

Department of Cardiology, Bombay Hospital Institute of Medical Sciences

INTRODUCTION

The legacy of Bombay Hospital commenced since the day the great Bharat Ratna Sardar Vallabhbhai Patel and then home minister of the new Indian Republic inaugurated this prestigious institute in 1951. The sole motto of the Bombay Hospital has been to provide the best quality care at affordable price. The Bombay Hospital Moto is based on Gandhian thoughts.

“A patient is the most important person in our hospital. He is not an interruption to our work; he is the purpose of it. He is not an outsider in our hospital; he is a part of it. We are not doing a favour by serving him; he is doing us a favour by giving us an opportunity to do so.”

Initially, Bombay Hospital started with 200 beds in the old wing of Bombay Hospital. Later creation of the Medical Research Center in the early 1970s was followed by the opening of the New Wing in 1991 under the dynamic leadership of Chairman Shri BK Taparia. With this Bombay Hospital became the largest non-government Hospital in Mumbai.

CARDIOLOGY IN ANCIENT INDIA

India has a heritage of knowledge regarding human biology dating back to 8000 BC i.e. Vedic era. Ayurveda came into existence around 5000 BC. Ayurveda means AYUR (means Longevity) plus Veda (means knowledge). Around 600 BC two great Indian scholars Sushrut Rishi (Sushrut Sanhita) and Charak Rishi (Charak Sanhita) very well described human anatomy and physiology. We see the description of diabetes, atherosclerosis, angina (which was labeled as Hritshool). The heart was described as prime mover of “Prana” or impervious energy. The heart being the center of the system transmits energy through different “Nadis” or channels, which were later on described as “Siras” or veins, and “Dhamanis or arteries.” Yoga and transcendental meditation, a lifestyle approach combined with dietary modification, and various Asana were very well known to ancient Indians’.

MODERN CLINICAL CARDIOLOGY PIONEERS

“Listen to your patient, He is telling you the diagnosis”
– William Osler.

Bombay Hospital set department of Cardiology under the supervision of Dr. Rustom Jal Vakil, Dr. RC Hansoti,

Anil Sharma

Department of Cardiology, Bombay Hospital, Mumbai, Maharashtra, India

Corresponding Author:

Dr. Anil Sharma, Department of Cardiology, Bombay Hospital, Mumbai, Maharashtra, India.

E-mail: dranilheart@yahoo.co.in

Dr. Nattubhai Shah and Dr. KK Datey [Figure 1]. Department of Cardiothoracic surgery was set by Dr. P Sen, Dr. Billimoria and Dr. Nimish Shah in 1956. At that time Bombay Hospital cardiology department was still in its infancy and it was limited to bedside cardiology i.e. detailed medical history taking, physical examination, hearing heart sounds/murmurs. Only investigations available were ECG and Chest X-ray.

In the early 1950s, the concept of acute coronary syndrome was at its infancy. Treatment meant bed rest, sublingual nitroglycerin and control of BP with Rauwolfia Serpentina [normal limit of blood pressure was 180/110. The late 50s made some headway in the successful treatment of hypertension after introduction of Thiazide diuretics in a multi-center study for diastolic hypertension in the hope of reduction of CV events such as Myocardial Infarction, stroke, and cardiac failure. But till the 1990s isolated systolic hypertension was considered untreatable till SHEP study which showed simple regimen of addition of atenolol and chlorthalidone. Then, came the era of SPRINT study and ACCORD study in the 21st century resulted in new target BP of 130/80. There was no Cathlab, no angiography, no echocardiography, no Coronary care unit in the 1950s. Later on, cardiac ICU was established in 1963. Thrombolytic therapy came into usage in the 1980s for the treatment of acute myocardial infarction, later Primary Angioplasty in Myocardial Infarction (PAMI) followed by pharmaco-invasive therapy became standard treatment in the 21st century. As a golden rule we prefer to finish PAMI before admission formalities are over.

