

CARDIAC SURGERY



The original cardiac surgeons of Pakistan when the PSCVTS was established at Peshawar in 1991

History of Cardiac Surgery in Pakistan

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INTRODUCTION

Nations who aspire to stand out remember the names of their heroes with great reverence and affection. They are the ones who set examples and become the source of inspiration for many, opening the doors to new horizons, leading to even higher levels of perfection, motivated by the passion to serve. By documenting the history of cardiac surgery in Pakistan we have tried to pay tribute to the leaders of our profession so that the coming generations remain indebted to and feel pride in the great services of those professionals devoted to the people of our country. Performing cardiac surgery many decades ago would have been a daunting task as the technology was primitive, resources scarce and surgery a social taboo. These valiant surgeons accepted those challenges and due to their professionalism, commitment and ultimate sense of responsibility, remained triumphant. Their contributions will always be remembered and will inspire young professionals to achieve excellence. The timeline of the events proves that their successors have kept the beacon alive by standing on the shoulders of giants.

As we turn the pages of history of cardiac surgery in Pakistan, we find the swift spread and rapid progress of the specialty in the country, and it becomes evident that the surgeons and allied professionals of the country were

bold enough to exploit the benefits of new and rapidly advancing technology that was not free of challenges. Their motivation was to provide benefits of the surgical advancement to their countrymen in need, as soon as they deemed possible. They indeed paved the way for further progress of cardiac surgery in Pakistan.

BEGINNING OF CARDIAC SURGERY

Story at the Birth of Pakistan

When on 14th August 1947 Pakistan emerged on the world map, cardiac surgery was still in its infancy. A limited number of extra-cardiac surgical procedures were performed in the USA and Europe, mainly for congenital heart ailments like patent ductus arteriosus (PDA) ligation and correction of coarctation of the aorta. The Blalock Taussig shunt introduced in 1944 was gaining popularity.¹ The only intracardiac operation done somewhat regularly was a closed mitral commissurotomy to open a stenosed mitral valve. Many surgeons worked hard to make intra-cardiac surgery possible. **Clarence Walton Lillehei** (the father of open heart surgery) with a cross circulation technique progressed to repair atrial and ventricular septal defects.² However, the real breakthrough came when after working tirelessly for 23 years, **John H. Gibbon** in 1955 succeeded in introducing a heart lung machine (cardiopulmonary bypass machine) which could take over the functions of the

heart and lungs during surgery, allowing surgeons to work on and inside the heart.³ Thus a new era of open heart surgery began. With the help of the heart lung machine, the repair of simple and complex abnormalities inside and outside the heart became possible, and the last organ of the human body thought to be inoperable and untouchable at one time, finally became accessible to surgeons.

In Pakistan, the earliest reports of heart surgeries can be traced back to the 1950s, just a few years after the country's inception, when a few extra-cardiac procedures like mitral valvotomies, patent ductus arteriosus ligations, coarctation of aorta and mitral commissurotomies were being performed in Karachi, Lahore and Rawalpindi. Although formal records of these are not available, cardiologists and cardiac surgeons from that era unanimously agree that even when facilities were primitive and paramedical support was minimal, such procedures were being sporadically performed. For example we are told by senior cardiac surgeons that at Mayo Hospital Lahore, **Professor Masood**, a general surgeon, performed closed heart surgery in 1958.

Cardiac Surgery in Karachi

The story begins with Afshan Zafar, a baby girl born to Mr and Mrs Zafar, with a congenital heart defect, causing her to look blue due to the lack of oxygen in her blood. Afshan, a 'blue baby', was unable to play and was becoming weak. Mr Zafar was told that treatment was not available for his daughter. One day in 1961 he came across a report on the surgical treatment of blue babies in the *Signs of the Times* magazine. The report described that the White Memorial Hospital of Loma Linda University in Los Angeles, USA had successfully treated blue babies. Afshan's father promptly wrote to the editor of the magazine, 'seeking advice, guidance and help' for his 'lovely doll'. The editor passed on the letter to the heart surgery team at Loma Linda University (a Christ-centered Seventh-day Adventist University Hospital) who in turn wrote back to Mr Zafar instructing him to take his daughter to the Seventh Day Adventist Hospital in Karachi. Following the advice, Mr Zafar took his daughter to the hospital, where she was examined and heart surgery was advised. Unfortunately, the surgery was only available in Great Britain or the USA at an unaffordable price. Mr Zafar, a humble factory worker, determined to save his daughter, launched a campaign with the help of his co-workers, to raise funds to go to USA. The surgery team at the White Memorial Hospital had also agreed to provide treatment without charges. Transportation to the USA however was expensive. He contacted the US Embassy in Karachi for help. This was the time when the American

administration of President John F. Kennedy was trying to improve relations with Pakistan. A visit to Pakistan by the Vice-President Lyndon B. Johnson subsequently led to authorization of the US Military Air Transport Service to fly the Pakistani father and daughter to California. On 1st October, 1962, **Woolley and Ellsworth E. Wareham** (1) performed a successful five-hour heart surgery on Afshan Zafar. The publicity of Afshan's successful treatment by the local press, raised the hopes of 'blue baby' parents who stormed the Seventh Day Adventist Hospital in Karachi and the US Embassy, demanding treatment for their babies. Lyndon B. Johnson's office took notice and asked Afshan Zafar's cardiac surgeon, Ellsworth E. Wareham, to travel to Karachi to perform surgeries. The good surgeon replied, "If you pay our way, and for heavy equipment, we'll go."

