preferences in Gorlin syndrome: A survey study

To the Editor: Gorlin syndrome (GS) is a risk factor for early basal cell carcinomas (BCCs),[1] although its prevalence of fewer than 1 in 30,000 individuals[2] limits existing literature. There are sparse pediatric GS studies beyond case reports, creating a knowledge gap regarding childhood cutaneous findings and sequelae, including BCC age at onset, quantity, treatments, and impact. Herein, we describe a global survey to illustrate the clinical presentation, childhood perspectives, and BCC management trends for pediatric GS to improve the understanding and inform patient care.

Institutional review board approval was obtained from Massachusetts General Hospital to study survey data collected by the GS Alliance and GS Group. Inclusion criteria for analyses were respondents with GS who were physician-diagnosed in childhood (at ages, ≤18 years), of whom, 122 qualified. The majority were female ($n = 93$, 76.2%), aged 5 to 14 years at diagnosis ($n = 66$, 54.1%), White ($n = 108$, 88.5%), and born in the United States ($n = 76$, 62.3%). Of known mutation status, PTCH1 was reported in 65 of 66 individuals (98.5%) and SUFU was reported in 1 individual (1.5%). The most common presenting characteristics (Fig 1) were keratocysts ($n = 68$, 55.7%), large/abnormal skull ($n = 55$, 45.1%), palmar/plantar pits ($n = 39$, 32.0%), and BCC ($n = 37$, 30.3%).

At the time of survey completion, 42 respondents represented children (aged ≤18 years), of whom 32 (76.2%) had a history of BCC. The 32 children with BCC (65.6% aged ≤13 years; range, 6-18 years) had notable BCC burden: their cumulative number of tumors was 1 to 30 in 17 patients (53.1%), 31 to 100 in 5 (15.6%), and > 100 BCCs in 10 children (31.3%).

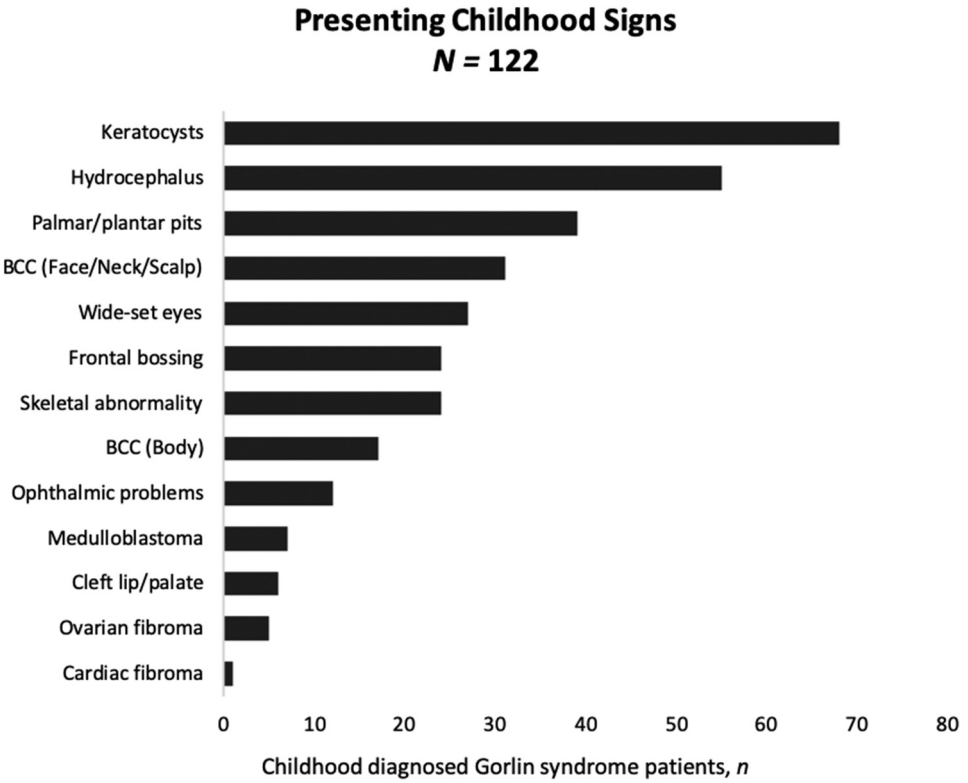

Fig 1. Presenting signs for patients with Gorlin syndrome who were diagnosed at ages of 18 years or younger. Respondents could select more than 1 presenting sign. *BCC*, Basal cell carcinoma.

© 2021 by the American Academy of Dermatology, Inc. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

