

Brig (Dr.) PK Sahoo: Tech Savvy Neurosurgeon and Pioneer of Cervical Disc Arthroplasty in India

HISTORY AND EVOLUTION OF SPINE SURGERY IN ARMED FORCES

Let us begin with a famous quote by Hieronymus of the 16th Century^[1] “I would remind you again how large and various was the experience of the battlefield, and how fertile the blood of warriors in rearing good surgeons.”

The current practice of neurosurgery and neurotrauma in Indian Armed Forces owes its status to the contributions of many military surgeons. Battlefield has provided a fertile ground for genesis, evolution, and refinement of the science and art of neurosurgery. Each war advanced the art and science of neurospine surgery in significant ways.

Military surgeons were the first to engage in spine surgery in the battlefield. Initial interventions were done as a lifesaving measure. Spine surgery got a better footing by World War II. This was due to advancements in general anesthesia, lighting, hemostasis, and antisepsis, coupled with better understanding of physiology.^[2-4]

By 1971 War, neurosurgeons had added imaging, bipolar cautery, and better instrumentation techniques to their armamentarium. This translated to improved outcomes. On December 31, 1932, Dr. Barr and Dr. Philip Wilson operated on the first patient for whom the preoperative diagnosis of ruptured intervertebral disc was made.^[5] Spine surgeons focused on spinal fusion surgery to treat most of spinal pathologies. Concurrently, with the safe return of survivors of spinal cord injury from World War II, focus shifted to field of rehabilitative medicine by establishment of rehab centers providing physical and occupational therapy. Understanding the need for rehabilitation, Indian Armed Forces established the largest spinal cord rehabilitation center in Asia at Kirkee in Maharashtra.

Keeping pace with advances in the West, Indian Armed Forces too began to train its neurosurgeons in spine surgery. Col. Madan is credited with introduction of magnification, superior optics by the use of loupes, and pioneering the surgery of lumbar discs by minimally invasive technique of fenestration, altogether avoiding laminectomies. He also performed the first cervical spinal fusion by Coward's technique.^[6] After the initial enthusiasm of spinal fusion,

surgeons began to encounter the problem of adjacent segment disease. This pushed neuroscientists to search for better alternatives. All these factors heralded the era of artificial motion-preserving intervertebral disc. The last several decades have witnessed notable milestones in the development of cervical disc arthroplasty.

CONTRIBUTION IN SPINE CARE

Brig PK Sahoo was the first in India to perform cervical disc replacement using Bryan's cervical disc for cervical disc prolapse in 2002.^[7]

Born in July 1, 1952, Brig Sahoo had set his aim early in life to become a doctor. After the preprofessional from Utkal University, he completed his medical graduation from Utkal University in 1975. He was commissioned into Army Medical Corps in 1977. After completing his basic training and tenure as a regimental medical officer, he did his postgraduation in general surgery from AFMC, Pune. During his tenure as a general surgeon in various combat zones of Armed Forces, he developed a keen interest in neurosurgery. This led him to join the prestigious AIIMS, New Delhi, to undertake MCh in neurosurgery under tutelage of Prof. A K Banerjee [Figure 1].

As a neurosurgeon, he served in many prestigious tertiary care hospitals of Armed Forces Medical Services. He served at Army Hospital (Research and Referral [R and



Figure 1: Prof. AK Banerjee

RJ), New Delhi from 1991 to 1997 and Base Hospital, Delhi, from 1997 to 1998. He then got posted to Command Hospital (Air Force), Bangalore, (1998-2000) as Professor of Surgery and HOD Neuro Surgery. After his promotion to the rank of Colonel, he had the distinction of working again at Army Hospital (R & R), Delhi, as a senior adviser, Prof. and HOD Neuro Surgery from 2001 to 2005. Subsequently, he was posted to Command Hospital (Southern Command, Pune) as Prof. and HOD Neuro Surgery, AFMC, Pune, from 2006 to 2008 [Figure 2]. During this tenure, he got promoted to the rank of a Brigadier and also headed the department of surgery. To keep abreast with recent advances in neurosciences, he conducted Armed Forces Neuro Sciences updates and published books on progress in Neuro Sciences at Delhi and Pune. He was the Organizing Chairman NSI 2008, Pune [Figure 3].

