

Brig. S.K. Mazumdar and INMAS: A Profile

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1. EARLY YEARS

[The author of this article had the privilege of working with Brig. Mazumdar right from the day the latter joined the Radiation Cell in August 1956, and so the article would naturally be tinged with a personalised perception].

Santosh Kumar Mazumdar was born on 1 September 1920 in Dinajpur, North Bengal (now in Bangladesh) in the house of his maternal grandfather who, though belonging to a landowning family, had become a physician. The family participated actively in the national movement and produced many professionals in medicine, law and journalism. His mother, Shrimati Suraualini Devi, had been a student of Annie Besant in Banaras and was greatly respected in Patna for her work for the distressed. Santosh inherited this trait of compassion for the distressed in full from his mother. On his paternal side also, Mazumdar came from a family of landowners turned physicians. His grandfather was a leading doctor in Patna, and his father, Dr. S.N. Mazumdar, was one of the Founder-Members of the Patna Medical Association. An uncle joined the Bihar Medical Service.

Born as the third in a family of five children, Santosh lost his elder brother and sister when he was still in school. His father's death a few years later placed the onerous responsibility of the headship of the joint family on his young shoulders. He has a younger brother, Shankar, now living. Santosh first opted to take a degree in physics in spite of his father's desire that he should study medicine. He passed his B.Sc (Hons) in Physics with first class from Patna University in 1939. Subsequently he joined medicine and in 1945 passed his MBBS from Patna University. Throughout the six-year course, he stood first every year. Soon after graduation he joined the Army Medical Corps (AMC) and was commissioned on 18 August 1945. Lt. Gen. A. Banerjee, till recently Director of Medical Services (DMS), Army, who was three years junior to Santosh in Patna Medical College, vividly recalls the convocation where Mazumdar and his course-mates were to receive their degrees. When

Mazumdar's name was called, he went up to the dais dressed in a captain's uniform. The audience started booing. Soon after, the booing turned into vociferous cheering and a standing ovation when it was announced that Mazumdar had stood first in every subject and had bagged all the gold medals (a total of seven). Mazumdar was an all-rounder even in his school and college days and was keenly interested in sports, body-building, photography and painting. One of his entries in a painting competition even today adorns the main hall of his school, the Ram Mohan Roy Seminary, in Patna. He had a great interest in the river where he both swam and rowed. In medical college he acquired, in partnership with a friend, a small country rowboat in which he spent many evenings. Adventurous by nature, he got involved in many scrapes with *goondas* who insulted or attacked those weaker than themselves.

During 1945-54, he served in various units under the Director General, Armed Forces Medical Services (DGAFMS), including a six-month stint as GDMO in Iraq.

In 1954 Capt. Mazumdar met Beant Kaur Sandhu at the Army Hospital, Delhi Cantt. where she was working as a Welfare Officer. They fell in love and were married in September of the same year.

Beant traces her lineage to the *Suryavanshis*, whose origins are lost in antiquity, but who are known to have played a prominent role in the battles of Guru Govind Singh, the 10th Sikh Guru, against the Muslims. Beant's ancestors were related to Maharaja Ranjit Singh, and taught him *Shastra Vidya*, and played a part in enthroning him. They took a leading part in the Anglo-Sikh wars. The British later compensated the family for the losses suffered by them. Beant's great-grandfather was ADC to five different British governors. Her father was commissioned along with Field Marshal Cariappa and was a KCIO of the first batch of the Army. He was awarded the Indian Order of Merit for bravery in the Palestinian Campaign.

Beant was born on 20 June 1924. Their family lived in Lahore, where she did her B.A. in History. The family had to leave Lahore during partition. In course of time Beant undertook training as a Welfare Officer in the Army Hospital, Pune, after which she was first posted as Welfare Officer in the Army Hospital, Madras, and then at the Army Hospital, Delhi Cantt. Beant's elder brother retired as DIG of Police. Her two sisters married army officers, one of whom died early in World War II and the other was highly decorated and retired as a Major General.

The Mazumdars have two children. As Kushwant Singh writes in his characteristic racy style¹: 'The union produced a lovely cuddlesome girl, Shumita, and a strapping lad, Ranjan. Mixed marriages always produce healthier and prettier offspring'.

Mazumdar went on study leave to UK during 1954-56. He became an MRCP (Edinburgh) in 1955. During his stay in UK, he was on attachment to various leading hospitals and familiarised himself with recent advances in medicine. He specially devoted considerable time to get advanced training in the newly emerging discipline of 'radiation medicine' (the term 'nuclear medicine' had not yet come into vogue then) concerned with the medical applications of isotopes. He was probably the first clinician in our country to specialise in this field.