PIONEERS OF CARDIAC INTERVENTION

The first open-heart surgery in private sector was done in Bombay Hospital of closure of ASD by Dr. Nimish Shah. In those days back in 1966 Dr. Nimish Shah had developed Dog

Lab at Bombay Hospital and investigated his own patients by cardiac angiographies. Till 1975 cardiac angiography were performed by surgeons using X-ray equipment, image intensifiers, and using only Cut films. Dr. AC Pereira was appointed in 1975 to establish dedicated invasive cardiology department at Bombay Hospital [Figure 2]. The first coronary angiography using contemporary equipment was done in December 1978 in the newly installed Cath lab and later on, its use was expanded for procedures such as temporary and permanent pacemakers in 1979 and balloon valvotomies in 1985. The use of catheters successfully for cardiac catheterization involved many challenges in the early era right from proper selection of accurate shape and size to reach the coronary arteries to perform selective coronary angiography as well cardiac catheterization. Initial work involved shaping guide catheters and comparing those shapes to radiographs of the ascending aorta to determine if the shape appears promising. If not, it involved re-shaping of catheters using hot water and heat fixation to permanently shape the catheter. It helped to specifically shape and match the size and shape of the aorta

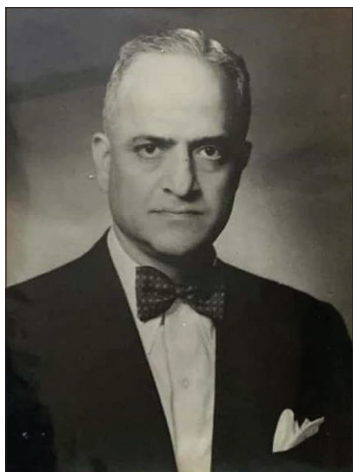


Figure 1: Pioneer Dr. K. K. Datey



Figure 2: Dr. A. C. Pereira (extreme left) discussing the new equipments of the Cath Lab

of the subject. Although it was time-consuming procedure, it helped in the successful completion of cardiac catheterization with very limited accessories. The angiography was recorded in film which could be seen on a Projector (Tagarno). There were no CDs available those days. Later on, a second Cath lab was installed; one for Cardiology and other was dedicated for Interventional Radiology/Neurology.

The first PTCA was performed in October 1988 after the international summit in cardiology took place in collaboration with Mayo clinic. Plain old balloon angioplasty (POBA) (Therapeutic) interventions increased in 1990s. POBA carried the risk of sudden artery closure for which sometimes the patient needed urgent CABG by Dr. DS Saxena/Dr. S Bhattacharya/Dr. SD Kole/Dr. YC Agnihorti/Dr. Anirudhh Trivedi/Dr. CA Somaya/Dr. Rajendra Umbarkar/Dr. Chokhani. We have a strong team of anesthetics under the headship of Dr. Pradnya Kulkarni. Special thanks to the anesthesia department for their prompt availability during tough interventional procedures. In the late 1990s with the introduction of bare metal coronary stents, acute vessel closure problem was solved but in-stent restenosis was a problem in upto 20% of procedures. In 2003 the development of Drug Eluting Stents in basket, in-stent restenosis rate was reduced to <5% and the procedure started increasing at galloping speed.

After 1992, further expanded to many structural interventions like ASD/PDA closure by device, Balloon Valvotomies, and electrophysiology study. Dr. Rajiv Karnik was Electrophysiology expert.

Till date, more than 85,000 procedures of coronary angiographies and cardiac catheterization combined had been performed at Bombay Hospital. Furthermore, more than 22,000 coronary interventions and more than 2500 structural interventions were done successfully.