From his early days, he had a burning desire to learn and keep abreast with the latest evolving technologies in neurosciences. This quest led him to attend and learn newer techniques from experts all across the globe. After learning the art of cervical disc arthroplasty, he was invited to give a live demonstration of the novel technique in various centers across India and abroad. He has held live workshops to disseminate this skill in India and abroad in various prestigious platforms including the Association of Spine Surgeons of India and Spine Society of Europe and National Neurospinal Conference. As a result of his unquenching thirst, he became the first to perform anterior stabilization of cervical spine instability using the Zephyr plating and Premier plating. He performed Apofix fixation for posterior stabilization of cervical spine instability, Cage placement and Z plate fixation for Thoracic spinal instability, TSRH System and Colorado II system spine. The details of workshop conducted by Brig Sahoo are given in Table 1.



Figure 2: (a) Army Hospital Research and Referral, New Delhi, (b) Command Hospital Air Force, Bangalore, (c) Armed Forces Medical College, Pune, (d) Command Hospital (SC), Pune

ROLE IN UPGRADATION OF NEUROSURGICAL CENTERS IN ARMED FORCES

Brig Sahoo played a pivotal role in establishing a state of the art Neurosurgery centers at Base Hospital Delhi Cantt and at Command Hospital (Air Force) Bangalore. He contributed enormously in modernization of Neuro surgical centers at Army Hospital (R and R) Delhi Cantt and Command Hospital (Southern Command) Pune. The Virtual Intracranial Visualization and Navigation (VIVAN system) and Head mounted voice activated system was made available for students and young Neurosurgeons at Army Hospital R and R, for planning spine and brain surgery.

He mastered the technique of Microscopic Neurosurgery, Neuro Endoscopic surgery, and Stereo tactic Image guided cranial and spinal Surgery. In his quest to keep abreast with the latest advancements, he learned and performed functional neurosurgery, i.e., Deep Brain Stimulation for Parkinson's disease, Spinal cord stimulation for failed back surgery syndrome, and Baclofen pump placement for Spasticity, for the first time in Indian Armed Forces.

Always open to adopt and embrace newer technologies, he has been credited as the first Military Neurosurgeon to perform Image guided Cranial and Spinal Surgery, Awake brain surgery, Stereotactic Neuro surgery, cervical disc replacement by prestige disc, Lumbar disc replacement by Charite disc, and Device for inter vertebral Assisted Motion (DIAM) placement for lumbar disc prolapse. He was a pioneer in SRS using Radionics XKnife and was instrumental for establishing a gamma knife center at AH (R and R) Delhi Cantt. He underwent training in cyber knife at the Barrows Neurological Institute and is currently perfecting the art of SRS by TrueBeam variant - STX at a premier Hospital in Bhubaneswar.



Figure 3: Armed Forces Medical College, Pune Annual NSI Conference held in 2008

Table 1: The workshops conducted in cervical and lumbar disc arthroplasty

July 13–14, 2002 3rd Armed Forces Neurosciences Update Army Hospital (R&R), Delhi Cantt - 110 010 (India)

July 13–14, 2004 Live Demonstration and Workshop of “Bryan’s Cervical Disc Replacement” during 3rd Armed Forces Neurosciences Update, Army Hospital (R&R) Delhi Cantt - 110 010

July 13–14, 2004 Live Demonstration and Workshop of “Endoscopic Discectomy/Endoscopic Management of CSF Rhinorrhea” during 3rd Armed Forces Neurosciences Update, Army Hospital (R&R) Delhi Cantt - 110 010

September 30 to October 01, 2002 Live Demonstration and Workshop – Neuroendoscopic Procedure, Army Hospital (R&R) Delhi Cantt - 110 010

February 19–21, 2004 4th Armed Forces Neurosciences Update at Army Hospital (R&R) Delhi Cantt - 110 010

February 22, 2004 6th Annual Conference of Delhi Neurological Association at Army Hospital (R and R) Delhi Cantt - 10

February 19–22, 2004 Live Demonstration and Workshop of “Bryan’s Cervical Disc Replacement” during 4th Armed Forces Neurosciences Update and 6th Annual Conference of Delhi Neurological Association at Army Hospital (R&R) Delhi Cantt - 110 010

February 19–22, 2004 Live Demonstration and Workshop of “Endoscopic discectomy using Metrix System” during 4th Armed Forces Neurosciences Update and 6th Annual Conference of Delhi Neurological Association at Army Hospital (R&R) Delhi Cantt - 110 010

February 19–22, 2004 Live Demonstration and Workshop of “Endoscopic 3rd Ventriculostomy” during 4th Armed Forces Neurosciences Update and 6th Annual Conference of Delhi Neurological Association from at Army Hospital (R&R) Delhi Cantt - 110 010