On 2nd May, 1963 a team of 6 people landed in Karachi with a heart lung machine – the White Memorial Hospital's only heart-lung machine.^{4,5,6,7} **Ellsworth E. Wareham** (a surgeon) and **Coggin** (a cardiologist) at the Seventh Day Adventist Hospital, Karachi began screening patients, some of whom had travelled as many as 1,500 miles. The other four members of the team were **Wilfred M. Huse**, a surgeon, **F. Lynn Artress**, an anaesthesiologist, **Lester H. Gibson**, the heart-lung-machine technician, and **Lavaun W. Sutton**, RN, a specialist nurse, who started training the local nurses in techniques of cardiac post-operative care.

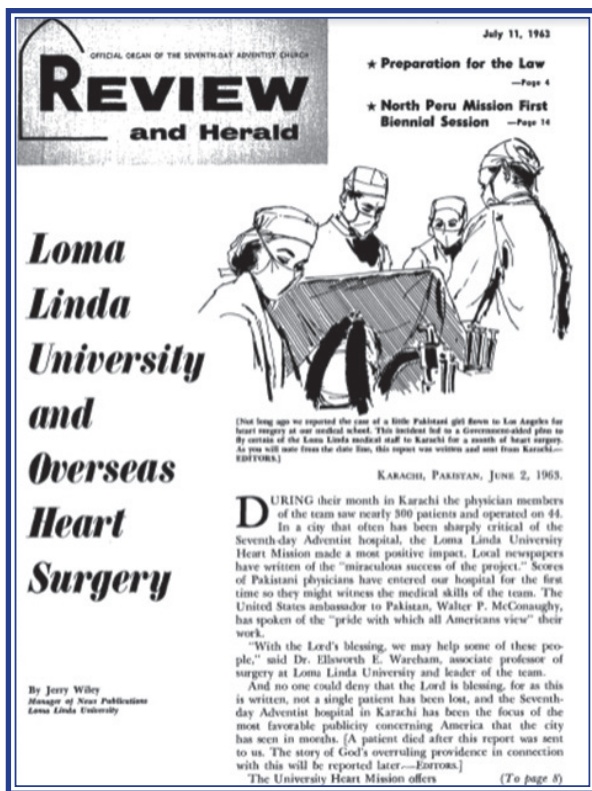


1-Ellsworth E. Wareham, MD, (1914 – 2018)

On 8th May, 1963 the first operation, a closed heart procedure was done on Jamil Shahid and the very next day on 9th May, 1963 the first open heart surgery in Pakistan was performed on the nine-year-old Anwer Zaidi, for an atrial septal defect. In 22 days, the team saw a total of 300 patients, and performed 44 surgeries, working 16 to 20 hours a day. They reported one mortality. President Mohammad Ayub Khan helped one of the patients from East Pakistan by providing military air transport. At the

time, Wareham recalled, "(Pakistani) Muslims didn't want to give blood. They equated it with the same thing as sacrificial blood-letting. But we got military people from the US embassy. We took this machine and primed it with blood and used the same blood on the patient in the morning and in the afternoon if they were the same blood types. First time I'd ever heard that done. That's the way we got started." Several government and non-government bodies united to provide assistance for the surgeries. The six to twelve pints of blood required for each surgery was donated by the All Pakistan Women's Association, and the Jamshed Lions Club. Moreover, prisoners in Karachi Jail were offered 15 days grace in their sentence for donating a pint of blood.

The visit by the Loma Linda University team (2) not only marked the first open heart surgery in Pakistan, but also the formation of the first overseas cardiac surgery team which later performed surgeries in many other countries in Asia and Africa.



2-The Loma Linda overseas heart surgery team report

NATIONAL INSTITUTE OF CARDIOVASCULAR DISEASES, KARACHI (NICVD)

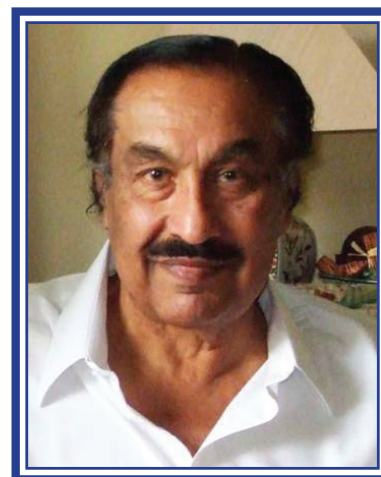
Dr Ali Muhammad Kasim, a physician and cardiologist trained in the UK and USA, returned to Pakistan in 1948.

He was concerned about the future of cardiology in a nascent country. He joined the Jinnah Central Hospital (later Jinnah Postgraduate Medical Centre) in Karachi. With his endeavours and exceptional vision of growth, funds were collected from foreign organizations and personal contacts. It was his dream come true when the foundation stone of the National Institute of Cardiovascular Diseases (NICVD) was laid by the President of Pakistan in 1963. Unfortunately, he did not live to see the outcome of the seed he had sown as he died a year later, in 1964. He was posthumously appointed the first director of NICVD (1963-64).

With support from the Government of Pakistan, USAID (US Agency for International Development) and the Japanese Government, NICVD became a fully functional tertiary care cardiac facility on 14th August 1971. NICVD played a major role in providing treatment, training and development of cardiology and cardiac surgery in Pakistan. In adult cardiology, **Drs Shaukat Ali Syed, Mohammad Shareef, Abdul Samad, Syed Aslam, Azhar M Farooqui, Abdul Haq Khan, Mohammad Ishaq, Khan Shah Zaman, Zia Yaqoob** and in pediatric cardiology **Dr Kaleemuddin Aziz** and many others worked beyond their call of duty to provide the best care to patients seeking help from all across the country.

In cardiac surgery **Drs Abdul Ghaffar Jatoi (3), Mohammad Rehman (4), Aziz Jamal Naqvi, Akhter Hussain, Arif-ur-Rehman, Fazal-e-Rabbi**, and other surgeons took responsibility of treating scores of patients queueing up every day in a very busy outpatient department. Today the NICVD treats a record number of patients in the main hospital and also in the satellite centres in all the major cities of Sindh. **Dr Sohail Bangash** provided surgical care for children with congenital heart diseases.