2. THE RADIATION CELL

On return to India, Mazumdar (promoted as Lt. Col.) was posted as a Specialist Medical Officer to the Defence Science Laboratory (DSL), Delhi in August 1956 and

established the 'Radiation Cell' there under the joint guidance of the Scientific Adviser (SA) to Defence Minister and the DGAFMS. His assignment was to study the biomedical applications of radioisotopes as well as medical radiation biology and to advise SA and DGAFMS on matters connected with radiation medicine.

He prepared a report on 'Medical Aspects of Ionizing Radiation' which was published as DGAFMS Memorandum No. 19 in 1957. In the Memorandum he covered the subject comprehensively, including basic nuclear physics, biological effects of radiation, medical management of radiation injuries, hazards from increasing uses of radiation, fallout problems, social and mental health aspects, protection measures and radiation safety. There was also a detailed account of the biomedical applications of radioisotopes for diagnosis, therapy and research. When one recalls that in 1957 there was very little literature available in any of these fields, one is struck by the width of Mazumdar's sweep.

Following a suggestion made by Prof. D.S. Kothari, the then SA, Mazumdar and Nagaratnam postulated that a part of the natural incidence of leukemia might be due to the influence of natural background radiation². Their paper, published in an issue of *British Medical Journal* in 1957, was reproduced in the Proceedings of the US Congress Hearings on the 'Nature of Radioactive Fallout and its Effects on Man' (1957) and was also referred to by Linus Pauling in his book 'No More War' (1958).

3. NUCLEAR MEDICINE COMES TO INDIA

Thanks to Dr. Homi Bhabha's vision, India embarked on a major programme in the early 1950s of harnessing atomic energy for peaceful uses in the areas of power production, and applications of radioisotopes in the fields of medicine, agriculture, industry and research. Our first reactor APSARA became critical in 1956. Inspired by the guidance given by Prof. Kothari, Lt. Col. Mazumdar visualised a far-reaching programme of developing radiation medicine for better health care of both the Armed Forces and the civilians, making use of the support available from the Atomic Energy Establishment. He used often to reminisce nostalgically about the exciting discussions he had in those days with Dr. Taylor (on deputation from the Radiochemical Centre, Amersham, UK, to the Atomic Energy Establishment, Trombay) and Dr. V.K. Iya, former Director of Isotope Group, Bhabha Atomic Research Centre, on the methodology for establishing the discipline as well as the details of procurement of isotopes, instrumentation, etc. Thanks to the keen interest and whole-hearted support of Col. R.D. Ayyar, the then Medical Superintendent of Safdarjang Hospital, New Delhi, he established a field unit of the Radiation Cell at Safdarjang Hospital in 1958.

It was towards the end of 1958 that he began his investigations on thyroid disorders using radioiodine. In 1959 he had investigated 59 patients with ¹³¹I at the Safdarjang Hospital and had treated 10 patients with ¹³¹I for thyrotoxicosis. He was thus the first to initiate nuclear medicine in our country.

A part of his work was presented at the International Symposium on Uses of Radioisotopes in the Study of Endemic and Tropical Diseases held at Bangkok in 1960 by the WHO and IAEA.

The nuclear medicine activities started on a modest scale, with radioiodine thyroid uptake studies and blood volume estimations on the diagnostic side, and treatment of thyrotoxicosis with ¹³¹I and polycythaemia vera with ³²P on the therapeutic side. With increasing indigenous availability of radiopharmaceuticals, particularly after the

commissioning of CIRUS in 1960, the scope of work naturally expanded.

Brig. C.R. Suryanarayanan, a friend of Brig. Mazumdar, whose main interest was various modalities of cancer therapy, developed at about this time a system at the Army Hospital, Delhi, for remote administration of radioactive gold to and safe handling of patients for palliative treatment of malignant effusions of the pleural and peritoneal cavities.

Lt. Col. Mazumdar maintained close personal friendships with the senior scientists of BARC, including Dr. A.R. Gopal-Iyengar, Dr. A.K. Ganguly, Shri A.S. Rao, and Dr. K. Sundaram, and the academic interactions with them were of great value to the Institute that he built up.

