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Original

Dermatology consultations in a tertiary care hospital: A retrospective study of 243 cases

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Abstract

Background: The practice of dermatology remains mainly outpatient, although dermatologic consultations often have a large impact on inpatient care.

Objective: To analyze the reasons for dermatologic consultation and the impact of dermatologic evaluation at a major teaching hospital.

Methods: Retrospective chart review of 243 consecutive dermatologic consultations from primary ward teams between July 2012, and August 2013.

Results: Sixty-seven percent of the dermatologic consults were requested by the internal medicine, intensive care units, and hematology/oncology departments. Common skin conditions accounted for a large majority of consultations including: infectious (24.0%), drug-related (22.3%), and inflammatory skin conditions (21.0%). Most consultations required only one visit for resolution (60.9%). The primary team submitted a correct dermatologic diagnosis in 48.9% of cases. Dermatology consultation resulted in a change in or addition to treatment in 72.4% of patients.

Limitations: Our analysis was limited by the data capture of the consulting physicians and the reliability of the patient historian.

Conclusions: Our results revealed that common dermatoses account for a majority of dermatologic consultations. Modern ward teams continue to struggle with promptly recognizing and appropriately managing common skin conditions. Further training of ward physicians on common dermatologic conditions will improve recognition and treatment of skin conditions in hospitalized patients.

Keywords: Dermatology Consultations

Introduction

The practice of dermatology remains mainly outpatient. However, dermatologic consultations often have a large impact on inpatient care. Indeed, dermatologic issues are common among admitted patients, cause significant morbidity, and are the impetus for many inpatient dermatology consultations. However, the reasons for and outcomes of inpatient dermatologic consultations have historically received little attention. To further clarify the circumstances and outcomes of inpatient dermatologic consultations, we analyzed several features of inpatient dermatology consultations over a 13-month period at a major tertiary care center.

The specific objectives of this study were to assess the following features of dermatology consultations in a large teaching hospital: demographic data of patients, the reasons for dermatologic consultations and the most frequent requesting primary teams (herein described as “ward team”), the number of follow up visits, the accuracy of ward team diagnosis, the final diagnosis according to the consulting dermatologists, the relationship between the skin condition and hospital admission, the diagnostic tests performed by the consulting team, the treatment methods most often prescribed, and the proportion of cases in which dermatologic consultation resulted in a change in diagnosis and treatment.

Methods

Informed Consent. Medical record review described in this study was approved by the Institutional Review Board of Stony Brook University School of Medicine.

Patients/Setting. Inpatients at Stony Brook University Medical Center having a skin condition that prompted the ward team to seek a formal dermatologic consultation.

Study Design. A retrospective chart review of 243 consecutive dermatologic consultations was performed. These consultation requests were received over a 13-month period between July 11, 2012, and August 11, 2013 by the department of dermatology at Stony Brook University School of Medicine, which is responsible for all dermatologic consultations for inpatients and for those evaluated in either emergency or urgent care settings. All patients were evaluated by a second- or third-year dermatology resident and by a full-time attending dermatologist. The final diagnosis determined by the consulting dermatology consult service served as the gold standard in this study. The following variables were collected and entered into a Microsoft Excel database: patient demographics, ward team requesting consultation, relationship between the skin condition and hospital admission, the ward team’s initial diagnosis if applicable, whether preliminary treatment for the skin condition was initiated, reason for consultation, laboratory testing obtained by the consulting dermatologists, definitive dermatologic diagnosis, number of follow up visits, and recommended treatment by the dermatology consultant. The ward teams requesting consultation offered their presumptive dermatologic diagnosis; descriptive terms had to be employed in some cases (e.g. “rash”). The final dermatologic diagnosis was established by the second- or third-year dermatology resident and the attending physician in dermatology. The dermatologic diagnoses were grouped in 6 categories: inflammatory skin conditions, infectious skin diseases, autoimmune and bullous skin conditions, skin tumors, drug-induced dermatoses, and vascular-related skin conditions.

Data analysis. We calculated the frequency of dermatologic consultations requested by the various hospital ward teams. We also calculated the frequency of the primary diagnoses by the non-dermatology teams and compared it to the final diagnoses of the dermatology consult service. Standard mathematical formulas were applied to summarize the data in the Microsoft Excel database. To ensure confidentiality, all patient data was encoded before it was included in the database. The data distribution was analyzed and the frequency of each variable was calculated.

