Telehealth in India – The Apollo Story
Apollo Today
The birth of APOLLO

- 1983- Apollo Hospitals, Chennai: The first Corporate Hospital in South Asia
- The underlying objective: Bring Healthcare of International standards to India
- The overriding objective: To make India the preferred Healthcare destination by 2003
- The first step was taken to put India on the international healthcare map.

- Ranked as one of the largest Hospital Chains in the world after HCA-Columbia and the Novation.
- Currently manages 8200 beds across 41 hospitals in India and parts of Asia.
- One of the world’s few integrated healthcare service providers
- A consultant, nursing and Para-medical strength of over 10,000 professionals.
- Treated patients from over 55 countries across the world including USA, Canada and UK
- Treated over 14 Million patients till date
India’s First Telemedicine Project 1995
Consult your doctor at Apollo Hospitals from almost anywhere in the world through Telemedicine.

Taking Modern Healthcare To Remote Areas Using Technology
Overseas Centres

1. Kazakhstan
2. Colombo
3. Dhaka
4. Lahore
5. Sudan
6. Yemen
7. Lagos
8. Maldives

92 Telemedicine Centers In India set up by ATNF
A Super Success Story in Rural Telemedicine

Aragonda
I think it is a very wonderful contribution to the healthcare of the people who live in rural villages and I hope that people all over the world will follow your lead, because if they do then the benefits of the Hi-tech medicine can go to everyone and not just people who live in big cities.

Bill Clinton
March 24th 2000
Aragonda Apollo Multi Specialty Hospital

- 50 Beds /10% - Intensive Care
- Master Health Check up
- CT Scan, X-Ray, Ultrasound, ECG, ECHO
- TMT, PFT & Endoscopy
- Emergency & Trauma Services with 1 Ambulance fully equipped
- 9 consultants, 5 Residents, 37 Nurses, 12 Technicians, 63 Other staff
- 200 patients / month- Bed Occupancy- 75%
- 2653 surgeries
SPECIALITY WISE TELECONSULTS FROM VILLAGE OF ARAGONDA (INDIA) FROM 2000 - February 2007

- Dermatology: 494
- Psychiatry: 432
- Cardiology: 191
- Paed. Cardiology: 174
- Neurosurgery: 173
- Neurology: 171
- Radiology: 95
- Endocrinology: 93
- Gastroenterology: 82
- Nephrology: 78
- Paed. Surgery: 77
TELECONSULTATIONS IN ARAGONDA
FROM 2000 TO FEB 2007

NUMBER

YEAR


89 225 411 377 315 420 366

No of Cases
152 Grand Rounds were held between Apollo Hospitals, Chennai and Apollo Hospital, Aragonda, every Tuesday morning from 2003. DNB PG’s with pediatric super specialists from Chennai review case histories, reports, CT, ultrasound, and X-ray images of children. Live echocardiograms and color Doppler are transmitted to a pediatric cardiologist. Follow up of these cases are also discussed.
The Aragonda Story

What started as a pilot project and proof of concept validation in 2000 has turned out to be a super success story. It is not only the 1837 patients who had teleconsultations who have benefited, not only their families, not only the doctors in the village hospital who are essentially having daily CME sessions, not only the city consultants who now know what rural medical practice, but society as a whole. During the last 6 years we have proved that today distance is meaningless and that Geography has become History. Aragonda served as a catalyst to energise ISRO to provide hundreds of VSAT’s for telemedicine. As the world’s first VSAT enabled village to have telemedicine ARAGONDA has indeed been an eye opener. What the world needs today is 500,000 Aragondas.

Improbable Yes

Impossible No
A Neurosurgical teleconsult in progress
Actinic Reticuloid plaques
Photographs of hard copy taken with Digital Camera and sent thru’ VSAT

Doctor and patient reassured that Calcified spots have no Clinical significance
Newborn baby Confident diagnosis of hydrocephalus (large head) with meningocoele (swelling at the back) made. 6-7 frames per second with digital camera the showed leg movement. Brilliant transillumination confirmed that the swelling did not contained spinal cord tissue. Local doctor was advised to transfer the child to the care of a neurosurgeon.
Radial Nerve injury Tele evaluation
Can the patients receive the same level of quality of care as they would receive during personal interaction?