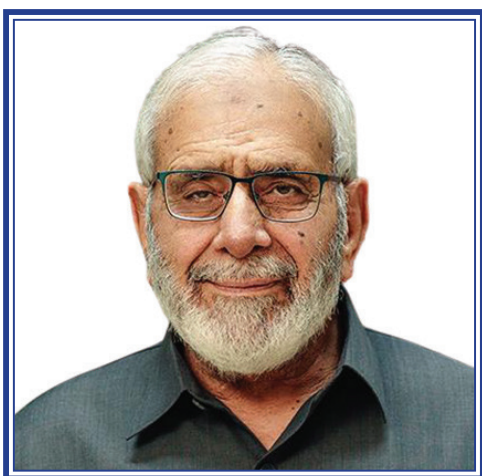
Dr Abdul Ghaffar Jatoi



3-Dr Abdul Ghaffar Jatoi

A renowned cardiac surgeon, was born on July 28, 1938 in New Jatoi in the Naushahro Feroze district of Sindh. He graduated from Liaquat Medical College, Jamshoro, where he received his MBBS in 1961, securing first position in Sindh. He did his cardiac surgery training in England and after obtaining a fellowship (FRCS), went to Texas where he was trained with the famous heart surgeon, **Dr Denton Cooley**. He returned to Pakistan and joined the NICVD in 1971-2 as chief of cardiac surgery. His contributions in the field of cardiac surgery can never be forgotten.^{8,9} In June 1972, he performed the first successful open heart surgery, an ASD closure, at the NICVD. This was also the first procedure in Karachi (but not in Pakistan) done by an indigenous team led by **Dr Jatoi** with anaesthetist **Dr Col. Rehman**, **Dr Faiz-ur-Rehman** and perfusionists **Abdul Haq Khan** and **Syed Nusrat Rizvi**. Incidentally, the same patient was admitted 35 years later at the Aga Khan University hospital in 2007, for mitral valve replacement. At surgery, the patient's previous ASD repair was sound. The first open heart valve replacement at the NICVD was also performed by Dr Jatoi and his team in October 1972. A 46 year old man had mitral valve incompetence. A ball and cage valve was donated by the Rotary Club for surgery. (Aortic cross clamp time: 41 minutes; pump time: 69 mints; hypothermia: 28 °C.) Dr Jatoi left the NICVD and established his own Mid-East Hospital in Karachi.

Dr Muhammad Rehman



4-Prof Rehman

Born on 5th January 1944, is among the pioneers of cardiac surgery. He hails from a remote village near Peshawar. Dr Rehman obtained his MBBS degree from the Khyber Medical College. He completed his training in cardiothoracic surgery in 1975 from the Royal College of Surgeons of Edinburgh. He was considered the leading cardiothoracic surgeon in Pakistan.¹⁰ His experience

in the field of cardiac surgery started in July 1974 as a registrar in cardiothoracic surgery at The London Chest Hospital. In January 1975 he moved on to work as a registrar in Brompton Hospital, London. He then decided to move back to Pakistan and started working in the NICVD as consultant cardiac surgeon in August 1977. He remained the Head of the Cardiac Surgery Department in the NICVD and served his department for 28 years, retiring as Professor of Cardiac Surgery in January 2004. While working at the NICVD, Professor Rehman had remained the Dean of the Faculty of Cardiac Surgery in the College of Physicians & Surgeons, Pakistan (CPSP), and also served as the President of the Pakistan Society of Cardiovascular and Thoracic Surgeons (PSCVTS). He was the patron of the "Friends of Cardiac Surgery", a non-profit organization supporting the Cardiac Unit at the Civil Hospital, Karachi. He is also the founding editor of the *Journal of Cardiovascular and Thoracic Surgeons*.

In 1991 he established the Pakistan Society of Cardiovascular and Thoracic Surgeons and organized three international symposiums on cardiovascular surgery and several academic events in all the major cities of Pakistan. In 1990, Professor Rehman along with other senior surgeons of Pakistan organized a Fellowship in Cardiac Surgery from the College of Physicians and Surgeons, Pakistan (FCPS). They formulated the syllabus for formal training of cardiac surgery leading to the exit examination. Before retiring from the NICVD, he had trained 21 FCPS cardiac surgeons and two surgeons with Master's of Surgery (MS) from the University of Karachi. **Dr Arif-ur-Rehman**, **Dr Abdul Bari Khan** (Indus Hospital), and many other notable surgeons were trained by him. He also helped in the setting up of four new Cardiac Centres for all the four provinces of Pakistan including Civil Hospital, Karachi; Civil Hospital, Quetta; Nishtar Hospital, Multan; and Ayub Medical Complex, Abbottabad.

Before retiring from NICVD, Professor Rehman established a modern state of the art hospital, the Rehman Medical Institute (RMI), in his hometown Peshawar, purely from his own resources. Later, Rehman Medical College and a nursing school was attached to RMI. In recognition of his services in the field of Cardiac Surgery, the President of Pakistan awarded him the "Sitara-e-Imtiaz" (Star of Excellence) in 2002, one of the highest civilian awards.

Dr Aziz Jamal Naqvi is a very well regarded cardiac surgeon whose endeavours are worth mentioning. He was trained in surgery in the UK and then returned to Pakistan, joining the NICVD. There he fortified the surgery unit, performed complex surgeries and trained many surgeons. He was also instrumental in opening a cardiac unit at the Liaquat National Hospital in Karachi. Until the mid-1990's, Karachi had the NICVD as its major cardiac

surgery centre. Dr Rehman initiated cardiac surgery in a private hospital, the Orthopaedic and Medical Institute, and later at Mid-East Hospital. **Dr AJ Naqvi** and **Dr Sulaiman B Hasan** also started cardiac surgery at Liaquat National Hospital. **Dr Rehman** and later **Dr Tariq Sherani** established cardiac surgery at Ziauddin Hospital.

