




## Alexander A. Potapov MD, PhD (July 5, 1948–May 15, 2021): an intensivist turned neurosurgeon

Leonid Likhterman<sup>1</sup> · Boleslav Lichterman<sup>2</sup> 

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According to Friedrich Nietzsche, the will to power (*der Wille zur Macht*) is the main driving force in humans. The life and fate of Alexander Potapov who always aspired to be a leader vividly illustrates this concept.

He was born in 1948 into the family of a civil engineer at a railway station in Fergana Region of Uzbekistan. His mother was German (*nee Klassen*) and almost 20 years younger than his father (this was his second marriage). When the family moved to Moscow, she worked as an editor of a German communist newspaper *Neues Leben* (“New Life”). Alexander was the second child of three children. In 1963 (after eight classes of school), he entered medical college (a nursing school). He was a sub-master boxer. In 1967, he became a student of the medical faculty of Second Moscow Medical Institute (now the NI Pirogov Russian National Medical University). During his studies, he worked part-time as a nurse anesthetist and an emergency paramedic. In one of his interviews (in 2018), he recalled his first impressions of a craniotomy after a severe head injury at a Moscow municipal hospital. There were no frames for head fixation at that period, and Potapov had to carry this out manually by fixing the patient’s head with his hands. He experienced horror seeing severe hemorrhage from the wound and pain in his fingers and decided that he would never become a neurosurgeon.

However, on graduation in 1973, he carried out his 2-year residency in intensive care at the Burdenko Neurosurgery Institute, where he remained for the rest of his life. Initially, he was a physician at the Department of Anesthesia and Intensive Care, headed by professor Alexey Manevich (1926–2015). Potapov was fluent in English and in 1978, he

(together with A.Parfenov) translated into Russian a book *Intensive care* by Ake Wahlin, Lars Westermark, and Ansjé van der Vliet (from Karolinska hospital in Stockholm). Being an active member of Komsomol (Young Communists’ League), he joined the Communist Party of the Soviet Union (CPSU) in 1977 in order to move into an administrative career. In 1980, he defended his PhD dissertation on cerebral blood flow (studied with mass spectrometry), metabolism, and ionic composition of blood and CSF in neurosurgery patients in early postoperative period. These parameters were used for outcome prediction and for diagnosing cerebral death. Manevich was his scientific supervisor. Potapov was a master of PR both nationally and internationally. He also wrote scripts for two popular medical films for Soviet TV.

In 1984, at the age of 36, Potapov was appointed as acting head of the neurotrauma department at the Burdenko Institute. His opinion was that surgery for head injury is so primitive that even an intensivist might do a craniotomy to remove intracranial hematoma or a depressed skull fracture. He demonstrated outstanding organizing skills by creating medico-mathematical lab, running the All-Union Neurotrauma program, and helping victims of an explosion at a railway station in Arzamas and an earthquake in Armenia in 1988. In April 1989, Potapov became a deputy director of the Burdenko Institute in charge of research parallel to his leadership of the neurotrauma department. In the same year, he defended his habilitation dissertation (a second thesis needed for professorship in the former USSR and present-day Russia) “Pathogenesis and differentiated treatment of focal and diffuse brain injuries” at the Neurosurgery Institute (now the AP Romodanov Neurosurgery Institute) in Kiev. He introduced the concept of diffuse axonal injury in USSR.

In 1993, he was promoted to professor of neurosurgery. The focus of his research and clinical practice was pathogenesis, diagnosis, treatment, outcome, and prediction of head injury. Together with his associates, he developed classification and differentiated treatment of head injury sequelae

✉ Boleslav Lichterman  
blikhterman@nsi.ru

<sup>1</sup> NN Burdenko National Medical Research Centre  
for Neurosurgery, Moscow, Russia