Lt. Col. Mazumdar had the vision to realise, even in those days, that nuclear medicine is essentially interdisciplinary in nature, involving the close integration of several sciences like nuclear physics, electronic instrumentation, health physics, radiobiology, radiopharmaceuticals, clinical and experimental medicine, all oriented to the use of ionizing radiations. (This concept was quite alien to the staffing pattern of other medical institutions). There were hardly any trained specialists in these fields nor were formal training courses available. A major task which he took upon himself was therefore to build up small effective teams in each of these fields, provide them necessary in-house training, and, where necessary, to depute the scientists for training at appropriate places. He had the special ability to choose the right type of men and mould them into effective workers. He himself could talk authoritatively on all the relevant areas in a simple and clear manner. His scientific colleagues of that time have happy memories of his frequent informal impromptu talks, his felicity of expression and his uncanny ability to get at the heart of a problem. The teams that he built up worked in close liaison inspired by his dynamism and infectious enthusiasm. Particular mention must be made of the encouragement he gave to the basic scientists. They were not considered ancillary or paramedical supporting services playing a secondary role to the clinicians, but as equal partners, enjoying (in Solly Zuckermann's expressive phrase) 'parity of esteem'. They therefore proudly participated in the exciting adventure of building up a new discipline from scratch and viewing its tangible applications towards improved patient management and health care.

Mention must also be made of his emphasis on the technician (technologist) as the backbone for the efficient running of any modern scientific laboratory. He was not bound by conventional ideas on the qualifications required for the technician. He felt that skilled hands and dedication were the most important requirements, rather than a formal degree or diploma. In fact, he chose three ex-servicemen, Shri E.J. Singh (an ex-Air Force Radar Mechanic), Shri G.S. Bedi (an ex-Army Male Nurse) and Shri Janki Dass (an ex-Army havildar clerk) for the Radioisotope Unit at Safdarjang Hospital, and personally trained them in the safe handling of radioisotopes. These three persons handled with confidence and absolute radiation safety discipline millicurie amounts of unsealed radioisotopes for diagnostic and therapeutic dispensing, not a single radiation incident happened during their long attachment to the department. He also recruited Shri D.V. Gupta, a diploma holder in medical laboratory technology, for the pathological support to his unit. He encouraged the junior technical staff by sponsoring their names for Cash Awards and Certificates of the Defence Research and Development Organisation (DRDO). Shri S. Krishnamurthi whom he chose as his personal assistant served the department with exemplary efficiency and

initiative, and was more than a Technical Staff Officer to Lt. Col. Mazumdar over the years.

He laid great stress on the effectiveness of suitably designed training aids for instructional purposes. Under his guidance Shri K.L. Bhateja became expert in photography oriented to clinical applications, microphotography, slide making, design of charts and other visual aids, as well as layout of exhibitions.

He was keenly aware of the social functions of science and the social responsibilities of scientists. He felt that the common citizen should be made aware of the fruits of new advances in science and technology, particularly as related to harnessing of nuclear energy in the biomedical field. He therefore organised under the auspices of the Ministry of Defence, with the guidance of Prof. Kothari and the support of Shri V.K. Krishna Menon (the then Defence Minister), a highly successful 'Atoms for Health' Exhibition at Delhi in February 1961, which was inaugurated by Pandit Jawaharlal Nehru. The Atomic Energy Department also participated in a major way in the Exhibition. The design and display of the entire spectrum of exhibits and live demonstrations were personally guided by him, revealing another facet of his personality. Later (in 1968) he was a Special Features Editor (along with A. Nagaratnam) of an issue of Popular Science and Technology (published by DRDO) entitled 'The Paradox: Radioactivity for Healing'.

4. ESTABLISHMENT OF INMAS

Lt. Col. Mazumdar gradually came to realise that nuclear medicine was no more an esoteric novelty confined to a select band but had become an established discipline in its own right, with a tremendous potential in the health care of our country's context. As an officer of the Armed Forces Medical Services, he felt that the diagnostic and therapeutic capabilities of nuclear medicine should be readily available to all Armed Forces personnel and their families. His initiative, combined with the unstinted support of Shri Krishna Menon and Prof. Kothari, led to the establishment of the Institute of Nuclear Medicine and Allied Sciences (now known more familiarly as INMAS) in June 1961 under DRDO. This was the first of its kind in the world, in that it was dedicated exclusively to nuclear medicine. A separate building was planned for the Institute. The foundation stone was laid by Shri Krishna Menon on 14 September 1961. It is worth mentioning that a CSIR architect with experience in the design of laboratories was closely associated with the design of INMAS. The building is characterised by elegance and a functional simplicity. Adequate attention was paid to radiation safety aspects. The building was ready by 1963 and modern equipment systems were procured and installed. The building was formally opened by Shri Y.B. Chavan, the then Defence Minister, on 13 February 1964. Lt. Gen. B.M. Rao, retired DGAFMS and Honorary Consultant to the Defence Minister, was the first (honorary) Director of INMAS. Lt. Col. Mazumdar, who in May 1961 had been appointed Officer-in-Charge of the Radiation Cell and Adviser in Radiation Medicine, became the Asst. Director. In November 1963, when Lt. Gen. Rao moved over to the Defence Institute of Physiology and Allied Sciences, Delhi as its Honorary Director, Lt. Col. Mazumdar was made Officer-in-Charge of INMAS. He became Director of INMAS in October 1966, a post in which he continued till his retirement on 29 August 1977. He was promoted as Colonel in May 1971 (with seniority from 1969) and as Brigadier in July 1976.