Cardiothoracic Surgery at the Aga Khan University Hospital Karachi (AKUH)



5-Dr Sohaila Mohsin with Dr Muneer Amanullah and her Operative team at AKUH from AKUH Archives

Dr Sohaila Mohsin Ali (5), an exceptional lady, trained at Baltimore, the first female cardiothoracic surgeon of Pakistan, was responsible for starting cardiac surgery at AKUH. She operated upon a large number of thoracic cases and also performed extra-cardiac operations for congenital anomalies. She performed the first coronary artery bypass surgery (CABG) at AKUH in 1994. **Dr Rehana Kamal** was the anaesthetist and **Mr Nusrat Rizvi** was the perfusionist. This initiated the cardiac surgery programme at AKUH. Dr Sohaila Ali later left Pakistan and went to the USA. Dr Sulaiman B Hasan was appointed as an honorary consultant in 1991 shortly after residency but he became a full timer from 1995 till 1999 after which he left for the USA and then returned in 2014, and was here till 2017. He did several remarkable projects like quality control, collection of data, increasing use of the internal mammary artery, preserving the pulmonary annulus in Tetralogy of Fallot patients, aortic surgeries, tracheal surgeries and Mustard procedures, but moved to the USA in 1999.

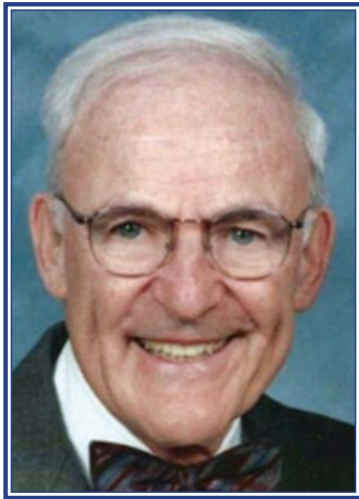
In 1998 Dr Shahid A Sami, an accredited cardiothoracic surgeon trained in the UK, joined AKUH. He paid particular attention to quality control, cost cutting measures, capacity building and manpower training. He made a database for all the adult cardiac surgery patients

and published results of cardiac surgery. He treated a large number of patients with low ejection fraction (weak hearts) due to coronary artery disease (with or without renal failure) and performed redo coronary bypass surgery and surgery for pathologies of the aorta, as well as introducing many new procedures. In 1998, AKUH started a primary angioplasty programme with round the clock cardiac surgery back-up cover; at that time only a few hospitals in the region had such a programme. Dr Sami also helped in establishment of Tabba Heart Institute and South City Hospital in Karachi and cardiac unit at the Aga Khan Hospital, Nairobi, Kenya. He received the prestigious national honour 'Sitara-e-Imtiaz' in 2019 for his services to medicine.

Dr Saulat Fatimi, an alumnus of AKUH, trained in the USA in cardiothoracic surgery, joining AKUH in 1999. He gave strength to a busy cardiothoracic unit by performing adult, paediatric cardiac and thoracic surgery. He excelled in video-assisted thoracic surgery and his tremendous zeal to treat patients; his limitless energy to train surgeons also brought many new ideas to training of cardiac surgery at AKUH. He developed and patented a heart simulator and initiated regular wet labs to enhance surgical training. The team at AKUH grew with the appointment of **Dr Hasanat Sharif**, a cardiothoracic surgeon trained in the UK and USA and a Rhode's scholar from Oxford University. The unit started a formal training programme and those trained here are now working all across Pakistan and abroad. **Dr Shahabuddin** (AKUH), an adult cardiac surgeon, and paediatric cardiac surgeons **Drs Muneer Amanullah** (Karachi), **Asim Khan** (Lahore) and **Mubashir Khan** (Peshawar), are all products of AKUH's residency programme. A large number of articles in the field of cardiothoracic surgery have been published in peer reviewed journals from AKUH, which is also the first hospital in Pakistan to receive the seal of approval of the Joint Commission International Accreditation (JCIA) in both clinical and academic aspects. The results of cardiac surgery in this unit also serve as bench-mark for the regional hospitals.

Today in Karachi there are a number of cardiac centres serving patients, with many cardiac surgeons. Besides cardiac surgery, some cardiac surgeons have diversified into other activities, among whom a notable name is **Dr Abdul Bari Khan** who was trained at the NICVD. He was instrumental in establishing a unit at Civil Hospital Karachi where **Dr Mudasir Daar** later joined. Dr Abdul Bari Khan is a philanthropist and then became CEO of Indus Hospital and Health Network and collected many accolades for his work including an Eisenhower Fellowship in 2004, Tamgha-e-Imtiaz in 2015 and Hilal-e-Imtiaz in 2019.

CARDIAC SURGERY IN LAHORE



6-Dr Donald E Bowes (1926 – 2013)

