OBITUARY

Tribute to Dr MS Valiathan, Padma Vibhushan: Pioneer of medical device development in India

M UNNIKRISHNAN, GS BHUVANESHWAR

Marthandavarma Sankaran Valiathan, known as MSV to all at Sree Chitra Tirunal Institute for Medical Sciences & Technology, Trivandrum (SCTIMST), and beyond, left for his heavenly abode on Wednesday, July 17, 2024 aged 90 years. Performing multifaceted roles in his lifetime, he successfully achieved the pinnacle in whatever he touched — as a reputed cardiovascular surgeon, untiring scientist, exponent of the science of Ayurveda, visionary academician and institution builder, prolific author, captivating orator and a great teacher.

Dr Valiathan completed his MBBS at Trivandrum Medical College in the first batch, in 1957; and his surgical training in 1960 at Liverpool University. He then went on to do advanced fellowship training in the USA in cardio-thoracic surgery, under the renowned surgeons, Dr Vincent Gott and Dr Charles Hufnagel. He obtained life-changing experience not only in cardiovascular surgery but also through exposure to the world of biomaterials and open-heart surgery. This experience kindled his passion for artificial heart valve development when he returned home and joined Safdarjung Hospital, New Delhi in 1972. The high incidence of rheumatic heart disease in India led to the need for valve replacement surgery in a large number of poor patients. He felt that "the need for artificial heart valves is too large and too expensive to be dependent on imports alone!". He clearly understood the need for a low-cost indigenous solution to this problem and pushed forward with his own concept of "Make in India".

In 1973, he moved to Madras (now Chennai) and joined the recently started programme in Biomedical Engineering at IIT Madras as a Visiting Professor. He also took up a part-time position as Honorary surgeon at the Perambur Railway Hospital and started one of the earliest open heart cardiac surgery programmes in south India. His project proposal to the Council of Scientific and Industrial Research (CSIR) at that time for the development of an artificial heart valve did not come through. This set-back led to a redoubling of his future efforts.

In October 1974, he moved to Trivandrum and set out on the arduous journey of setting up a super-speciality hospital (specialising in Cardiac and Neuro care) as the Director of the Sree Chitra Tirunal Medical Centre. Despite his administrative responsibilities, he did not lose any of his zeal for the development of an artificial heart valve. A project proposal for the development of biocompatible polyvinyl chloride (PVC) for disposable medical devices and titanium for an artificial heart valve submitted jointly with Dr S Ramaseshan (Head of the Materials Division at National Aerospace Laboratories (NAL), Bangalore) and Dr Gowarikar (Head of the Polymer complex at Vikram Sarabhai Space Centre (VSSC), Trivandrum) was sanctioned by the Department of Science & Technology (DST), Government of India in November 1975. He hired two young enthusiastic project engineers — Bhuvaneshwar and Venkatesan — for this project and started his foray into medical device development. These two engineers went on to support him in the major task of setting up the Biomedical Technology Wing.

The Senior Maharani, Pooradam Thirunal Sethu Lakshmi Bayi, ruled the state of Travancore as Regent during 1924 to 1931 from the Satelmond Palace in Poojappura, Trivandrum. Nineteen acres of this historic property was acquired by the Kerala Government under the Urban Land Ceiling Act, while

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the balance 4.5 acres belonged to the family descendants. A senior family member approached Dr Valiathan and requested him to take over the palace and use it for the greater public good. This opportunity kindled his imagination to set up a research facility for medical device development. With this aim, he organised a Panel discussion in February 1976 with many leading scientists and academics "on the need for investment and creation of facilities for R&D in Biomedical Technology in India". The panel was chaired by the renowned cardiologist Dr S Padmavati, then Director of the GB Pant Hospital in New Delhi. The other eminent panellists included Dr Raja Ramanna, Director, BARC, Dr CNR Rao (Indian Institute of Science), Dr SR Valluri (Director, NAL), Dr S Ramaseshan (NAL), Dr Gowarikar (VSSC), etc. The positive recommendations of this eminent panel played a crucial role in subsequent developments.