Telemedicine delivers the same quality of care as personal interaction. Patient and doctor satisfaction is very high.

Is consultation through Telemedicine expensive?

NO! NO! NO!

It will cost about 20% of the money spent on travel, food, and accommodation. What more you don’t lose precious time travelling to the hospital for consultation.

Does Apollo offer Telemedicine?

Apollo Hospital Group, India’s largest Healthcare provider offers telemedicine facilities through Apollo Telemedicine Networking Foundation (ATNF). Currently ATNF has the largest multi speciality Telemedicine network in South Asia.

* Please refer the map for the nearest Telemedicine Consultation Center (TCC) location or the Help Desk or visit www.telemedicineindia.com.

Are there any special additional advantages in obtaining a teleconsultation at Apollo?

If the specialist asks for additional tests or if admission to an Apollo hospital is required, a 5% discount will be given for investigations to Teleconsultation patients. Contact the help-desk at the hospital for more details.

For more details on Telemedicine visit www.telemedicineindia.com

---

**Details of your Teleconsult Center**

<table>
<thead>
<tr>
<th>TCC Center</th>
<th>Location</th>
<th>Tel. Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Telemedicine - An Introduction

The world's population is increasing rapidly without corresponding increase in funds for healthcare. People in suburban and rural areas are not able to get high quality healthcare and specialist consultations. Telemedicine can bridge this gap. Today, Geography has become History and Distance has become Meaningless.

Telemedicine incorporates direct clinical, preventive, diagnostic and therapeutic services. Follow-up and remote monitoring of patients can also be done. Patients can also be educated from a distance. Telemedicine can meet many challenges in an organized and cost effective manner. Exchange of information and medical expertise leads to increasing access to quality healthcare.

Telemedicine is not a medical specialty, but an important tool, which is being increasingly used to deliver better healthcare throughout the world. Utilizing the rapid advances in information and communication technology, it is now possible to transmit text, sound, images and video from one location to another. Time and costs involved in patient's transportation can be significantly reduced.

Telemedicine applied to medical practice results in:
- Reduction in the need to transfer patients to big specialist hospitals.
- Reduction in the need of a specialist travel to smaller towns.
- Better-organized and cost effective healthcare.
- More efficient and effective use of medical and technological resources.

There is no difference in the consultation received by the patient whether he/she meets the doctor directly or through Telemedicine.

Frequently Asked Questions

What is Telemedicine?
Telemedicine is the term used for the process where medical services are provided when the patient and the doctor are far away from each other.

What does Telemedicine mean to my family and me?
Telemedicine is designed to bring quality healthcare and specialty services to remote areas, where it is not available.
- Specialist service can be made available immediately.
- Follow-up care can be done from a Telemedicine center close to your hometown.
- You and your family are saved the inconvenience and expenses involved in traveling long distances.
- Considerable effort, and inconvenience is avoided. Money need not be spent on food, accommodation etc.

What exactly happens in a Telemedicine consultation?
- The patient or relative contacts the nearest Telemedicine Consultation Center (TCC) and requests for a specialist consultation. The local Telemedicine administrator fixes an appointment with the concerned specialist and informs the patient.
- Problems and history of the patient is sent electronically in a specially designed case sheet. Test reports like X-Ray, ECG, Blood investigations, CT scan, Angiogram, ECHO pictures etc can also be sent from TCC to the specialist at the hospital.
- After the specialist goes through this information he/she talks to the patient and examines the patient remotely through video conferencing. If special devices are available in the TCC, the specialist can hear the heart sounds through an electronic tele stethoscope. Even the blood pressure can be measured from thousands of miles away. After a provisional tele diagnosis is made the opinion of the specialist is communicated to the patient at the remote end through email/fax. A prescription with the specialist's signature is also faxed to the patient. If reviews are required a similar procedure is followed.