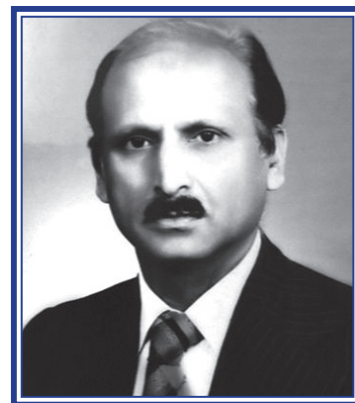
Dr Donald Bowes (6) was onboard the MV Britannic sailing east across the Atlantic from New York, on 28th November 1958, a day after thanksgiving. He was carrying his heavy equipment required for cardiac surgery and arrived in Liverpool, UK where he and his family stayed for a week and then left on another ship, the Caledonia, bound for Karachi. It arrived at its destination on 31st December 1958. He then took a train to reach Lahore in January 1959 and joined the United Christian Hospital, Lahore.⁴ Dr Bowes was born and trained in Canada, and later trained at the Mayo Clinic in the USA as a general and cardiothoracic surgeon. Pakistan was facing a tough year; Marshal-law was in place, earthquakes had caused immense destruction, there were financial hardships, and medicines were not available. In those early days, people were under the impression that if they donated or received blood, they would die, and Dr Bowes had to work hard to change this mindset. In 1960, the King Edward Medical College celebrated its 100th anniversary with an exhibition. **Dr Masood-ur-Rehman Kiani**, who was a first year medical student at that time, spotted Dr Bowes at the exhibition. He writes in his book *Kiani Kahani* (Kiani's story) that a particular stall at the exhibition was the centre of attraction where Dr Bowes was demonstrating the heart lung machine. The young Dr Kiani took special interest in the machine not knowing that a few years later he also would become a cardiac surgeon himself.

Dr Bowes performed his first closed heart surgery on Nausheen Andrews Khan; the operation was a success. The first open heart operation took months of preparation. Dr Bowes's wife, Mrs Grace Bowes, in an interview, recalled how wild dogs were used to practise cardiopulmonary bypasses. As the nurses were afraid of these dogs,

they often overdosed the dogs with anaesthetic agents making recovery difficult. Later, they switched to using baby goats for training. When all aspects of training of the cardiac surgery team were satisfactory, two siblings, a boy and a girl from Peshawar, were selected for the first open-heart surgery. Their parents laid the condition that if the daughter's surgery was successful, only then would they allow their son to be operated upon. Thankfully both the children survived. The first mitral valve replacement in Pakistan was performed on Zafar Rasheed, a 15 year old boy, on 17th February 1968 at United Christian Hospital (UCH), Lahore. A Teflon coated valve was used. Dr Bowes stayed in Pakistan for almost 15 years and carried out 300 successful cardiac cases besides numerous thoracic and general surgery procedures. He trained seven heart teams who later went on to make him proud in different parts of the world, such as the UK, USA, and Middle East. Being a board certified general surgeon, he also trained many general surgeons. He went back to the USA and continued his career as a surgeon until retirement. He died in 2013 at the age of 86. Dr Bowes' wife Grace Bowes was interviewed by the authors in October 2021. She gave insights of her family's stay in Lahore, and to this date cherishes their days spent in Pakistan. Dr Donald E. Bowes's name will always be remembered and written in the history of cardiac surgery in Pakistan.

Dr Aslam Cheema started heart surgery in or around the 1970s at Mayo Hospital Lahore. Dr Aslam Cheema soon left Pakistan and moved to the USA due to family reasons. 'Tall Cheema Sahib', as he was known, set up the first open heart theatre and ICU in Mayo Hospital and brought equipment from the USA. He left without having done open heart surgery in 1970 but donated the equipment to the Thendi Ward, being the only air conditioned ward in the hospital. Very little is known about his contribution to cardiac surgery in Lahore.

Dr Masood A. Cheema



7-Dr Masood A Cheema (1938-2019)

After graduating from King Edward Medical College in 1960, he joined the Pakistani Army as a general duty medical officer. Later he served as Surgeon in CMH Abbottabad, Murree and Muzaffarabad. Then he spent a year in Karachi for FCPS training. After clearing FCPS-I he was posted at Military Hospital, Rawalpindi, and got trained in general and thoracic surgery by **Lieutenant General Shaukat Hassan Malik** who was Brigadier at that time and made his mark as a thoracic surgeon.⁵ Lt. Gen. Shaukat Hassan Malik saw his surgical skills and arranged for him to go to the UK for training, funded by the Pakistani Army. He joined a course of the Royal College of Surgeons in 1971 and while he was studying, the East Pakistan war started, resulting in the separation of East Pakistan which later became Bangladesh. During this turmoil Dr Cheema (7) received a letter from the Pakistan High Commission that his salary in foreign exchange had been stopped. To sustain himself, he started working in a hospital and fortunately passed his fellowship examination (FRCS) the same year. He wrote back to Gen. Shaukat Hassan about his success who advised him to stay in the UK but on leave without pay and get trained as a cardiac surgeon, which he did. He returned back to Pakistan in 1973 as a trained cardiac surgeon and served in Military Hospital, Rawalpindi until 1977. During that period, he faced many hierarchical barriers and difficulties due to which he was unable to perform cardiac surgery. Feeling dejected he left the army and joined his alma mater King Edward Medical College and Mayo Hospital as an Assistant Professor in 1977, through public service commission. He faced difficulties as the cardiac surgery funding was scarce and support was dismal from the government. The acceptance and will to start cardiac surgery in a government hospital was lacking and on one occasion a government official told Dr Cheema that 'people are dying here due to scabies and you want to start cardiac surgery'. Against all the hardships and resistance, perseverance and hard work eventually paid off and Dr Cheema did his first open-heart surgery at Mayo Hospital, Lahore in 1978. He recalls in his book *Dil Rawaan Dawaan* that for his first surgery, blood was arranged from Karachi, and two medical supply companies, Interrex and ACP, provided instruments. Dr Abdul Haque went from Karachi to Lahore to run the heart lung machine under his supervision.

Dr Cheema excelled in adult and paediatric cardiac surgery. He went to Paris to learn mitral valve repair from the expert, **Dr Alain Carpentier**, and on his return adopted and modified the techniques of mitral valve repair to perform the procedure at the least expense. He trained many cardiac surgeons who later propagated his work, and a large number of cardiac surgeons working in Punjab directly or indirectly benefited by his training. The

Punjab Institute of Cardiology (PIC) was his brainchild and he envisioned it as a Centre of Excellence of Cardiac Surgery in Lahore. He joined the PIC in 1991 as Chief Cardiac surgeon. Dr Cheema retired from the PIC in 1998.