October 8, 2004 Live Demonstration and Workshop of “Bryan’s Cervical Disc Replacement” during 2nd Instructional Course in Spine Surgery – “Surgery of the Cervical spine” conducted by Association of Spine Surgeons of India and Spine Society of Europe

October 8, 2004 Live Demonstration and Workshop of “Anterior Cervical Discectomy and Fusion” during 2nd Instructional Course in Spine Surgery – “Surgery of the Cervical spine” conducted by Association of Spine Surgeons of India and Spine Society of Europe

October 8, 2004 Live Demonstration and Workshop of “Global Stabilisation for dislocation of C5–C6” during 2nd Instructional Course in Spine Surgery – “Surgery of the Cervical spine” conducted by Association of Spine Surgeons of India and Spine Society of Europe

September 28, 2006 conducted a live workshop for Bryan’s disc prosthesis on at 7th National Neurospinal Conference held at Jaipur, India

January 2007 conducted a live workshop on Charite Lumbar Disc at CH (SC), Pune

February 2007 conducted a live workshop on Prestige Disc at CH (SC), Pune

March 2007 conducted a live workshop on DIAM at CH (SC), Pune

March 30, 2007 conducted a live workshop on Cervical disc Replacement on Bryan Disc at MS Ramayya Medical College, Bangalore

September 28–30, 2007 conducted a live workshop for Prestige disc at 7th Annual National Conference of Neuro Spinal Surgeon’s Foundation of India at Cochin, Kerala, India

November 3–4, 2007 conducted a live workshop on Cervical Disc at VIth National Armed Forces Neurosciences Update and Annual Conference of Society for Neurosciences, Pune, at AFMC, Pune

November 3–4, 2007 conducted VIth National Armed Forces Neurosciences Update and Annual Conference of Society for Neurosciences, Pune at AFMC Pune as organizing Chairman

November 26–29, 2008 conducted a live workshop on cervical disc replacement using Discover disc at Khoula Hospital OMAN, 12th GCC/13th Pan Arab Orthopedic Congress

December 17–20, 2008 organizing Chairman 57th Annual Conference of Neurological Society of India. (Neurocon-2008) Pune, India

AFMC: Armed Forces Medical College, DIAM: Device for Inter Vertebral Assisted Motion, CH: Command Hospital, SC: Southern Command, CSF: Cerebrospinal fluid GCC: Gulf Cooperation Council

Throughout his stint in Army, Brig Sahoo had been engaged in active training, research, and innovation. During the course of his career in army, spanning over three decades, he has trained and inspired many young minds and brought the Neurosciences Department of AFMS to a pedestal comparable to institutes of excellence the world over. He was detailed by the Medical Council of India (MCI) to inspect various Medical Institutions to assess their fitness for starting MCh training program in Neurosurgery. Brig PK Sahoo has trained many DNB and MCh students in neurosurgery and was an examiner for hundreds of DNB and MCh students in different medical colleges and institutions all over the country.

Generation of neurosurgeons had the privilege of being trained by this tech-savvy Mentor who taught the basics of contemporary Neurosciences and subsequently introduced many to the changing technological landscapes in Neurosurgery. Brig Shashivadhanan credits his courage to venture into percutaneous axial lumbar interbody fusion and keen interest in research to this great teacher who always taught his students to respect the past and embrace the future.^[8,9] Brig Sahoo has done pioneering research in Anterior Cervical Osteosynthetic Trapezoid Fusion with Caspar Technique for Cervical Spinal Instability. Cervical Disc Replacement for Spondylotic Myeloradiculopathy. He was the first to undertake research as an AFMRC Project investigating the role of Autologous bone marrow mononuclear cells for patients with spinal cord trauma.

Brig Sahoo retired prematurely from military service on September 2009 from Military Hospital, Namkum. Since then, he has settled in Bhubaneswar and is deeply involved in serving the population of Odisha and surrounding states, who are immensely benefiting with his years of experience and unmatched skills. Mrs. Sarojini Sahoo has been supporting all his endeavors through thick and thin of his illustrious carrier. The couple is blessed with two children who are working in IT Industry.

CONCLUSION

From refinement of operative techniques, to prevention and rehabilitation, military neurosurgeons embraced virtually all aspects of neurosurgery. This paper serves as a tribute to Brig PK Sahoo [Figure 4] and all the heroes in uniform, who contributed to the progress of neurosciences. The list of stalwarts and their contribution may not be complete due to a lack of literary evidence. Nevertheless, we acknowledge and salute all the unsung heroes who played an important role in genesis and furthering our understanding of this challenging field.



Figure 4: Brig (Dr.) PK Sahoo

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Conflicts of interest

There are no conflicts of interest.

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