Do I get to meet the same Specialist?
- Yes, you will be able to get in touch with the same specialist for all your review consultations.
The mobile teleclinical van reaches the preplanned destination

Medical Consultation given by the DISHA doctor

Required investigations are done

Referral to Apollo, Mul for secondary/tertiary care

Admission in the nearby level 1 government hospital for primary care

Expert opinion from Apollo - Madura through telemedicine

FLOW CHART

Interior of VSAT enabled Mobile Van

Live Teleconsultation from Van
Medical congress live in Chennai on video

Express News Service
Chennai, March 9

FOR the forty-city-based neurosurgeons, it did not prove necessary to travel all the way to Nagoya in Japan to attend the 6th International Congress on Minimally Invasive Surgery. Instead, the sessions were transmitted live here for them today. All thanks to the efforts of the Apollo Telemedicine Networking Foundation.

K Ganapathy, specialist in stereotactic radiosurgery and consultant at Apollo Hospitals, made a 20-minute presentation on the surgery to a gathering spanning countries like Japan and Hong Kong.

"In the presentation, I discussed my experiences from treating 240 patients with cerebral arteriovenous malformations. This condition causes the rupturing of abnormal blood vessels in the brain and can even lead to death," Ganapathy said. Apollo, he claimed, was one of the first hospitals in South Asia to introduce minimal invasive surgery to treat these malformations.

Japan, Chennai and Hong Kong were chosen as the centres for teleconferencing the sessions. Ganapathy was one of the few experts invited to make a presentation at the congress.

While 300 doctors participated in Japan, almost 65 watched the live demonstration from Hong Kong. "Technology has indeed done wonders. It would have cost us a packet for travel and accommodation. Forty-five Indian doctors participating would have been financially impossible," Ganapathy said.
Academic Activities in Telehealth

- Lectures to Hospital Management postgraduates
- Lectures to senior officers of College of Defence Management Hyderabad
- Two M.Phil dissertations, two MA dissertations and 5 BE final year dissertations
- 130 papers presented at local, regional, national and international conferences. 35 papers published in regional, national and international journals besides 3 chapters in overseas publications. Details available at www.kganapathy.com
Telemedicine in the Management of Head Trauma: An Overview
K Ganapathy MCh
Senior Consultant Neurosurgeon, Apollo Specialty Hospitals, Chennai

Abstract: This article reviews the successful utilization of telemedicine in managing head trauma. Telemedicine has made geography and distance meaningless. It can be a major tool in providing expertise for the management of neurotrauma cases, in far away areas. With the digital divide reducing in India, telemedicine should be considered a method to overcome the shortage of neurosurgeons. Following a discussion of the relevance of telemedicine in the Indian context and after outlining the author’s personal experience, the world literature is reviewed.

Keywords: Telemedicine, Head injuries, neurotrauma

Head injuries are universally a public health hazard, and India, which also has the maximum number of two wheelers, constitutes one sixth of humanity. A fatality every four minutes, makes head injury the sixth commonest cause of death in India. Only 800 neurosurgeons are available for a population of 1075 million, out of which 620 million live in rural India with no direct access to immediate neurosurgical care. Though 100-120 new neurosurgeons qualify every year from 50 medical colleges, only 105 out

ROLE OF TELEMEDICINE IN NEUROSCIENCES
K. Ganapathy

Key words: Telemedicine, Neurosurgery, Neurology

“The future ain’t what it used to be” – Mark Twain

“The problem with the future is that it is always ahead of schedule.”