Results

During a period of 13 months, 243 dermatologic consultations were requested and delivered for patients either hospitalized or being evaluated in the emergency or intensive care units. Demographic characteristics of the patients were recorded. The ratio of men to women was 1.17 and the mean age of the patients was 52.3 years. A majority of the patients (64%) were 45 years of age or older at time of consultation (Table 1).

Table 1. Demographics of Study Subjects

Age Range (years)	Number of Patients in Present Study (%)	Number of Patients Davila et al* (%)	Number of Patients Falanga et al**(%)

<1	6 (2.5%)	3.0%	8 %
1-6	3 (1.2%)	1.8%	7 %
7-18	14 (5.8%)	7.8%	8 %
19-45	66 (27.1%)	33.6%	38%
45-60	61 (25.1%)	24.7%	15%
>60	93 (38.3%)	29.1%	18%

Male:Female ratio - 131 (54%):112 (46%)

*From reference [13].

**From reference [4].

In 148 of the 243 (60.9%) initial consultations, the complaint was resolved with a single visit (Table 2). During the study period, 412 visits took place; the average number of visits per patient was 1.69. The total number of follow-up visits was 169; the number per patient ranged from 1 to 9. In the case of 10 patients, at least one re-consultation was placed over the time period studied.

Table 2. Consultations Resolved within a Single Visit

Study	Percentage of Consultations Resolved Within a Single Visit
Fischer et al.*	85
Lorente-Lavigren et al.**	71.8
<i>Present study</i>	<i>60.9</i>
Mancusi et al.***	58
Ahmad et al.****	55

*From reference [6]

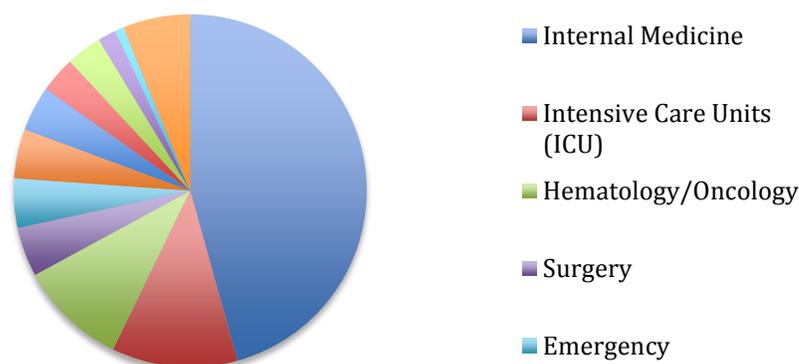
**From reference [14]

***From reference [12]

****From reference [9]

One hundred-sixty five (67.1%) of the dermatologic consultations included in this analysis were requested by three departments - internal medicine, the intensive care units, and hematology/oncology. The medicine service was the source of nearly one-half of all consultations (45.7%). Intensive care unit services (including pediatric, surgical, medical, and neonatal), which we separated from other inpatient unit consultations, contributed the second greatest number of consultations at 11.5%. Hematology-oncology accounted for 9.9% of all consultations. Other services that made up the top ten most frequent teams requesting dermatologic consultation included emergency (4.5%), surgery (4.5%), ssychiatry (4.5%), CACU/CCU (4.1%), family medicine (3.3%), pediatrics (3.3%) and other (23%) (Figure 1).

Figure 1. Distribution of Interdepartmental Consultations



In 233 out of 243 cases, the consulting dermatology team was able to provide a definitive diagnosis. We analyzed the ward team's diagnostic accuracy in the cases in which the consulting dermatologist was able to provide a definitive diagnosis. In 114 cases (48.9%), the ward team provided the definitive diagnosis in their differential diagnosis or as their sole diagnosis for the skin condition in question. In the remainder of cases (51.1%), the consultation request had only vague descriptions of the skin lesions in question or did not include the definitive diagnosis in their differential (Table 3).