EVOLUTION OF THE INTERVENTIONAL ERA

In the 1980s hospital was strengthened in by joining of Dr. Eric Damian Borges who is amongst the finest cardiologist in the city and is known for offering excellent patient care. He is an alumnus of the TN Medical College and a recipient of 13 prizes and gold medals in his career. He is also associated as a cardiologist in Mauritius and Tanzania at hospitals which have collaboration with Bombay Hospital. Dr. Kalyan Halasyam Ayyer joined Bombay Hospital immediately after getting his DM Cardiology degree from the University of Mumbai as a Gold medallist in 1981. Dr. Kalyan Ayyer who is one of the excellent clinical cardiologists. Dr. KH Ayyer is very popular among resident doctors for his interpretation of ECG/Echo and analytic approach depending on history and physical examination. Dr. KH Ayer published a book on clinical echocardiography jointly with Dr. RC Hansoti and Dr. Satyavan Sharma in 1985. Dr. P. L. Tiwari also joined in the 1980s. In the 1980s cardiology was limited to clinical cardiology, ICU care, echocardiography and diagnostic coronary angiography/ cardiac catheterization, Balloon Valvotomy only.

Padma Vibhusion Dr. B. K. Goyal who joined Bombay Hospital in the late 60s after completion of MRCP from the U.K took cardiology department to new heights [Figure 3]. In his initial two decades, he had to give significant time to JJ Hospital where he was professor and head and director of Cardiology. But after retirement from JJ Hospital in 1990, he became Professor and Head, Director of Interventional Cardiology and Dean at Bombay Hospital Institute of medical sciences which actually was the result of his persistent, enormous and dedicated hard work. He was an Honorary Consultant Cardiologist at Houston USA and visiting Professor of cardiology at the University of Alabama, USA. He was chairman of the Haffkins Institute.

Cardiological Society of India came into existence on 4th April 1948 by the immense effort of the great leader Bharatratna Dr. Bidhan Chandra Roy. Dr. B. K. Goyal was the youngest president of the Association of physicians of India, the youngest president of Cardiological Society of India, He was cardiologist to the six presidents in a row, what a more you can expect from a cardiologist, he was an outstanding teacher, medical educationist, very dedicated doctor towards the welfare of his patients and he was the man mainly involved in the development of Bombay Hospital Institute of Medical Sciences with the kind cooperation of Bombay Hospital management. Bombay Hospital is probably the only non-government postgraduate medical institute in India. He was one of the few operators who did more than 10,000 Percutaneous Transluminal Coronary Angioplasty and more than 25,000 Coronary Angiography and other procedures. In the initial years Dr. Hansmukh Ravat and later Dr. Sudheer Vaishnav played an important role in the success story of Dr. BK Goyal who was the first professor and head department of Cardiology Bombay Hospital [Figure 4].

In 1992 Dr. Satyavan Sharma joined Bombay hospital after taking voluntary retirement from Nair Hospital where he



Figure 3: Dr. B. K. Goyal receiving Padma Vibhushan by HE Shri APJ Abdul Kalam President of India

retired as a professor and head department of cardiology. He is an outstanding teacher with a keen interest in academics, clinical science, and interventions. He has received many prestigious awards. He is a legendary teacher and one of the finest clinicians. His knowledge in cardiology is par excellence and he is one of the few very popular teachers in cardiology. He has a large number of publications to his credit. He served as President of CSI. Dr. Satyavan Sharma headed the cardiology department till 2019 [Figure 5].

In 1997 Dr. Anil Kumar joined Bombay Hospital after playing a long innings at Sir JJ Hospital as Professor. He also strengthened the academic activities at Bombay Hospital. Dr. Kirti Punamiya also joined Bombay hospital for a few years in the late 1990s.

We have a team of Interventional Radiologist Dr. Kranthikumar Rathod, International Neurologist Dr. Rakesh Singh, Dr. Dhaval Modi and Dr. Sharad Ghatge.

TRANSFORMATION INTO ACADEMIC INSTITUTE (BHIMS)

“You will never change your life until you step out of your comfort zone” - Roy T Bennett.