During the early years basic research was carried out at INMAS while the clinical work continued at the Safdarjang Hospital. Since 1971 a Clinical Outpatient Department started functioning at INMAS, and the activities were gradually withdrawn from Safdarjang. (INMAS has also been running a field unit at the VP Chest Institute, Delhi, where work on electrophysiology pertaining to chest diseases is being carried out).

The objectives of INMAS are:

- (a) Promotion and development of radioisotopic and related modern techniques in medical research, diagnosis and therapy as well as research in allied sciences such as medical radiation biology, pathology and health physics;
- (b) Providing specialist advice on matters pertaining to radiation medical sciences;
- (c) Development of radiation hygiene and health protection practice; and
- (d) Providing training facilities in nuclear medicine.

4.1 DRM Course

Meanwhile Lt. Col. Mazumdar came to realise that a formal comprehensive course in radiation medicine was a necessity to train nuclear medicine specialists to cater to the growing needs. He accordingly got instituted in 1962 a one year post-graduate Diploma Course in Radiation Medicine (DRM) to be conducted at INMAS in collaboration with the Science and Medicine Faculties of Delhi University. This was the first such course in the world. INMAS accepts both civilian doctors and Army Medical Corps officers for the course. The candidates undergo a three-month course at Delhi University in nuclear physics and instrumentation, followed by another three months at INMAS in relevant sciences like radiobiology, health physics, radiopharmaceuticals, etc. They then undergo a rigorous six-month training in various branches of clinical nuclear medicine. Major N. Lakshmipathi, who later became Director of INMAS, was among the first batch of DRM students. Dr. A.K. Basu who was from the second batch later became Professor of Nuclear Medicine at the All India Institute of Medical Sciences, Delhi, and a WHO Consultant in nuclear medicine and was deputed to many countries.

4.2 Thrust Areas of INMAS in its Formative Years

AT INMAS Lt. Col. Mazumdar identified the broad thrust areas of research effort. His first love was thyroid research where he did outstanding work on endemic goitre and also developed a new technique of thyrotoxicosis management with ^{131}I . In addition, he nurtured an all-round growth of INMAS not only in nuclear medicine but in a variety of allied sciences like health physics, radiopharmaceuticals, radiobiology, radiation entomology and experimental medicine. He carefully chose brilliant doctors and scientists to head the various disciplines, inspired them with his vision, and moulded them into leaders. A tribute to this facet of his personality is the fact that five of his junior colleagues later became Directors of various DRDO Laboratories. (Col. B.R. Kochhar succeeded him as Director of INMAS who in turn was succeeded by Maj. Gen. N. Lakshmipathi; Dr. P.K. Ramachandran became Director of the Defence Research and Development Establishment, Gwalior; Shri A. Nagaratnam became Director of Defence Laboratory, Jodhpur; and Dr. B.N.

Chaudhuri became Director of the Defence Institute of Physiology and Allied Sciences, Delhi).

A detailed account of the research activities and achievements of INMAS during its formative years and in the post- Mazumdar period is given in another article in this issue³.

4.3 Transfer to DGAFMS and Return to DRDO

As a result of a high level policy decision (in which the working scientists were not involved), INMAS (along with two sister laboratories concerned with biomedical sciences) was transferred from DRDO to DGAFMS in 1970. The budget continued to be provided by DRDO. All the three laboratories reverted to DRDO in January 1980.

5. HONOURS AND AWARDS

Col. Mazumdar was awarded the Padma Shri in 1964 for his pioneering contributions to the development of nuclear medicine. He was a member of various high level committees of the DRDO, UGC, DAE, ICMR, INSA, Director General of Health Services, Cabinet Secretariat and other bodies. He was President of the Society of Nuclear Medicine, India for two consecutive terms and was chosen to deliver the Bhabha Memorial Oration of the Society in 1976.