Table 3. Effect of Dermatology Consultation on Diagnosis and Treatment of Skin Conditions

	Change (%)	No Change (%)
Dermatologic diagnosis (n=233)	119 (51.1%)	114 (48.9%)
Dermatologic treatment (n=243)	176 (72.4%)	67 (27.6%)

The percent of correct diagnosis by ward teams requesting dermatology consultation is listed in Table 4. Pediatrics, neurology and hematology/oncology services had the highest percent correct, whereas the psychiatry, emergency and intensive care units had the lowest percent correct.

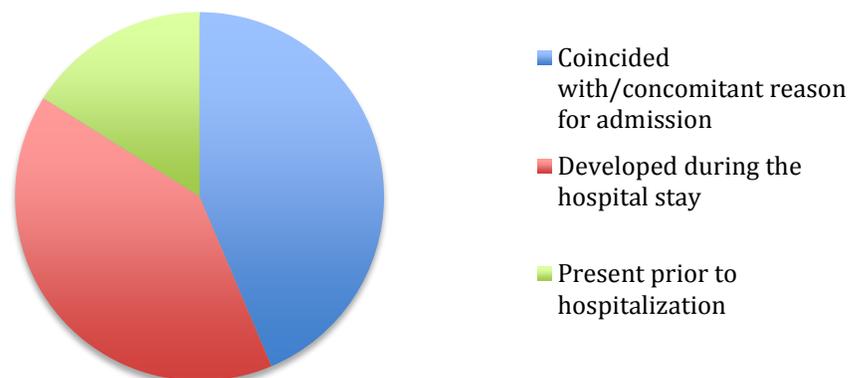
Table 4. Percentage of Correct Diagnoses Made by Ward Team

Consulting department	Percentage of correct diagnosis	Percentage of correct diagnosis Davila et al*	Percentage of correct diagnosis Falanga et al**
Pediatrics	87.5	28.0	44
Neurology	75.0	5.3	52
Hematology/Oncology	54.2	25.5 (Oncology only)	-
Medicine	51.4	33.2	37
OB/GYN	50.0	0	-
ICU	32.1	13.2	22
Surgery	45.5	15.5	39
Emergency	36.4	-	36
Psychiatry	9.1	32.4	42

*From reference [13]. **From reference [4].

In 106 patients (43.6%), the skin disease coincided with or was a concomitant reason for admission; in 98 patients (40.3%), the skin disease developed during the hospital stay. In 39 patients (16.0%) the skin disease was present prior to hospitalization (Figure 2).

Figure 2: Temporal Relationship of Skin Disease to Hospitalization



Infectious skin conditions accounted for the largest proportion of cases (24.0%), with cellulitis and viral exanths contributing most frequently to consultation requests. Drug-induced dermatoses contributed the second largest number of cases (22.3%); most consisted of drug eruptions. Inflammatory skin conditions accounted for 21.0% of cases; vascular-related conditions contributed to 13.7% of cases; autoimmune and bullous diseases accounted for 3.9% of cases; skin tumors accounted for 3.4% of cases. Other conditions accounted for 11.6% of cases (Table 5).

Table 5. Diagnoses Made by Dermatologic Consulting Service

Diagnosis (n=233)	No. of Patients (%)
Infectious Skin Conditions	56 (24.0%)
Cellulitis/Erysipelas	10
Viral exanthem	8
Candidiasis	7
Herpes Zoster	6
Herpes Simplex	4
Folliculitis	3
Fungal	3
Abscess	3
Intertrigo	1
Other*	11
Drug-Induced Conditions	52 (22.3%)
Drug eruption	46
Stevens-Johnson Syndrome	5
Toxic erythema of chemotherapy	1
Inflammatory Skin Conditions	49 (21.0%)
Contact Dermatitis	18
Atopic Dermatitis	10
Urticaria	6
Psoriasis	6
GVHD	3
Seborrheic dermatitis	3
Dermatographism	1
Erosive pustular dermatitis	1
Ichthyosis	1
Vascular-Related Conditions	32 (13.7%)
Stasis Dermatitis	12
Rumpel-leede sign	3
Vasculitis	3
Antiphospholipid syndrome	2
Edema bullae	2
Calciophylaxis	4
Vasculopathy	1
Purpura fulminans	1
Vasocclusive disorder	1
Ecchymoses	1
Septic emboli	1
Dependent edema	1
Autoimmune & Bullous Skin Conditions	9 (3.9%)
Bullous pemphigoid	4
Pemphigus vulgaris	2
Linear IgA Bullous dermatitis	1
Lupus	1
Erythema Nodosum	1
Skin Tumors	8 (3.4%)