Telemedicine and Neurosciences: Its relevance in India

That distribution of specialists in neurological sciences worldwide is topped an accepted fact. That increasing the number of specialists, providing them with the requisite infrastructure and maintaining high standards to provide neurological and neurosurgical care to the 800 million, living in suburban and rural India is just not possible. is also an accepted fact. 300 million Indians live below the poverty line. In India, at present, access to neurosurgical care is available only to about 450 of the 1075 million. About 750 neurosurgeons and 110 neurosurgical trainees provide this. Less than 110 Neurosurgeons qualify per year from about 55 residency programmes (5 National Institutes, 4 Deemed Universities, 25 Medical Colleges, 21 corporate, private and trust hospitals). Only 80 of the 160 medical colleges in India have neurosurgical departments. Neurosurgery units in 25 – 30 of the 275 corporate hospitals supplement this. Small to medium nursing units, where basic neurosurgery is conducted, number less than 130. The 15 neurolsurgical systems of excellence, of world standards, are few for this vast country. The city-based neurosurgeons are not willing to relocate to suburban or rural India because of lack of infrastructure and level of professional isolation. The 75 neurosurgeons in Chennai (population 4 million), outnumber the total number of neurosurgeons in the whole of North Eastern India (population 250 million). The story for medical neurology is similar.

“...”

and rural India is just not possible, is also an accepted fact. 300 million Indians, like many, many more in other parts of the world, live below the poverty line. In India at present, access to neurosurgical care is available only to about 450 million of the 1,000 million Indians. About 750 neurosurgeons and 110 neurosurgical trainees provide this. Fewer than 110 neurosurgeons qualify per year from about 55 residency programmes (5 national institutes, 4 deemed universities, 25 medical colleges, 21 corporate, private, and trust hospitals). Only 80 of the 160 medical colleges in India have neurosurgical departments. Neurosurgery units in 25 – 30 corporate hospitals supplement this. Small to medium nursing homes where basic neurosurgery is conducted, number less than 130. The 15 neurosurgical systems of excellence, of world standards, are few for this vast country. The city-based neurosurgeons are not willing to relocate to suburban or rural India because of lack of infrastructure and level of professional isolation. The 75 neurosurgeons in Chennai (Madras), with a population 4 million, outnumber the neurosurgeons in the whole of North Eastern India (population 250 million).

Technology

TELEMEDICINE AND NEUROSCIENCES IN DEVELOPING COUNTRIES
K. Ganapathy, M.Ch., Ph.D.,
Department of Neurosurgery and Department of Telemedicine Apollo Hospitals, Chennai, India


It is a universally accepted fact that the number of neurosurgeons in developing countries is woefully inadequate. It is also unacceptably high to expect this limited number to work in professional isolation, in suburban and rural areas, without adequate infrastructure. Therefore, this has resulted in concentration of neurosurgeons in developing countries, in metropolitan areas, even at the risk of being under-employed. The phenomenal advances in communications and information technology in India are resulting in a new look at how secondary and tertiary health care can be provided to the underprivileged masses. Following a proof of concept validation ISSO (Indian Space Research Organization) in conjunction with the Apollo Hospitals, is ready to use satellite technology to provide specialist care not only to suburban and rural India but to other countries as well, by using the large number of highly qualified and trained specialists in urban India. The implications of these developments for the delivery of neurosurgical care to suburban and rural India is briefly reviewed. © 2002 by Elsevier Science Inc.

KEY WORDS
India, e-mail, satellite, telemedicine, neurosciences in developing countries.

“...”
TELEHEALTH TECHNOLOGY COURSE

Apollo Telemedicine Networking Foundation

Anna University
Telemedicine Course for Armed Forces
Prof. K. Ganapathy interacting with His Excellency Olusegun Obasanjo, President of Nigeria (seated in the middle) in a demonstration of Telemedicine

Interacting with the PM of Mauritius at Apollo Hospitals Delhi
ATNF selected by Govt. of India for this MEGA PROJECT

Architecture of PAN-African e-Network

- A Satellite Hub station at a suitable location in Africa connected by submarine cable link to India.
- The network operates in C-Band with INTELSAT-904/RASCOM satellite.
- 10 Super Speciality Hospitals & 5 University centers.
- One Tele-Education terminal (Learning Center), One Tele-Medicine terminal (Patient End) and One VIP communication node for Head of State in each Participant country.
- Tele-Medicine and Tele-Education Hubs from India with INSAT/EDUSAT shall be connected to the Hub in Africa by submarine cable link.
Harnessing the power of Telemedicine

To Harness the unlimited power of Information Technology to provide world class medical knowledge & expertise to the global citizen.

The New Millennium

Extending Beyond National Boundaries

Global Destination For Quality Health Care