It was a difficult task to start cardiac surgery in Punjab. Dr Cheema recalls that when in September 1991 cardiac surgery started in the PIC, one young man was admitted who needed mitral valve repair or replacement. There were many patients waiting for surgery in the ward but he insisted that his operation should be done first. He was informed that his valve would be opened with a minor operation as it was very bad, but he refused to wait and committed suicide by jumping from the roof of the PIC.

Dr Cheema served as President of the Pakistan Society of Cardiovascular and Thoracic Surgeons and was also a President of the Association of Thoracic and Cardiovascular Surgeons of Asia. In recognition of his services Dr Cheema was appointed Professor Emeritus at the PIC in 2007. He was also appointed the Project Director of Chaudhry Pervaiz Elahi Institute of Cardiology, in Multan. His mission and vision helped the spread of cardiac surgery in the country, but particularly in Punjab. He died at the age of 81 years in 2019. His book *Dil Rawaan Dawaan* is an inspirational read for all. **Drs Anjum Jalal, Haider Zaman, Raja Pervez Akhtar, and Aftab Younus**, as well as many other renowned cardiac surgeons trained by Dr Cheema are carrying forward his work.¹¹

Dr Jawad Sajid Khan was born in Punjab, but completed his schooling, medical graduation and postgraduate training in surgery and cardiac surgery in the UK. He worked with **Professor Magdi Yaqoob, Dr Donald Ross** and **Lord Belsey**, the surgeons who were masters in their field. Dr Khan's father was a retired Professor of King Edward Medical College and Mayo Hospital. Dr Khan paid several visits to his home in Lahore during his training between 1982 and 1984. During these visits, he frequently met Dr Cheema who was looking after his ailing father. Dr Cheema informed him of the difficulties he was facing in Lahore and invited Dr Khan to join the cardiac surgery unit at Mayo Hospital. Finally in 1984, Dr Jawad Sajid Khan joined the Mayo Hospital through the Public Services Commission.

Dr Cheema recalls in his book that the joining of Dr Khan gave impetus to the department of cardiac surgery. Both Dr Cheema and Dr Khan worked closely to take cardiac surgery to new heights in Lahore. Dr Khan assisted Dr Cheema in the first coronary bypass operation at Mayo Hospital and respected him as his senior. When Dr Khan was offered the post of Chief Cardiac Surgeon at the PIC, he declined the offer in favour of his senior, Dr Cheema, a gesture duly noted in his book.

Until 1991, coronary artery bypass surgery (CABG) had not started in Lahore and was restricted to the NICVD and AFIC in Rawalpindi. Dr Khan not only initiated CABG but introduced new surgical procedures like homograft aortic valve replacement and established a homograft bank. He also performed off pump CABG on awake patients with high epidural anaesthesia.

When Dr Bowes returned to USA, he left unused oxygenators and heart valves at UCH, which the administrator of UCH donated to Gulab Devi Hospital, Lahore. Besides Mayo Hospital, Dr Khan also started cardiac surgery services at Gulab Devi Hospital in 1986 and often used donated heart valves.

Dr Khan was awarded 'Sitara-e-Imtiaz' in 2003 and Hilal-e-Imtiaz in 2008 for his services to cardiac surgery.

Dr Shahkar Ahmed Shah started another cardiac centre in Lahore at Sheikh Zayed Hospital in November 1986. Starting with closed cardiac and thoracic surgery, he did the first open heart surgery on 12th November 1988, excising a supra mitral valve membrane in an adult who had developed severe pulmonary hypertension. Dr Shah later moved to Peshawar. Later Dr Fayyaz Hashmi, an eminent surgeon trained in the USA, came to Lahore. He introduced off-pump CABG and new surgical procedures. He also trained surgeons in Lahore but some personal reasons forced him to go back to the USA. Dr Sulaiman B Hasan trained at the Cleveland Clinic in the USA and also worked in Lahore with Dr Cheema but later joined hospitals in Karachi before going back to the USA in 1999.

Today cardiac surgery has spread from Lahore to many Punjab cities (see Table 1).

THE CARDIAC SURGERY IN RAWALPINDI



Fig 2. The pioneering open heart surgery team of Pakistan at Rawalpindi. (Reproduced with permission from the personal collection of Brigadier (Rtd) Dr Abdul Malik.)

The Pakistan Army Cardiac Service started in 1953 in the Cardiothoracic Centre, Rawalpindi.^{12,13} Initial surgeries were mostly thoracic, and later extra-cardiac procedures were also performed. The first angiography in Rawalpindi was performed in 1969.

The morning of 4th March 1970 marked an important event in the history of cardiac surgery in Pakistan. It was the day when a native team of Pakistani doctors (8) performed first intra-cardiac surgery using a heart lung machine in Rawalpindi. **Dr Masud-ur-Rehman Kiani** was part of the team that is credited with the first open heart surgery performed entirely by native surgeons of Pakistan. He writes in his book *Kiani Kahani* that Lieutenant Colonel Dr Ali Masood Ikram, was a competent surgeon who initially used dogs to teach open heart surgery to his team with the use of a heart lung machine. It was on 4th March 1970 when the first open heart surgery was performed on a patient at the Military Hospital, Rawalpindi. The chief surgeon in that operation was Dr Lieutenant Colonel Ali Masood Akram, and among the group from anaesthesia were Dr Faiz Khan and Major Siddique. The chief cardiologist was **Dr Major Mohammad Abdul Malik** representing the Western and Eastern wings of what was then Pakistan. In 1978, the Cardiothoracic Centre in Rawalpindi was upgraded to the Armed Forces Institute of Cardiology (AFIC). Three years later in 1981, the hospital extended their services to all Pakistani Citizens and upgraded to the National Institute of Heart Diseases (NIHD) under the directions of the President of Pakistan. Over the years many famous surgeons including **Major General Sayed Afzal Ahmed, Major General Azhar Rasheed, Major General Asif Ali Khan, Dr Kamal Saleem, and Professor M Afsheen Iqbal**, inter alia, have provided patient care combined with research and training at this centre.