T-Cell Lymphoma (inc. Cutaneous T-Cell Lymphoma, Sézary Syndrome)	3
Basal cell carcinoma	1
Squamous cell carcinoma	1
Melanoma	1
Leukemia cutis	1
Pyogenic granuloma	1
Other	27 (11.6%)
Excoriations	9
Delusions of parasitosis	2
Elephantiasis verucosa nostra	2
Hidradenitis suppurativa	2
Port wine stain	2
Calcinosis cutis	1
Birth trauma	1
Nevus spilous	1
Hereditary hemorrhagic telangectasia	1
Dermatoheliosis	1
Granulomatous dermatitis	1
Traumatic ulceration	1
Dependent rubor	1
Congenital hemangioma	1
Pyoderma gangrenosum	1

*Other infectious includes: Syphilis, chiggers, scabies, bed bugs, molluscum contagiosum, bug bites (2), infected ulcer, neonatal cephalic pustulosis, mucositis, Staphylococcal scalded skin syndrome.

No additional testing by the dermatology consult service was required for 155 patients (63.8%). Table 6 shows the most frequently requested additional tests. A total of 79 skin biopsies were performed on 47 patients. The other most commonly performed diagnostic tests included bacterial, viral, and fungal cultures and tzank smears. It is not possible to determine the diagnostic value of these tests, as even a "negative" biopsy or test result offered value in ruling out certain conditions in the differential diagnosis.

Table 6. Diagnostic Tests Performed by the Dermatology Service

Tests Performed	No. of patients in which test was performed
Biopsies performed (79 total biopsies)	47
Average # of biopsies per patient biopsied	1.68
Cultures	
Bacterial	31
Viral	14
Fungal	4
Acid Fast Bacilli	1
Tzank smear	2
Wright stain	1
Skin scrape	1

In 135 cases (55.6%), the ward team had initiated treatment for the skin condition prior to the dermatology consultation; here we included discontinuation of potential offending medications in cases of purported drug eruptions. The remaining 108 patients (44.4%) had received no previous treatment for their skin condition prior to the dermatology consultation.

Table 3 shows that dermatologic consultation had a decisive impact on the diagnosis and treatment of skin disease. In more than half of the cases, evaluation of the skin condition by the dermatology service resulted in change to definitive diagnosis (51.1%) and treatment (72.4%). A change to treatment was defined as the initiation or addition of a new topical or oral medication, a

change in the type or dose of a current medication, or discontinuation of a previous medication. The most common changes in treatment included the addition of a topical corticosteroid (74), topical antibiotic (46), or an emollient (23). Table 7 lists the most common treatment recommendations by the consulting dermatologic team.

Table 7. Most Common Changes in Skin Disease Treatment Resulting from Dermatology Consultation

Treatment	No. of patients
Topical Treatment	178 (80.1)
Addition of topical steroids	74
Change in topical steroids	4
Discontinue topical steroids	3
Addition of topical antibiotic	46
Change in topical antibiotics	4
Discontinue topical antibiotics	1
Addition of topical antifungal	11
Change in topical antifungal	5
Discontinue topical antifungal	2
Addition of topical permethrin	3
Addition of ammonium lactate	2
Addition of emollient	23
Systemic Treatment	42 (19.1)
Addition of systemic steroid	7
Change in systemic steroid dosing	1
Discontinuation of systemic steroid	1
Addition of systemic antiviral	10
Discontinuation of systemic antiviral	1
Addition of systemic antibiotic	6
Change in systemic antibiotic	1
Addition of systemic antihistamine	11
Change in systemic antihistamine	1
Addition of sodium thiosulfate	2
Discontinue systemic opioid	1

Discussion

In this study, we analyzed the reasons for dermatologic consultation and the impact of dermatologic evaluation on the inpatient units, intensive care units, and emergency department at a major teaching hospital. Our review of the literature revealed 14 relevant articles on the role of dermatology consultation in the hospital setting [1-14] (Table 8).