In 1990 there was one seat for DM cardiology at Bombay Hospital the only postgraduate teaching Hospital in private



Figure 4: Dr. B. K. Goyal doing Angioplasty with Dr. Ramesh Kavar, Dr. B. C. Kalmath and Dr. Anil Sharma

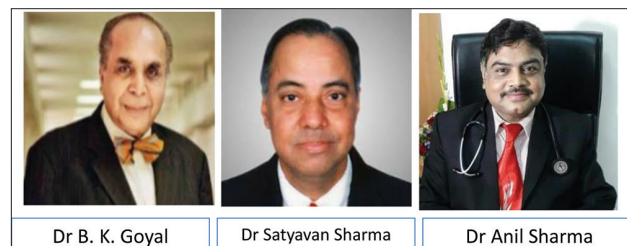


Figure 5: Head of the department

set up in India, now we have 2 DM cardiology seats per year. Apart from DM cardiology, we have a fellowship in interventional cardiology and there was PGDCC a certificate course that was recognized by Indra Gandhi Open University. In earlier days we had both DNB and DM cardiology courses at Bombay Hospital Institute of Medical Sciences.

In the 1990s, three more doctors joined the Department of Cardiology as DM Cardiology Resident Doctors under Dr. BK Goyal, i.e., Dr. Ramesh Kawar, Dr. BC Kalmath, and Dr. Anil Sharma. Later all three were appointed as consultants and contributed significantly in the development of Cardiology at Bombay Hospital to Greater heights. Both Dr. Ramesh Kawar and Dr. B. C. Kalmath got the Gold Medal in DM Cardiology examination and both are presently working as Associate Professor. Dr. Ramesh Kawar is known for his keen interest in performing complex coronary lesions like left main and CTOs. Dr. BC Kalmath is an outstanding operator for coronary as well as non coronary interventions and also he is known for his communication skills.

At present Dr. Anil Sharma is Professor and Head Department of cardiology at Bombay Hospital since August 2019. He is one of the few Indian cardiologists who did Advanced Fellowship in Complex Angioplasty from Italy and confirmed honorary Doctor of Science by D. Y. Patil University [Figure 6]. Dr. Anil Sharma works on the principle of A, B, C which means A – Availability, B – Behavior, and C – Competence. He also assesses R, B, C of the patient which means R – Risk, B – Benefit, and C – Cost every time before any procedure. Although Dr. Anil Sharma's skills for doing complex intervention are unparalleled, he is well known for Cardio-mythology, that is, the involvement of patient in decision-making with total transparency with full explanation of modifiable/non-modifiable risk factors and lifestyle modification. 'First, do no harm'. Dr. Anil Sharma conducted the MOCK examination and MUHS examination for DM Cardiology students under the guidance of Shri. B. K. Taparia



Figure 6: Dr. Anil Sharma conferred honorary Doctor of Science degree by Dr. D. Y. Patil University by Governor

(Chairman), Dr. R. V. Patil (Director) and Dr. S. V. Khadilkar (Dean) [Figures 7-9].



Figure 7: DM Mock Exam final year 2021 (from L to R sitting: Dr. Nagesh Waghmare, Dr. B. C. Kalmath, Dr. E. D. Borges, Dr. Satyavan Sharma, Dr. Anil Sharma and Dr. Sameer Pagad with Resident students standing behind Dr. Anushree, Dr. Shankar, Dr. Akash, Dr. Gunjan and Dr. Vishal)



Figure 8: DM Mock Exam 2nd year 2021 Dr. Satyavan Sharma, Dr. Anil Sharma and Dr. Sameer Pagad taking practical exam of resident doctors Dr. Akshay Kashid and Dr. Vishal Patil



Figure 9: DM MUHS Final Practical Exam 2021 conducted by Dr. Anil Sharma and Dr. Ramesh Kawar with external examiners

Dr. Ajay Chaurasia [Figure 10] is also the consultant working in Bombay Hospital who has a vast experience and he is also head of the department in T. N. Medical college, Nair Hospital.