Col. Mazumdar was an official delegate to various international conferences including the WHO/IAEA Symposium on the Use of Radioisotopes in Tropical Medicine held at Bangkok in 1960, the IAEA Symposium on Whole Body Counting at Vienna in 1961, the IAEA Symposium on Effects of Ionizing Radiation on the Nervous System at Vienna in 1961, and the WHO/IAEA/FAO Conference on the Use of Radioisotopes in Animal Biology and the Medical Sciences held in Mexico in 1961.

5.1 The Last Days

Brig. Mazumdar retired from service as Director of INMAS on 29 August 1977. Subsequently he started private practice, working mostly in a Polyclinic in South Delhi. He had a massive heart attack on 12 December 1983 from which he almost completely recovered, although it had left him weak and emaciated. He was gradually picking up strength when death suddenly snatched him away at his residence at New Delhi in the early hours on the morning of 6 August 1984, before medical assistance could arrive.

5.3 Mazumdar Memorial Trust

Soon after the death of Brig. Mazumdar, a Brig. Mazumdar Memorial Trust was formed through the initiative of Maj. Gen. Lakshmipathi. Dr. V.S. Arunachalam, Scientific Adviser to the Defence Minister is the patron, and Mrs. Beant Mazumdar, the Vice-Chairperson. The Board of Trustees has the benefit of constant guidance from Prof. D.S. Kothari. The Trust has instituted an annual Brig. S.K. Mazumdar Memorial Oration and also gives an annual award to the best outgoing student of DRM course of Delhi University and the Young Scientist Award of the Year to an INMAS scientist. In addition, the Trust supports publication of an Abstract Service in the Indian Journal of Nuclear Medicine.

Brig. Mazumdar Memorial Thyroid Clinic has been recently opened separately, specially for the benefit of the poor, thus fulfilling a dream of the late Brigadier which Mrs. Mazumdar was keen to make into reality.

5.4 Mazumdar—The Man

It is above all as a warm human personality that Brig. Mazumdar is remembered by his colleagues, friends and patients. He was basically an agnostic but was extremely understanding of and respectful to differing points of view. He thought deeply about the role of the physician in tomorrow's world. He felt that valid connections have to be established between culture, religion, morality, environment and scientific humanism. The ultimate goal of the physician is not mere delivery of medical skill but to bring man into tune with his environment. He was not merely a nuclear medicine specialist, but an outstanding endocrinologist, cardiologist and neurologist. In fact, he viewed the disease process in its totality and never forgot the human element.

Although he liberally encouraged publication of scientific work by his colleagues, he was personally not at all keen on publishing his own work (which was a pity). He set an example of scientific rectitude by insisting on not having his name as a co-author in any of the publications in the work on which he was not actively involved. He relied primarily on his clinical judgment and utilised the results of biochemical and nuclear medicine investigations as supporting evidence in arriving at clinical decisions.

All his colleagues, both senior officers and junior staff, had access to him at all times and expressed their views freely, confident that he would carefully listen to all points of view and arrive at a fair and just decision. Decisions were generally by consensus. Discipline was not imposed from above by the Director but was something adhered to spontaneously. He rarely gave 'orders', but such was the love of the staff for him and their implicit faith in him that his wishes were invariably carried out enthusiastically.

He could discourse knowledgeably and interestingly on any subject. His characteristic smoker's cough and hearty laughter sounding along the corridors of INMAS stand imprinted in the minds of his colleagues. His loud thinking during the differential diagnosis of a difficult medical case was a treat to his medical colleagues and students, revealing his incisive and analytical thinking. He liked to relax over a drink with his friends in the evenings, and loved dancing.

His personal touch went a long way in reassuring the patient. He was particularly solicitous about poor patients and went out of the way to render them financial help by way of medicines, tonics, travel fare, etc. No wonder that one and all of his patients loved and adored him. One patient, on hearing of his death, said: 'If there is a God, he would be like Brig. Mazumdar'. What more tribute can one man pay to another! He inspired unswerving loyalty in everyone who had the good fortune of working with him. All his friends are unanimous in expressing the opinion that words, however eloquent, are inadequate to express the full gamut of their feelings about Brig. Mazumdar.

As a brilliant clinician of outstanding professional excellence who pioneered the development of nuclear medicine in the country, as an inspiring teacher, as a distinguished medical educationist, as a dynamic administrator and director, and above all as a human being whose warmth, brilliance, spontaneity, basic decency and magnetism attracted everyone, Brig. Mazumdar will be long remembered.

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