Table 8. Comparison of Similar Studies.

Author	Year	City, Country	Requesting Department	Final Diagnosis
Sherertz [1]	1984	Gainesville, United States	Not reported	Cutaneous manifestations of systemic disease 9.4% Drug reactions 9.2% Superficial mycoses 9.1%
Hardwick et al. [2]	1986	Cape Town, South Africa	Internal medicine 45.6% General surgery 10.6% Obstetrics and gynecology 8.4%	Dermatitis 17.1% Drug reactions 10.5% Superficial mycoses 7.0%
Arora et al. [3]	1989	India	Internal medicine 49.8% Surgery 22.7% Pediatrics 9.8%	Cutaneous manifestations of systemic disease 23% Drug reactions 9.1%

Falanga et al. [4]	1994	Miami, United States	Medicine 39% Emergency 16% Pediatrics 14%	Miscellaneous 48% Drug reactions 8.8% Atopic dermatitis 5.1%
Itin [5]	1999	Aarau, Switzerland	Internal medicine > 50%	Infectious skin diseases 21.7% Drug reactions 9.8%
Fischer et al. [6]	2004	Halle, Germany	Internal medicine > 42.8% Pediatric medicine 11.7% Neurology 9.9%	Infections 24.4% Candidiasis 23.9% Eczemas 12.4%
Walia et al. [7]	2004	West Bengal, India	Surgery 29.8% Medicine 29.7% Psychiatry 16.4%	Allergic dermatitis 30.2% Infections 29.8%
Antic et al. [8]	2004	Basel and Aarau, Switzerland	Only internal medicine included	Precancerous skin lesions 6.2% Drug reactions 4.2%
Ahmad et al [9]	2008	Limerick, Ireland	Not reported	Atopic eczema 12.7% Infectious 11.8% Psoriasis 8.5% Drug rash 8.0%
Maza et al. [10]	2009	Marseille, France	Medicine 60.8% Emergency 11.6% Surgery 10.5%	Infectious skin diseases 34.8% Miscellaneous 26.4% Inflammatory skin conditions 21.7%
Peñate et al. [11]	2009	Las Palmas de Gran Canaria, Spain	Internal medicine 21.5% Pediatric medicine 11.4% Neurology 8.3%	Contact dermatitis 8.9% Drug reactions 7.4% Candidiasis 7.1%
Mancusi et al. [12]	2010	Sao Paulo, Brazil	Internal medicine 24% Neurology 12% Cardiology 11%	Infectious skin diseases 25.8% Eczemas 16.6% Drug reactions 14%
Davila et al. [13]	2010	Iowa City, United States	Internal medicine 38% Surgery 21% Psychiatry 17% Pediatrics 7%	Infectious 24.2% Dermatitis 21.0% Drug eruption 10.0%
Lorente-Lavirgen et al. [14]	2013	Seville, Spain	Internal medicine 27% Hematology 15% Surgery 12%	Inflammatory skin conditions 36.2% Infectious skin diseases 26.5% Autoimmune processes 10.10%
Present Study	2013	Stony Brook, United States	Internal medicine 45.7% Intensive care 11.5% Hematology/Oncology 9.9%	Infectious skin diseases 24.0% Drug reactions 22.3% Inflammatory skin conditions 21.0%

Because the populations studied, sample size, length of study, and variables analyzed varied widely between these studies, it is difficult to make comparisons and draw conclusions from these studies.

Of the 13 studies analyzed, 5 reported the number of visits per patient. Complaints were resolved with a single visit in 85% of cases in the study by Fischer et al [6], in 71.8% of cases in the study by Peñate et al [11], in 59.9% of cases in the study by Lorente-Lavigren [14], in 58% of cases in the study by Mancusi et al [12], and in 55% of cases in the study by Ahmad et al [9]; our results are consistent with these findings (60.9%). The conclusion that may be drawn from these findings are that the majority of consultations placed for dermatologic conditions do not require extensive follow up because they involve uncomplicated, easily managed skin conditions. This is further supported by the fact that the treatments most frequently prescribed by the consulting dermatology service were topical agents.

