Case report: an example of international telemedicine success

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Summary
An 8-month old girl presented to the Angkor Hospital for Children in Siem Riep, Cambodia with fevers, bilateral eye discharge and an extensive body rash. The rash consisted of large, fluid-filled bullae and significant desquamation. The patient was admitted to the hospital and given intravenous cloxacillin for presumed bullous impetigo. Despite treatment with antibiotics, the skin lesions did not improve and the fevers continued. Telemedicine consultations were initiated by email between Angkor Hospital for Children and paediatric specialists in the USA. Several diagnoses were entertained throughout the subsequent collaborative dialogue. Ultimately, teleconsultation led to a diagnosis of chronic bullous dermatosis of childhood (CBDC), a rare sub-epidermal blistering disease. The child was started on appropriate medications. Within 24 hours, the lesions showed significant improvement and fevers resolved. By enabling advice from distant providers on diagnosis and treatment of paediatric patients, telemedicine may improve health care in developing countries.

Introduction
In developing countries such as Cambodia, the disease burden far outweighs the country’s health-care resources. For example, there are only 30 doctors per 100,000 people. Telemedicine provides a method through which the expertise of health-care professionals can be shared across borders and physical barriers. At an international level, it can be used to help counteract the disparity between the locations of the disease burden and the health-care resources. The following case represents an example.

Case report
An 8-month old Cambodian girl presented to the Angkor Hospital for Children in Siem Riep, Cambodia with a severe body rash. According to the mother, the child had been healthy until approximately three months prior to presentation. The illness began with a rash consisting of small, clear vesicles on the patient’s face. Shortly thereafter, the child developed intermittent tactile fevers and bilateral eye discharge. The rash gradually generalized to include the patient’s upper and lower extremities, as well as her buttocks. The mother reported that despite multiple trials of outpatient antibiotics, as well as traditional Cambodian medicines, the symptoms continued. No further information about the antibiotics and traditional drugs was provided. Ten days prior to admission, the rash became significantly worse. The child developed large, fluid-filled bullae on her lower extremities, and she had significant desquamation on her posterior thighs and buttocks. The child was otherwise well.

Past medical and birth histories were unremarkable. She was on no medications and had no known allergies. The patient had been growing well and meeting her developmental milestones appropriately.

There was no family history of any skin conditions or known childhood illnesses. The skin examination was significant for large areas of severely excoriated and erythematous lesions with desquamation, which was most severe over the buttocks and posterior thighs. The entire upper and lower extremities including the ankles, wrists, hands and feet, as well as the genitalia were affected. Large (3–4 cm in diameter), clear, fluid-filled bullae were present and most prominent around the child’s wrists and ankles, as well as upper thighs and proximal upper extremities. The trunk and abdomen were relatively spared. There was no involvement of the palms or soles of the feet. There were

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small, erythematous and excoriated papules on the cheeks, and clustered around the lips and eyelids. The oropharynx was clear with no apparent involvement of mucous membranes. A clear, viscous discharge drained from the eyes bilaterally (see Figures 1–2).

The patient was admitted to the hospital and started on intravenous cloxacillin for presumed bullous impetigo. Despite treatment with antibiotics for several days after admission, the skin lesions showed little indication of resolution and the patient continued having low-grade fevers. Temperatures over the course of the week ranged from 36.9°C to 39.2°C. On hospital day 3, a visiting paediatrics resident was asked to initiate a telemedicine consultation by email. The resident sent digital photographs of the patient with a brief case description to several infectious disease and dermatology departments in the USA. Several diagnoses were entertained, including bullous impetigo in an immunocompromised host, Stevens-Johnson Syndrome (SJS), acute immersion burns/abuse, zinc deficiency, varicella with secondary staphylococcus infection and epidermolysis bullosa. The lack of oral mucosal involvement reduced the likelihood of SJS. Further investigations, including syphilis and maternal HIV testing, were unhelpful. The distribution of the skin lesions was not fully consistent with abuse and there was no reason to suspect it. With the exception of anaemia, the child showed no other signs suggesting malnutrition, so vitamin deficiency was unlikely. However, a multivitamin and folate test were conducted. With no definitive diagnosis, the patient was continued on intravenous cloxacillin. Chloramphenicol eye drops were started for presumed bacterial conjunctivitis. Pain was controlled with intravenous morphine. The patient’s fevers continued and the skin lesions remained.

On hospital day 7, a second communication from the infectious diseases department at the Hasbro Children’s Hospital was received suggesting two more diagnoses to consider: childhood pemphigus and chronic bullous dermatosis of childhood (CBDC), also known as linear IgA dermatosis. An Internet search was conducted by the physicians at the Angkor Hospital for Children on the proposed diagnoses. On reviewing the literature and images readily available on the Web, it was decided that the patient’s clinical presentation was consistent with CBDC, a sub-epidermal blistering disease characterized by linear depositions of IgA along the basement membrane of cells. Various electronic articles and websites recommended antibiotic therapy and systemic steroids. Thus, the child was started on prednisone on the afternoon of hospital day 7. Within 24 hours, the lesions showed significant improvement and the fever resolved (see Figure 3). Over the next 72 hours, the lesions continued to improve dramatically. Intravenous antibiotics were discontinued on hospital day 11. The patient was discharged home the following morning with oral prednisone and almost complete resolution of the lesions (see Figure 4).

Discussion

The ability of telemedicine to allow distant providers to evaluate, diagnose, treat and provide follow-up care to paediatric patients, makes it a technique that could provide great benefits at an international level. In developing countries where resources and sub-specialists are scarce, telemedicine is being used to assist struggling hospitals and health centres. Low bandwidth Internet telemedicine can be used in places with precarious political and economic situations, such as Uzbekistan, Kosovo and (as demonstrated by the present case) Cambodia. Several well-known telemedicine networks have now been serving over 30 different developing countries for longer than five years. These include Partners Healthcare in Boston, USA; Tripler Army Medical Center in Honolulu; the iPath association at the University of Basel in Basel, Switzerland; the Swinfen Charitable Trust in Canterbury, UK; and the Réseau Afrique Francophone de Télémedicine (RAFT) at the Geneva University Hospitals in Geneva, Switzerland.
Various studies have been conducted to establish the cost effectiveness of international telemedicine. One such study looked at electronic communications between the UK and South Africa in the field of ophthalmology. The authors supported telemedicine as a cost-effective way for industrialized nations to provide health care outreach to poorer countries. The government of Uzbekistan has also recognized the value of telemedicine and established three official international telemedicine programmes. Kirigia et al. pointed out both the need for telemedicine in the WHO African regions and the barriers to its introduction, such as limited information and communications technology, lack of infrastructure and limited Internet connectivity.

While many studies have investigated international telemedicine, few have addressed the specific benefits with respect to paediatrics. The present case study demonstrates the ability and relative ease of using telemedicine to improve the quality of paediatric health care in a developing country. Through Internet communications, paediatricians can facilitate equity in health care for children around the world.

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References

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