

# Tele dermatology: Clinical case profiles and practical issues

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## ABSTRACT

**Background and Aims:** Tele dermatology is an area that has shown rapid growth in the recent past. However, not many studies have been conducted with regards to the application of tele dermatology in India. Aim of our study was to evaluate the clinical profiles of cases referred for tele dermatology consultation at our center, and to assess and compare the different modalities of tele dermatology consultations done at our center along with the practical issues related to such a service. **Methods:** A retrospective study of tele dermatology consultations at our center over a 3-year period was carried out. Store-and-forward (SAF), realtime consults (RTC), and hybrid (combining the two) were included. Two trained dermatologists were involved in carrying out the consultations in the referral center. **Results:** Of the 120 consultations, 68 male and 52 female patients in the age range of 2–77 years were seen. In more than 90% of the cases, teleconsultation was the first contact for the patient with the dermatologist (for the present condition). In 68% of the cases, the reference was for both diagnosis and management, while in the rest, the reference was mainly related to management issues (appropriate diagnosis having already been made). Certainty of diagnosis was maximum for hybrid, SAF, and RTC. **Conclusions:** Tele dermatology can prove valuable as a tool to provide healthcare in areas of shortage of specialists. A hybrid system combining SAF and RTC could be the ideal form of tele dermatology consultations in the future. Many practical issues need to be addressed before the effectiveness of tele dermatology in India can be fully recognized.

**Key words:** Tele dermatology, Clinical profiles

## INTRODUCTION

Tele dermatology is fast expanding into one of the most exciting specialties of dermatology.<sup>[1, 2]</sup> However, there are a number of practical issues that needs to be rectified before the complete benefit of tele dermatology can reach either the patients or the dermatologist, especially in the Indian setting. There are not many detailed studies conducted related to tele dermatology in the Indian setting. We attempt to study some of the factors relating to a steady tele dermatology practice at our center over a 3-year period.

## METHODS

The study consisted of tele dermatology SAF, real time, and combined consultations (for purely dermatological complaints) during the period August 2004–2007 at our center over a 3-year period.

The 'Sony PCS-1600 P' camera, with a resolution of 640 X 480 and frame rate of 30 fps (frame per second), was used in the study for RTC. Live sessions were routed via an integrated services digital network link. Images were stored either in the digital imaging and communication in medicine (DICOM), JPEG, or TIFF formats.

A broadband connection with speed of more than 1 mb/s was used for SAF consultations (without realtime consults).

For the combined/hybrid consultations, the patient details along with photographs of the skin lesions were initially sent to our center and viewed by the dermatologist. The protocols for transmission of auxiliary data included specific electronic medical record software for telemedicine (like Televital® – by Indian space research organization), e-mails, and

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dedicated web portals for SAF consults. Thereafter, an appointment for the RTC was given. Following the RTC (during which any information gaps could be filled interacting directly with the treating physician and the patient), the diagnosis and management details were typed and sent back to the referring physician.

## RESULTS

A total of 120 teleconsultations were included in the study. Of these, 47 consultations were of the SAF type, 20 were of RTC, while the rest 53 consultations were combined SAF and RTC.

The study group consisted of 68 men and 52 women patients in the age range of 2–77 years.

Teleconsultation was for primary diagnostic and treatment purposes in a majority of cases (82), while in the rest, the consultation was primarily for management issues in the diagnosed case.

In more than 90% of the cases ( $n = 110$ ), the teleconsultation was the first contact for the patient with the dermatologist (for the present illness), implying that though patients have access to primary care givers, access to a dermatologist is generally limited.

In all cases referred to us, the patients were already on some medications for the medical problem in question.

Of the cases referred for diagnosis, a definite primary diagnosis with absolute certainty could be made in 35 cases (42%), of which 15 cases were combined RTC and SAF, while 10 were SAF alone. In rest of the cases, differential diagnosis was considered [Table 1]. In none of the cases involving RTC alone, could a single definite diagnosis be made with absolute certainty.

The basis of ‘certainty of diagnosis’ was entirely subjective and was decided by the consulting dermatologist. All cases were subjectively categorized into three by the consulting dermatologist – absolutely certain (when a single diagnosis was made), moderately certain (when not more than two differentials were considered), and not certain (when three or more differentials were considered). We feel that since the consultations were done by trained dermatologists, subjective scoring should be a valid measure of

**Table 1: Primary provisional diagnoses considered\***

Provisional diagnosis	Number of cases
Eczematous dermatitis	43
Papulosquamous disease	37
Pigmentary disorder	3
Vasculitis/connective tissue disease	6
Acne/rosacea	5
Drug reactions	3
Benign tumors/cysts	5
Malignant tumors	1
Hair and nail disorders	2
Superficial fungal and bacterial infections	14
Chronic granulomatous conditions	18
Genodermatosis	1
Viral infections	10
Nevi	1
Parasitic infestations	7
Insect bite reactions	2
Autoimmune vesiculobullous diseases	1

\*In some cases, more than one diagnosis was considered

certainty.

Diagnoses were made with absolute certainty in cases like viral warts, herpes zoster, acne vulgaris, irritant dermatitis, vitiligo, and superficial bacterial and fungal infections. In cases where papulosquamous, chronic granulomatous, vesiculobullous conditions, and vasculitis were considered, certainty of diagnosis was low. Continued and adequate follow up with ultimate confirmation of the diagnosis (in cases with diagnostic uncertainty) were obtained in only a minority of cases (<10%).