In the past couple of years, two other cardiologists joined Bombay Hospital at Bombay. Dr. Sameer Pagad who initially joined as a student of fellowship program, later on joined as a consultant and Assistant Professor, and Dr. Nagesh Waghmare who joined as Consultant Cardiologist and is also working as an associate professor at JJ Hospital Mumbai. Both of them are emerging as leaders in the field of non-invasive and invasive cardiology.

At Bombay Hospital we have two states of art catheterization laboratory machines with the latest digital technology. We are doing all varieties of complex procedures at Bombay Hospital, Mumbai, which includes coronary and non-coronary work. We saw the evolution of cardiology at Bombay Hospital from the days when there was only ECG was available to M-Mode to 2-D Echo, Colour Doppler, TEE, 3-D echo, Intraoperative echo. We have witnessed the development of patient care in ward to intensive care coronary care unit. Started with a few angiogram initially done by cardiovascular surgeons and later cardiologists enter into that field and then as with the evolution of the plain angioplasty and later the stent in the 1990s, now we are doing the highest number of procedures in the whole Mumbai city in a non-government organization. We are using all the debulking devices such as rotational atherectomy, cutting balloon, scoring balloon, high-pressure balloon, and lithotripsy. We are using the imaging technique such as Intra Vascular Ultrasound (IVUS) and Optic Coherence Tomography (OCT). We have FFR for functional assessment of coronary lesions/blockage.

We are performing all types of Pacemakers, ICDs, CRTs. We are doing device closures for various congenital defects such as ASD, VSD, PDA. We are doing other interventional procedures such as valvotomies for valvular stenosis. Recently we started doing TAVR [Transcatheter Aortic Valve Replacement], leadless pacemaker, his bundle pacemaker, ECMO. We do Renal Stenting, Alcohol Septal Ablation for Hypertrophic Cardiomyopathy.



Figure 10: Dr. Ajay Chaurasia and Dr. Anil Sharma during DM Cardiology MUHS Exam 2021

BOMBAY HOSPITAL JOURNAL

Bombay Hospital Journal is an another milestone in the journey of BHIMS and the credit goes to earlier dean Dr. BK Goyal, Dr. S Jayram then Register Mr. PB Khandekar and medical director Dr. DP Vyas the editor Dr OP Kapoor. Credit for streamlining of the academic activities and modern digitalization fully goes to present dean Dr. SV Khadilkar and Director Dr. RV Patil under the dynamic leadership of Shri BK Taparia Chairman [Figures 11 and 12].

NON-INVASIVE CARDIOLOGY

Earlier cardiac interventions were done in the absence of 2D Echo. It was in 1975 that hospital established separate non-invasive department with 2D Echo limited to M-Mode only, developed by Dr. IJ Pinto. Furthermore, the Nuclear Medicine department was started in 1973 under incharge of Dr. BD Pimparkar.

2D Echo was introduced by Dr. KH Ayyer, Dr. ED Borges and Dr. BB Ichhaporia in the early 1980s. There was a significant change in 1987 when the first color



Figure 11: HE Governor Shri S. M. Krishna inaugurating Cardiology conference (from L to R) Chairman Shri B. K. Taparia, Dr. D. P. Vyas, HE Governor Shri S. M. Krishna, Dr. A. C. Pereira, Dr. B. K. Goyal and Dr. Satyavan Sharma



Figure 12: Dr. Pradeep Vyas IAS Principal Secretary Health inaugurating the World Heart Day conference (from L to R) Dr. Anil Sharma (HOD), Dr. Pradeep Vyas IAS, Shri Manoj Sharma IPS, Dr. R. V. Patil (Director), Dr. S. V. Khadilkar (Dean) and Dr. Bharat Bhatt (President GPA)

Doppler machine was brought in Bombay Hospital and Dr. RG Goyal was appointed as full-time echocardiographer. Various newer modalities were introduced gradually like Trans Esophageal Echocardiography in 1991, Dobutamine stress echo in 2007, 3D/4D in 2014 [Figures 13 and 14]. Single-channel Treadmill test was started in the 1980s. In 1984 12 channel TMT and Holter Monitoring was started which became digital in 1990. Presently Dr. Rajendra Goyal is head of the Echo department. Echo department was further strengthened by appointing Dr. Mohammed Taufiq as a consultant. Dr. Vruti Vaghela joined recently as clinical associate in echo department.