<sup>2</sup> IM Sechenov First Moscow State Medical University,  
Moscow, Russia

(since at the Burdenko Institute the hospitalizations of emergency cases were only by a special agreement). Potapov was one of the founders of modern reconstructive cranial surgery. Together with a group of physicists, he introduced stereolithography for cranioplasty. He advocated evidence-based neurosurgery. Potapov was involved in compilation of national and international guidelines for the management of traumatic brain injury (TBI) as a recognized expert. He and his colleagues suggested an MRI-based classification of brain injuries based on their localization in cortical, subcortical, and brainstem structures. Springer Verlag published their book *Neuroimaging of Traumatic Brain Injury* in 2014. He supervised many dissertations on neurotrauma. Potapov was also interested in chronic impairment of consciousness and mental recovery and collaborated with psychiatrists at the Burdenko Institute. He suggested the concept of split brain in TBI based on plasticity of midline structures evaluated with MRI. Potapov organized several international conferences on neurotrauma. He was involved in the care of victims of mass disasters in Bosnia and Herzegovina and Chechnya in the 1990s and North Ossetia (in Beslan) in 2004. For his work in neurotrauma Potapov and his team were twice awarded State Prize.

In 1998, he became an Honored Science Worker of the Russian Federation. In 2002, Potapov was elected a corresponding member of the Russian Academy of Medical Sciences, followed by full membership of this Academy in 2007 and full membership of Russian Academy of Sciences in 2011. By that time, he was a chairman of the neurotrauma committee of WFNS, a member of the editorial board of *Acta Neurochirurgica*, *World Neurosurgery*, and *Neurosurgery*, and a vice-president of WFNS (from 2009 to 2013). He befriended neurosurgery leaders in many countries and invited them to Russia.

In 2014, Potapov was elected a director of the Burdenko Neurosurgery Institute replacing Alexander Kononov who had been the director since 1975. The institute was renamed the Burdenko National Medical Research Centre for Neurosurgery. A new building was opened and PET scan was installed. Potapov's research interests shifted to the study of glial tumors with special reference to metabolic navigation (fluorescence). He developed a precise intraoperative diagnosis of tumors in eloquent areas.

The list of his positions included membership at Presidential Council on science and education, at the Council of Russian Foundation for Basic Research (RFFI), at the Presidium of the Russian Academy of Sciences. He was an honorary member of Österreichische Gesellschaft für Neurochirurgie (Austrian Society for Neurosurgery), a corresponding member of Deutsche Akademie für Neurochirurgie (German Academy of Neurosurgery), and an honorary member of Euroacademia Multidisciplinaria Neurotraumatologica

(EMN). In 2018, he was elected the president of the Russian Association of Neurosurgeons.

Potapov's directorship lasted for five years. In November 2019, he retired from his position at the Burdenko by the ministry of health due to his age (with few exceptions you cannot run a public institution in Russia after 70). He aspired to create an independent Institute for Neurosciences and Technologies, but his time was up. At the beginning of 2020, he was diagnosed with an oncological disease. His health rapidly deteriorated despite intensive chemotherapy.

Several years ago, the senior author of this publication (LL) asked Potapov to fill in the modified *Proust Questionnaire* (a set of questions composed by the French writer Marcel Proust). Potapov's favorite virtue was friendship. He called dirty trick the most detested feature. His favorite quality in a man was courage and his favorite quality in a woman was kindness. He called reading his favorite occupation, Spring—his favorite season, morning—his favorite part of a day, Alexander Pushkin—his favorite poet, Leo Tolstoy—his favorite writer, and Moscow—his favorite city. His favorite flower was rose, and sunshine was his favorite color. When asked what is the most difficult thing for him to do, he replied: "To offend [other people]."

Alexander Potapov is survived by his elder sister Nellya (a retired obstetrician), his younger brother Victor (a retired engineer), his first wife Svetlana (a former prosthetic technician), his second wife Marina (a former intensivist), and his son Grigori from his first marriage (who became an economist) and his two grandchildren. The Neurotrauma department at the Burdenko National Medical Research Centre for Neurosurgery was named after Alexander Potapov.



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