Pediatric teledermatology: Observations based on 429 consults

Tina S. Chen, MD,[a] Marc E. Goldyne, MD, PhD,[b] Erin F. D. Mathes, MD,[b,c] Ilona J. Frieden, MD,[b,c] and Amy E. Gilliam, MD[b,c]
Irvine and San Francisco, California

Background: Store-and-forward teledermatology is an emerging means of access for patients with skin disease lacking direct access to dermatologists.

Objectives: We sought to examine the patient demographics, diagnostic concordance, and treatment patterns in teledermatology for patients younger than 13 years.

Methods: We conducted a descriptive retrospective cohort study involving 429 patients.

Results: Diagnoses were concordant in 48% of cases, partially concordant in 10%, and discordant in 42%. Management recommendations were concordant in 28% of cases, partially concordant in 36%, and discordant in 36%. Primary care providers tended to underuse topical steroids and overuse topical antifungals and systemic antibiotics. Only 1.4% and 6.0% of patients required repeated teledermatology consultation and in-person dermatology consultation, respectively.

Limitations: Limitations were the inability to generalize the data from the population studied and the chances of error and bias in teledermatology diagnoses.

Conclusions: Store-and-forward teledermatology can improve diagnostic and therapeutic care for skin disease in children who lack direct access to dermatologists. (J Am Acad Dermatol 2010;62:61-6.)

Key words: diagnosis; management; pediatric; store-and-forward; teledermatology.

Telemedicine is the practice of health care delivery using digital data shared over public or private computer networks. There are two basic technologies: live-interactive and store-and-forward telemedicine. The former uses a real-time, broad-bandwidth audio-video link-up between the referring providers and the specialists; the latter requires the referral center to upload relevant text and image data onto their computer and forward them through encrypted e-mail to a specialist who makes diagnostic and therapeutic recommendations based on the data received. For dermatology, both of these techniques have been shown to be equally effective.[1]

The use of teledermatology as a branch of telemedicine has increased during the last several years. Currently, there are at least 115 programs in the United States; 47 provide teledermatology services in 32 states, and 4 of these are in California.[2] Because the distribution of dermatologists is skewed toward metropolitan areas, many rural regions have no access to a dermatologist. Consequently, teledermatology offers a potentially significant means for improving the delivery and quality of skin care to underserved areas.[3] Studies have shown that between 18.5% and 31% of clinic visits can be avoided when store-and-forward teledermatology consultation is available.[4] Teledermatology may also decrease the cost of care in rural communities without a local dermatologist.[5]

Although a number of published studies have compared the abilities of dermatologists and nondermatologists to diagnose and treat skin disease,[6-9] few have focused on dermatoses affecting children[10-12]

From the Department of Dermatology, University of California, Irvine[a]; and Departments of Dermatology[b] and Pediatrics,[c] University of California, San Francisco.
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Reprint requests: Amy E. Gilliam, MD, Palo Alto Medical Foundation, 795 El Camino Real, Clark Bldg, Palo Alto, CA 94301. E-mail: dr_amy_g@yahoo.com.
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and there are even fewer studies of teledermatology that have focused on the pediatric age group.[13]

To acquire a better understanding of potential issues that might arise in using teledermatology to care for children with skin disease, we performed a retrospective study of the electronic medical records of 429 children, aged 12 years or younger, referred from rural primary care facilities in California using store-and-forward technology to a teledermatology practice located in the San Francisco bay area.

CAPSULE SUMMARY

- Store-and-forward teledermatology is an emerging means of access for patients with skin disease lacking direct access to dermatologists, and can improve diagnostic and therapeutic care for skin disease in children.
- Agreement in diagnosis between the primary care provider and the teledermatologist was 48%, which is similar to previously reported studies. Agreement in management was found in only 28% of cases.
- Most commonly referred conditions mirrored those seen in general pediatric dermatology outpatient clinics, except for an increased number of teledermatology referrals for disorders of pigmentation.
- This study supports the conclusion of earlier reports that dermatologists are more likely than pediatricians to prescribe both topical steroids and higher potency topical steroids.

METHODS

Design, setting, and patients

We undertook a retrospective cohort study using the electronic medical records of pediatric patients in a private store-and-forward teledermatology practice in the San Francisco bay area. At each referral site, a medical provider had completed a standardized electronic referral form and acquired digital images of the skin lesions. The referral form included a provisional diagnosis in 405 of the 429 study patients. These files were sent by encrypted e-mail for review by the teledermatologist, who generated an electronic consultation report providing a diagnosis (or differential diagnosis) and recommendations for additional tests (eg, biopsy) and therapy. Software (Second Opinion Software, LLC, Torrance, CA) was used for all referrals and consultations, and this software was responsible for encrypting the patient files. In Second Opinion software, all images and patient data are saved in a format that is not recognized by other graphics or word-processing applications. The use of this software requires a password, and passwords are provided only to those providers involved in patient care.

In all, 429 patients aged 12 years or younger were referred for teledermatology consultation between January 1, 2002, and May 1, 2006. All patients with complete referral and/or consultation data were included. For patients who had more than one teledermatology consult for the same condition, only the initial consultation was included. The study was approved by the committee on human research at the University of California, San Francisco.

Data collection

Provisional and consultant diagnoses and all medications previously used and subsequently recommended by the consultant were recorded. Age, sex, referral location, reason for consultation, and the chronicity of the skin problem were tabulated for each patient. Specific requests for follow-up teledermatology consultation or a live visit to a dermatologist were also recorded and tabulated.

Diagnostic concordance

The provisional (referral) and consultant diagnoses were tabulated. Patients were excluded from this analysis if they lacked a provisional diagnosis (2.1%) Concordance between provisional and consultant diagnoses was categorized as follows:

- A — "Agree" included cases for which provisional and consultant diagnoses were identical or an acceptable nonspecific term was used to represent the dermatologic condition involved. For instance, the provisional and consultant diagnoses were considered to be in agreement when "eczema" referred to atopic dermatitis and "birthmark" referred to a melanocytic nevus, nevus anemicus, nevus depigmentosus, nevus spilus, nevus of Ito, or halo nevus.
- P — "Partial" included cases where at least one diagnosis was concordant, eg, either more than one consultation diagnosis was made, or the correct diagnosis was mentioned in the differential diagnosis.
- D — "Disagree" included cases where the provisional diagnosis was either incorrect or not recorded.

Management concordance

Recommended management by the referring provider and consultant, including the number and names of medications, if any, were recorded.