Based on these recommendations, Shri Achutha Menon, then Chief Minister of Kerala, readily agreed to transfer the 19 acres of Satelmond Palace to the medical centre along with a grant of INR 50 lakhs for buildings, including an animal house, for the setting up of a biomedical research wing. This enabled Dr Valiathan to get a splendid grant of INR 90 lakhs (worth about INR 90 crores now) from the DST, Government of India, for the purchase of research equipment and setting up of other testing facilities. All these efforts led to the birth of the Biomedical Technology wing, India's first dedicated R&D unit for medical device development within the framework of a medical institute and hospital.

In December 1980, the Indian Parliament passed the SCTIMST Act, making the medical centre an "Institute of National Importance". The Government of India placed the new institute under the aegis of the DST to reflect its core mission of developing indigenous biomedical technology. The earlier DST-funded project made progress during the 1980s in the new campus. In 1982-83, the need for developing PVC-based disposable blood transfusion bags was identified and a project was started. The development and early testing of this project was completed in 1983-84.

At this time, Dr Valiathan understood the need for ensuring that these products were proven to be safe for clinical use and for ensuring that ethical requirements were met before human trials started. He constituted in 1984, one of India's first Institutional Ethics Committees with a majority of external members, under the chairmanship of a sitting Judge of the Kerala High court. With this step, he clearly demonstrated that the Institute was willing to adhere to and follow international requirements for ethical conduct and ensure that the medical devices developed there met the highest standards of safety and performance.

The decade from 1984 to 1994, during the last part of his tenure as Director, SCTIMST, witnessed the successful development and transfer of technology of high-risk medical devices — the Chitra blood bag, a hard-shell bubble oxygenator and cardiotomy reservoir, the heart valve and a hydrocephalus shunt system. Today, Trivandrum boasts of two blood bag plants, Terumo-Penpol (capacity of 38 million bags per year) and HLL Ltd (13 million bags) based on the technology developed by the Institute. With this, Trivandrum is now the single largest location in the world for blood bag manufacturing. Over 160,000 TTK-Chitra Heart valves have been implanted and his first patient implanted on December 6, 1990 is still doing well. The prices of artificial heart valves in India are the lowest in the world today! In his own way, Dr Valiathan showed how indigenous development can benefit the nation — decades before Prime Minister Modi started the "Make in India" development programme in 2014!

While R&D work progressed, cardiovascular procedures were performed in the hospital wing regularly, five days a week. This work was done along with Prof MP Mohan Singh who joined Sree Chitra, with excellent results. Dr Valiathan's vision of a structured, quality MCh programme for training in cardiovascular surgery commenced in 1982. Thereafter, large numbers of young surgeons joined it for the opportunity of training with Prof Valiathan. His major decision to extend these post-graduate programmes to a duration of three year (as against the nationally prevalent two years) enabled a much higher quality of training, which was then adopted nation-wide, by institutes like AIIMS, New Delhi and MCI, thereafter. Many sub- and super specialty courses were started in Sree Chitra including the MCh course in Vascular Surgery with candidates selected from all over the country.

The third dimension of Sree Chitra, "the Achutha Menon Centre for Health Sciences" was his brainchild to help society at large through public health research and initiatives. The country's first MPH programme was started by the Institute during 1995-96 at the Centre and paved the way for more centres to start similar training programmes in public health.

His great dreams, greater vision and the greatest missionary zeal are evident in every endeavour he took up during his life, exemplified by the three components of Sree Chitra, followed by his brilliance in academic programme development at the Manipal Academy of Higher Education and later, his efforts to decipher Ayurveda scientifically.

He was soft spoken and inspiring to everyone he met. The Government of India honoured him with the Padmashri, Padma Bhushan and Padma Vibhushan awards. He received many more international and national awards, which are testimony to his brilliance, commitment and dedication which make him one of the greatest sons of our country.

For further reading:

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