We have a fully functional CT and MRI department also at Bombay Hospital.

We have a very active physiotherapy department for perioperative and rehabilitation programs. We have a strong team of dieticians under the headship of Dr. GD Koppikar for lifestyle modification programs and also have qualified and trained sisters as well as technicians in Cath laboratory.

This reminds us of the old saying if you want to go fast go alone and if you want to go far go together [Figures 15 and 16].

SUMMARY

We have witnessed the evolution of cardiology at Bombay Hospital from the basic bedside cardiology to the use of advanced technology for diagnosis and therapy (plumber [opening the obstruction/blocks and closing the holes] and electricians):

- From 12 lead ECG to remote monitoring/advance electro physiological study
- From M-Mode Echo to TEE/3D Echo
- From coronary angiography recording on film to be viewed on Tagarno to advanced digital CD recordings with full anatomical and physiological assessment of CAD by IVUS/OCT/FFR and patient data storage for future patient's treatment
- Bedside monitoring to advance digital coronary care unit
- Bed rest to complex interventions for care of various diseases.

All the consultants in the department of cardiology are excellent teachers and keen in overall development of the fellows and resident doctors. The pride of the cardiology



Figure 13: Inauguration of Indian Academy of Echocardiography Conference 1996 (from L to R) Dr. Satyavan Sharma, Dr. R. G. Goyal, Dr. B. K. Goyal and Dr. K. Parashar



Figure 15: (from L to R) Dr. Anil Sharma, Dr. K. H. Ayer, Dr. Satyavan Sharma, Dr. E. D. Borges and Dr. A. C. Pereira on the retirement day of Mr Rameshan (Stenographer) Cath Lab



Figure 14: 3D Echo Update 2020



Figure 16: Dr. A. C. Pereira and Dr. Anil Sharma seen with others in Cath Lab

department is the fellows/resident doctors passing out from BH, who is doing very well and raising the flag of Bombay Hospital all over the world.

FUTURE OF CARDIOLOGY

Assessments of polygenic risk scores would play a huge role in primordial prevention extending back even into the prenatal period. Assessments of accelerate atherosclerosis by measuring Clonal Hematopoiesis of Independent Potential may be an important milestone. Control of atherogenesis would include editing PCSK9 by genetic engineering, using drugs such as inclisiran, antiinflammatory drugs such as Colchicine, Canakinumab, Methotrexate and Ziltivekimab Use of artificial engineering enabled ECG algorithm during sinus rhythm to predict future Atrial Fibrillation/LV Dysfunction would be another big milestone.

Today's cardiology is focused on recognizing and managing established disease with drug and device. The principal role of future cardiologist would be to interpret and apply genetic information/engineering and artificial intelligence in prevention, diagnosis, and treatment. We are moving from organ to tissue to cell to molecule.

"We cannot become what we want by Remaining what we are"- Max Depree.

THANKS to Dr. AC Pereira, Dr. KH Ayyer, Dr. Anil Kumar, Dr. RG Goyal, Dr. Akshay Kashid, Dr. Anushree Kumbhalkar and Miss Archana Mayekar.

How to cite this article: Sharma A. Department of Cardiology, Bombay Hospital Institute of Medical Sciences. Bombay Hosp J 2022;64(1):1-7.

Source of support: Nil, **Conflicts of interest:** None

This work is licensed under a Creative Commons Attribution 4.0 International License. The images or other third party material in this article are included in the article's Creative Commons license, unless indicated otherwise in the credit line; if the material is not included under the Creative Commons license, users will need to obtain permission from the license holder to reproduce the material. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/> © Sharma A. 2022.