Major General Masud-ur-Rehman Kiani



9-Maj Masood ur Rehman Kiani

Major Kiani (9) was born in Abbottabad, and graduated from King Edward Medical College. He completed his general surgery residency in Rawalpindi Military Hospital and Combined Military Hospital followed by cardiac surgery training in London. He spearheaded the development of cardiac surgery at the AFIC and NIHD. He is a founding member of the PSCVTS and also joined hands with other surgeons to establish fellowship examination of cardiac surgery in Pakistan. He trained and mentored many surgeons who achieved high ranks and gave exponential growth to cardiac surgery. His autobiography *Kiani Kahani* takes the reader through his struggles in life and gives insights into Pakistan's medical and political history. He retired as Major General and is the recipient of many accolades, including the prestigious Hilal-e-Imtiaz (Military), Sitara-e-Imtiaz and Tamgha-e-Basalat for his services.¹⁴

Cardiac Surgery in Peshawar

In the early 1970s, **Dr Amjad Hussain** returned to Peshawar after finishing his training in cardiothoracic surgery in the USA and started closed heart surgeries at Lady Reading Hospital, Peshawar. **Dr Shahkar Ahmed Shah** also moved to Peshawar from Lahore in 1989 and started closed cardiac and thoracic surgery that year. The first open heart surgery in NWFP (now KPK) was an ASD closure done at Lady Reading Hospital, Peshawar in February 1993 by Associate Professor Dr Shahkar Shah. He is presently medical director of the newly established Peshawar Institute of Cardiology. Later **Drs Mannan, Zahoor and Riaz Anwer** performed surgeries in Peshawar. Professor Rehman also moved from Karachi after his retirement to run Rehman Medical Institute. Cardiac surgeons in Peshawar also provide surgical care to patients who travel from Afghanistan.

Cardiac Surgery in Quetta

Dr Daud Shah received his training under supervision of Dr M Rehman at the NICVD. After his fellowship from the CPSP, he settled in Quetta. The first cardiac surgery was done in a non-government private hospital in April 2005, on an eighteen year old male patient with pulmonary stenosis and an atrial septal defect. Dr Shah later started cardiac surgery at Civil Hospital Quetta, a government hospital which now has an active cardiology and cardiac surgery unit. At present two cardiac surgery hospitals are under construction in Quetta after which a large volume of patients who travel to other provinces for treatment will receive care within their own province.

History of Perfusion

Dr Abdul Haq Khan, a cardiologist, was qualified as the first perfusionist. In 1971, he was sent to the UK (Guy Hospital, London) by the NICVD for training. He was one of the pioneers of angiography, echocardiography and cardiology in Pakistan whereas in the early days of cardiac surgery he also trained two in-house cardiac perfusionists in animal lab; namely **Tariq Mehmood** and **Syed Nusrat Rizvi**. Mr Tariq Mehmood moved overseas soon while Nusrat Rizvi went abroad for further training in 1977, and continued working in Pakistan.

Animal Laboratory

An animal lab was established in June 1971 at the NICVD. **Dr Naseer Shaikh** and **Dr Col. Abdul Rehman** (anaesthesiologist), with operating technician **Mr Khalid**, were the first to start perfusion experiments and training of perfusionists. Dr Abdul Haq joined the team in February 1972. Dr Abdul Ghaffar Jatoti later enhanced the training and worked until the first human case of atrial septal defect closure was performed at the NICVD.

Spread of Cardiac Surgery

Cardiac surgery in Pakistan was initially limited to few cardiac centres in the large cities. At that time the training of cardiac surgery was informal. Now cardiac surgery is performed in many cities of Pakistan. Congenital/paediatric surgery was lagging behind in progress and patients were travelling abroad for treatment. Many cardiac surgeons went abroad to the UK, USA and Canada, to get congenital heart surgery training after which congenital surgery began emerging as a sub-specialty with excellent results. Karachi, Lahore, Rawalpindi and Peshawar have dedicated congenital heart surgeons and cardiologists, but being the sixth most populous country in the world, there is a need for many more cardiac centres. Dr William Novick and his team trained the surgical team of the AFIC in paediatric cardiac surgery. Today many cardiac centres are providing quality care to their patients.

Pakistani Surgeons Working Abroad

There are many surgeons of Pakistani origin who are working in many parts of the world. Some of these surgeons have been helpful in training their fellow surgeons. Among these are **Dr Asif Hassan**, a very well-known paediatric cardiac surgeon; **Dr Fayyaz Hashmi**, who himself lived in Lahore for some time and raised coronary artery surgery to new levels with the introduction of off pump coronary artery bypass grafting; **Dr Sulaiman Hassan**, who is well known for his work at Aga Khan University Hospital; and **Professor Syed Saeed Ashraf** from Swansea, UK. At the

same time some renowned surgeons who were masters of their field like **Dr William Novick** and his team played an instrumental role in promoting congenital heart surgery at the AFIC. **Drs Zohair Al Halees** and **Magdi Yaqoob**, in addition to many other famous surgeons, performed live surgeries during international conferences in Pakistan.

PAKISTAN SOCIETY OF CARDIOVASCULAR AND THORACIC SURGEONS (PSCVTS)

This is a society that was established to promote charity, care for patients having cardiovascular and thoracic surgery, carry out research and award fellowships and scholarships, and propagate the cause of cardiovascular and thoracic surgery. This society was established in 1994 and since then has brought surgeons from all over Pakistan under one umbrella, organizing numerous meetings, symposia, seminars, workshops and lectures for promoting research and advances in cardiothoracic surgery.