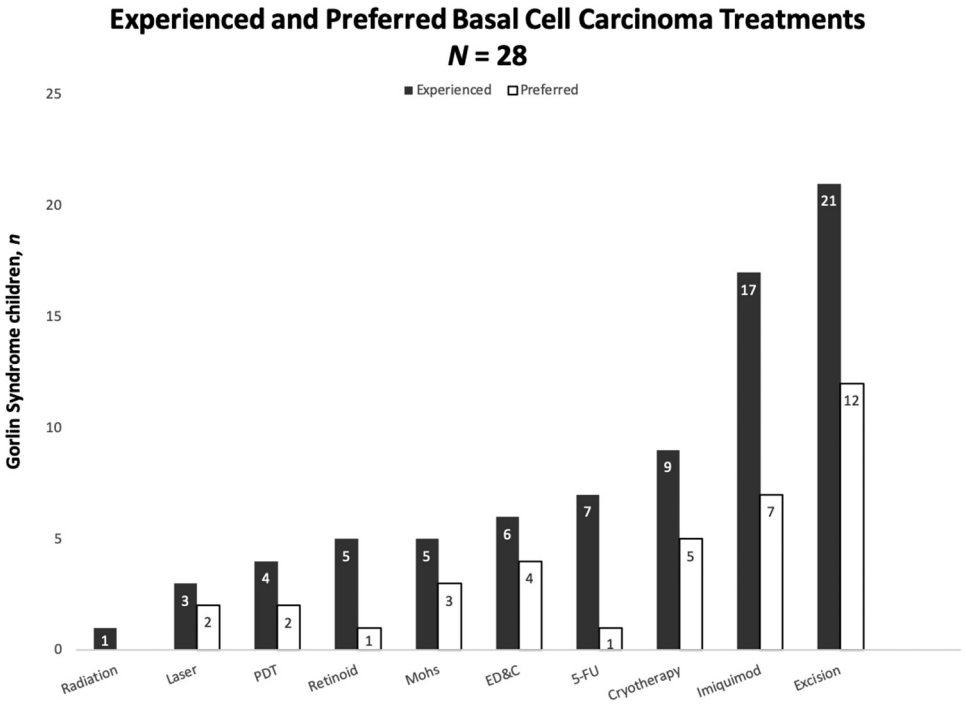

Fig 2. Basal cell carcinoma treatment modalities that were experienced by patients with Gorlin syndrome aged 18 years and younger with basal cell carcinoma have been shown (*solid bars*). Treatment modalities that were preferred by the children with Gorlin syndrome with basal cell carcinoma who had experienced the respective treatment have also been represented (*white bars*). *ED&C*, Electrodessication and curettage; *5-FU*, 5-fluorauracil; *PDT*, photodynamic therapy.

Excision was the most commonly pursued treatment for pediatric BCC ($n = 21$) and preferred by 12 patients who experienced it (57.1%). However, a higher percentage expressed preference for Mohs micrographic surgery (3 of 5), electrodessication and curettage (4 of 6), and laser modalities (2 of 3) (Fig 2). The top 10 burdensome aspects of treatments were as follows: time spent off work/school to recover ($n = 22$), time spent on appointments ($n = 21$), time spent traveling to appointments ($n = 21$), mental well-being ($n = 21$), scarring ($n = 20$), physical appearance ($n = 20$), healing time ($n = 19$), pain ($n = 18$), physical well-being ($n = 18$), and quality of life ($n = 16$).

This childhood GS study identifies meaningful trends, demonstrating how patient voices may inform and improve the management of GS. Although literature estimates the cumulative incidence of BCC by the early 20s in patients with GS to be 12% to 50%,[3,4] our data reflect a considerably higher burden with over three-quarters of pediatric respondents (aged ≤18 years) reporting a history of BCC. Dermatologists, as well as dentists, oral surgeons, and other clinicians, have an important duty to recognize presenting features of GS for appropriate care. BCC management in children may create treatment challenges, thus a pediatric-centered approach and consideration of patient and caregiver preferences must be used to provide individualized care.[5]

Further research is required to confirm patient-reported data. Results are limited by the unknown response rate and bias of participants who are engaged in patient advocacy organizations and may exhibit a more severe disease expression.

Holly Neale, BS,[a,b] *Julie A. Breneiser, PA-C Emeritus,*[c] *and Elena B. Hawryluk, MD, PhD*[b,d,e]

From the University of Massachusetts Medical School, Worcester, Massachusetts[a]*; Department of Dermatology, Massachusetts General Hospital, Boston, Massachusetts*[b]*; Gorlin Syndrome Alliance, Reading, Pennsylvania*[c]*; Dermatology Program, Department of Immunology, Boston Children's Hospital, Boston, Massachusetts*[d]*; and Harvard Medical School, Boston, Massachusetts.*[e]

Funding sources: None.

IRB approval status: Reviewed and approved by the institutional review board of Massachusetts General Hospital.

Correspondence to: Elena B. Hawryluk, MD, PhD, Department of Dermatology, Massachusetts General Hospital, 50 Staniford St, Boston, MA 02114

E-mail: ehawryluk@partners.org

Conflicts of interest

Author Breneiser is the executive director and a board member for the Gorlin Syndrome Alliance. Dr Hawryluk is a board member for the Gorlin Syndrome Alliance (uncompensated). Author Neale has no conflicts of interest to declare.

REFERENCES

1. Moustafa D, Neale H, Hawryluk EB. Trends in pediatric skin cancer. *Curr Opin Pediatr*. 2020;32(4):516-523.
2. Evans DG, Howard E, Giblin C, et al. Birth incidence and prevalence of tumor-prone syndromes: estimates from a UK family genetic register service. *Am J Med Genet A*. 2010; 152A(2):327-332.
3. Jones EA, Sajid MI, Shenton A, Evans DG. Basal cell carcinomas in Gorlin syndrome: a review of 202 patients. *J Skin Cancer*. 2011;2011:217378.
4. Kimonis VE, Goldstein AM, Pastakia B, et al. Clinical manifestations in 105 persons with nevoid basal cell carcinoma syndrome. *Am J Med Genet*. 1997;69(3):299-308.
5. Fisher J, Moustafa D, Su KA, et al. A pediatric approach to management of skin growths in basal cell nevus syndrome. *Pediatr Dermatol*. 2020;37(3):527-530.

https://doi.org/10.1016/j.jdin.2021.07.003