Sixty-two cases (51%) were advised skin biopsy for confirmation of diagnosis. In 70 cases (58%), lab/radiological investigations were advised. Immediate referral to higher center was advised in only 9 cases (7.5%).

## DISCUSSION

There have been numerous proposed definitions for telemedicine and teledermatology. Telemedicine can be broadly defined as the use of telecommunication technologies to provide medical information and services. The application of the principles of telemedicine to dermatology is generally referred to as ‘teledermatology’.<sup>[1]</sup> It is in essence an application of clinical telemedicine that deals with the practice of dermatology via the latest communication and information technology. As with other telemedicine

applications, the goal is to provide the highest quality of dermatologic care more efficiently by moving patient information rather than the patient.<sup>[2]</sup>

The last few years have shown a tremendous increase of activity levels in the field of teledermatology. Unfortunately, being in its infancy, there are lot of unresolved issues especially with respect to standardization and ethical–legal issues. There have been quite a few studies related to different parameters involved in teledermatology and its applications. However, there are only a few studies, which have looked specifically at clinical profiles. Oakley *et al*<sup>[3]</sup> study involved 384 cases, of which 74% were diagnosed as ‘inflammatory skin disease’, 10% as ‘cutaneous infection’, 12% as ‘nonspecific skin lesions’, and no diagnosis was made in 4% cases. Interestingly, though this study mentions an apparent success rate of 75%, with a positive feedback from the patients, the authors mention that the service was not sustainable in the long term due to various factors like other priorities for the delivery of healthcare, lack of support by clinicians and administrators, and financial costs. However, in general, high satisfaction rates with teledermatology services on both patient and physician sides have been reported in various studies.<sup>[4-6]</sup>

The type of cases suited for teledermatology is another topic, which requires clarity. Du Moulin *et al*<sup>[7]</sup> observed that eczema and follicular lesions were diagnosed with relatively more certainty. In our study, we felt that diagnoses were made with more certainty in cases like viral warts, herpes zoster, acne vulgaris, irritant dermatitis, vitiligo, and superficial bacterial and fungal infections. Unlike in western studies where pigmented lesions suspicious of melanomas are one of the most referred cases for teledermatology (with or without teledermatoscopy), our study had only one case referred for evaluation of possibility of a melanoma.

In our study, a majority of the cases were referred for diagnosis and management; while a few cases were referred for management purposes only. Lamminen *et al*<sup>[8]</sup> in their study including 25 teledermatology consults, reported a change in the primary diagnosis in 52% and a change in management in 76% of the cases.

It has been documented by some studies that clinicians tend to suggest more investigations,

especially skin biopsies, following a teledermatology consult, as compared to a normal face-to-face consult.<sup>[9]</sup> We felt this to be true in our experience too. This is understandable considering that the certainty of diagnosis and proper follow up is always on the lower side with a teledermatology consult. The issue of inadequate follow up in teledermatology consults, highlighted in our study, has also been mentioned by other authors like Krupinski *et al*.<sup>[10]</sup>

Many studies have demonstrated that clinical outcomes with SAF teledermatology compare quite well with direct face-to-face consultations and video conferencing (VTC)/RTC. The same is the case with web-based teledermatology portals.<sup>[11-14]</sup> There are also studies which clearly demonstrate that teledermatology, in general, compares well with direct face-to-face consults.<sup>[15,16]</sup> Our study has a definite limitation in this aspect as we have not compared the efficacy of the teledermatology consult *vis-à-vis* face-to-face consults. It is also well documented that a well-organized teledermatology network can cut down patient waiting times, while serving as an effective triage system for dermatology cases.<sup>[17-19]</sup> It goes without saying that a purely SAF or a web-portal-based consultation has its own disadvantages, especially with respect to gaps in the case history and a lack of rapport with the patients.<sup>[20,21]</sup> Also, a lot depends on the quality of images submitted for consultation, especially if the referring physician is not familiar with dermatological photography (as is often the case).<sup>[21]</sup> The main disadvantage of VTC is the issue of video clarity, likely to be resolved in the near future, with improvement in video resolutions and bandwidth. Time constraints (especially for the specialist), financial issues, and ethical–legal issues are also significant problem areas as far as VTC/RTC is concerned. However, it has been shown that RTC-based teledermatology can itself be quite useful in improving treatment outcomes in areas with shortage of specialists.<sup>[22]</sup> We feel that the best results, as expected, would be from a hybrid SAF and VTC consult. Ideally, the images and patient details can be sent initially for the specialist’s preview and then a time can be set-up for a VTC during which the specialist can fill any information gaps or focus on any other area of interest on the skin, as required.

The need for proper standardization of teledermatology equipments and procedures is essential. Various groups have been working to this end. One of the most recent and most elaborate recommendations regarding

the same was made by the American Telemedicine Association (ATA).<sup>[23]</sup> The guidelines of the ATA also include a detailed account of the accepted imaging standards in teledermatology, especially the DICOM format.

## CONCLUSIONS

Teledermatology is a science in its infancy, but is likely to grow by leap and bounds in the future. Standardization of equipment and procedures is essential to the success of teledermatology. Lot of practical issues need to be addressed and ironed out before teledermatology can be introduced on a larger scale. The best results are likely to be obtained by combining the two primary modalities of teledermatology SAF and RTCs. Such hybrid models may well form the basis of teledermatology consultations in the future.

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