Our analysis revealed that the internal medicine service was responsible for a large proportion of consultation requests, in keeping with the conclusions of most other studies on inpatient dermatology consultations [2, 5-6, 10-14]. These studies revealed that medical services consulted the dermatology service more often than surgical services (46.5% versus 4.5% in the present study). This is likely a reflection of longer hospital stays for patients on medical services who are also taking multiple medications for comorbidities. This is corroborated by the large proportion of drug eruptions that were diagnosed in the present study (19.7%), many of which developed during the course of hospitalization, prompting a dermatology consultation request.

In our study, the most common diagnoses were infectious skin conditions. These findings are similar to those of other studies in which infectious etiologies were the leading cause of dermatologic consultation [5, 6, 10, 12, 13]. Our study confirmed that in the inpatient setting, dermatologic consultation was often requested for evaluation of drug eruptions, which comprised 22.3% of our consultations. Other conditions that contributed to fewer consultations included inflammatory skin conditions, vascular-related dermatoses, autoimmune and bullous skin diseases, and skin tumors. Unlike the study by Lorente-Lavigren and colleagues, autoimmune and bullous skin diseases comprised a small number of consultation requests (3.9% versus 10.51% in the study by Lorente-Lavigren). This is likely owing to the prominent collagen-vascular unit in the hospital in which the latter study was performed.

We also analyzed the temporal relationship between the onset of the skin disease and hospitalization. Similar to the study by Lorente-Lavigren, the current study found that in a large proportion of cases, requests for dermatology consultation were placed for patients who developed a skin condition during the course of hospitalization (39.86% in the study by Lorente-Lavigren and 40.3% in the current study). Unlike the Lorente-Lavigren study, however, the skin condition was the reason for admission or coincided with admission in a majority of cases in the present study (43.6% versus 16.55%). One reason for the discrepancy may be the exclusion criteria of the Lorente-Lavigren study, which eliminated patients admitted on the recommendation of a dermatologist and patients hospitalized for exclusively dermatologic conditions.

In the reviewed literature, the percentage of patients who required additional testing to reach a definitive diagnosis ranged from 6.4% [11] to 48% [12]. The present study's findings are more consistent with the latter data; additional testing was performed in 36.2% of cases. It is important to note that those patients who refused testing recommended by the consulting dermatology service were classified as having undergone no additional testing.

Finally, similar to the findings by Falanga and colleagues [4], dermatologic consultation resulted in a change in diagnosis and treatment in more than half of the cases. The fact that treatment changed more often in this study than in the study by Falanga et al. (72.4% versus 61%) may reflect a wider definition of treatment change in the current study.

Our study had several limitations:

- Our data analysis relied on review of electronic medical records; the record detail varied somewhat depending on the physician's reliability as a historian and the patient's reliability as a historian, which has the possibility of introducing error into the present study.
- The definitive diagnoses were determined by a dermatologist and a resident and were not subsequently verified by any third party with training in dermatology, except in cases in which a biopsy or culture was performed. There is inherent ambiguity in providing certain diagnoses given that dermatology requires clinicopathologic correlation (i.e. drug rashes).
- Our data does not capture any so-called "curbside" consultations in which a primary team does not call an official consult but asks simply for advice or for the dermatologist to quickly look at a patient. These "curbside" consultations tend to be uncomplicated, but they are not captured here.

Conclusion

The findings of this study suggest that hospitals should promote inpatient dermatology consultation. Dermatology consultation resulted in a change in definitive diagnosis and treatment in a majority of cases. Dermatology consultation improves inpatient care and decreases comorbidity during hospital stays. In concordance with prior studies, we report that common skin conditions account for a large proportion of dermatologic consultations in a the hospital setting, are not often recognized by the ward team, and are often misdiagnosed by non-dermatologists. These findings support the notion that a two-fold approach to better care of skin conditions for hospitalized patients is warranted. First, primary teams should augment training on recognizing, diagnosing, and treating common skin conditions. This is especially true for physicians who will practice internal medicine, as this inpatient service has been shown to be the team most likely to request dermatology consultation in the preponderance of studies on the subject. Second, when available, ward teams should avail themselves of dermatology consultation when there is any question regarding the diagnosis or treatment of a skin condition to avoid prolonged morbidity or inappropriate treatment.

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