FUTURE DIRECTIONS

Cardiac surgery in Pakistan has witnessed exponential growth in the last two decades. It has gone from having no cardiac centres to having various centres all across the country, providing state of the art treatment to cardiac patients (Table 1). As we write these lines in November 2021, the CPSP data shows that 152 surgeons have been qualified and awarded fellowships in cardiac surgery so far. A small number of candidates taking the fellowship examination were from other countries of the region. To meet the needs, the CPSP initiated a fellowship in cardiac anaesthesiology as well. Cardiac surgery being a labour intensive activity, involves the specialized training of doctors, nurses, perfusionists, intensivists, physiotherapists, operating room personnel and other para-medical staff. Throughout the history of cardiac surgery of our country we have seen that many highly trained healthcare workers related to cardiac surgery choose to leave Pakistan to work abroad. A better standard of living and quality of life, higher salaries, and more stable political conditions abroad may be responsible for the 'brain drain'. The government and health policy makers should do an in-depth analysis of factors responsible for brain drain and steps should be taken to retain more manpower within the country. At the same time many more cardiac centres are required to meet the growing needs of the huge population of over 220 million. In future, the demand for congenital cardiac surgery is expected to be high as a large number of our population is of a younger age group, combined with unchecked population growth and high birth rate, many babies will be born with congenital heart diseases. The

handful of paediatric cardiac centres with a few paediatric cardiac surgeons and cardiologists are already under considerable pressure to provide healthcare to too many patients with congenital heart diseases.

The cardiac surgeons at the Aga Khan University Hospital, took the initiative to maintain a database of cardiac surgery in their hospital and impressed on other colleagues the advantages of the database. Dr Anjum Jalal, a surgeon with excellent knowledge of databases and computer skills, took the lead in designing a database for the collection of data from all the hospitals in Pakistan. He also digitized the PSCVTS journal. He is a constant source of inspiration for all surgeons to be accountable and to make constant efforts to improve their surgery results.

Before the COVID-19 pandemic, approximately 27,000 cardiac surgeries were done per year in Pakistan. This large number of cases in many cardiac centres provides opportunities for training and could be translated into meaningful surgical and medical research. Unfortunately only a few surgeons and still fewer cardiac centres are actively submitting research and journal articles. In fact the society (PSCVTS) journal fails to collect enough material to be able to regularly publish.

In the years to come, minimally invasive cardiac surgery and robotics will replace large painful incisions made in the chest. The surgeons-in-training and young surgeons should acquaint themselves to new and rapid changes taking place in the cardiac surgery world. Surgery for failing hearts, total arterial revascularization, valve repairs, percutaneous and transvascular wire based therapies, and hybrid treatments will be the new frontiers for the next generation of surgeons while there are and will be many new venues in research to explore. The acceptance, knowledge and ability to stay abreast of light speed progress in artificial intelligence and preparedness to embrace new surgical technologies will be the desired traits for progress in cardiac surgery for the surgeons of tomorrow.

Table 1:Major Cardiac Surgery Centres of Pakistan

Punjab & Federal Capital:
1. Punjab Institute of Cardiology, Lahore
2. Doctors Hospital, Lahore
3. Army Cardiac Centre, CMH, Lahore
4. Omar cardiac Centre, Lahore
5. King Edward Medical University, Mayo Hospital, Lahore
6. Akhtar Saeed Medical & Dental College Hospital, Lahore
7. Surgimed Hospital, Lahore
8. Shalamar Cardiac Centre & Medical College, Lahore

9. Gulab Devi Chest Hospital, Lahore
10. National Defence Hospital, Lahore
11. Shaikh Zayed Hospital, Lahore
12. Jinnah Hospital-Allama Iqbal Medical College, Lahore
13. Bawja Hospital, Lahore
14. Sharif City Medical College Hospital, Lahore
15. Armed Forces Institute of Cardiology, Rawalpindi
16. Rawalpindi Institute of Cardiology
17. Pakistan Institute of Medical Sciences (PIMS), Islamabad
18. Shifa International Hospital, Islamabad
19. Wazirabad Institute of Cardiology, Wazirabad
20. Chaudhry Pervaiz Elahi Institute of Cardiology, Multan
21. Faisalabad Institute of Cardiology
22. Tahir Heart Institute, Rabwah, Jhang
23. Shaikh Zayed Hospital, Rahimyar Khan
24. Saddique Saddiq Memorial Trust, Gujranwala
25. The Cardiac Centre, Ittefaq Hospital, Lahore
26. Rehmatulil Alameen Institute of Cardiology, Multan Road, Lahore
27. Center of Pediatric Cardiac Surgery, Lahore

Sindh

1. NICVD, Karachi
2. Liaqat National Hospital, Karachi
3. Agha Khan Hospital, Karachi
4. Dow University of Health Science, Karachi
5. Tabba Heart Institute, Karachi
6. Karachi Institute of Heart Diseases
7. Indus Hospital, Karachi
8. KIDH Karachi
9. Medicare Cardiac and General Hospital, Karachi
10. South City Hospital, Karachi
11. Civil Hospital, Hyderabad
12. Liaqat University of Medical Sciences, Jamshoro
13. Gambat Institute of Medical Sciences, Gambat Sindh
14. Patel Hospital, Karachi
15. Dow Institute of Cardiology, Ojha Campus
16. Isra University Hospital, Hyderabad

Quetta

1. Heart and General Hospital
2. Civil Hospital

Khyber Pakhtunkhwa

1. Peshawar General Hospital, Peshawar
2. Lady Reading Hospital, Peshawar
3. Rehman Heart Institute, Peshawar
4. Peshawar Institute of Medical Science, Peshawar
5. Northwest General Hospital and Research Institute, Peshawar
6. Ayub General Hospital, Peshawar

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