

## A GLIMPSE OF OUR PAST

## Albert Wojciech Adamkiewicz 1850–1921

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For those who study the history of European medicine, the life of Polish physician and pathologist Albert Wojciech Adamkiewicz has always been fascinating and full of professional drama. At one time he was considered to be one of the foremost European researchers, an admirable university professor, and a skillful administrator. But his premature publication of unconfirmed scientific data abruptly ended his impressive academic career. Despite this controversy, many of his more than 100 scientific publications have survived the test of time. To this day, important scientific discoveries and observations are linked to his name. As reported by Konopka (1974), they include observations of changes in brain tissue after compression, formulation of new histologic stains for the medulla oblongata, studies of protein and peptide structure, and discovery of a quantitative colorimetric reaction to detect proteins (Adamkiewicz's reaction). Yet the most important contribution appreciated by anatomists and surgeons is his complete and accurate description of the blood supply to the spinal cord (Adamkiewicz, 1881). He described the "*magnus ramus radicularis anterior*" as the main feeding vessel to the lower spinal cord (Adamkiewicz, 1882). The artery of Adamkiewicz (the great anterior segmental medullary artery) is now an everyday term in the surgical and anatomical nomenclature (Milen et al., 1999; Moore and Dalley, 1999).

Albert Wojciech Adamkiewicz (Fig. 1) was born on 11 August 1850, in Żerków (western Poland) to the family of Adolf Adamkiewicz, a small-town physician, and Zuzanna Jacobson Adamkiewicz (Operacz et al., 1995). Albert showed an early aptitude for science and medicine. He graduated high school with honors in 1868; the note on his high school diploma as reported by Operacz et al. (1995) states "he excelled in all subjects and possesses strong determination to achieve his life goals."

In 1868, at the age of 18, Albert began his study of medicine in Królewiec (then East Prussia, now Kaliningrad, Russia) and 6 months later left for a larger academic center in Wrocław (southwestern Poland). As an honor student, he worked as a student assistant in the Department of Physiology, then under the direction of Professor Rudolf Heidenheim (Operacz et al., 1995).

The Franco-Prussian War briefly interrupted his education in 1870, during his third year of medical school, as he was drafted into the army (Meissner and Hasik, 1989). After the war, in 1871, he continued his medical studies, but this time at the University of Würzburg (Bavaria). Here, he was also employed as a student assistant in the Department of Anatomic Pathology under the direction of Professor Friedrich von Recklinghausen (Abakanowicz and Beynart, 1935). His research study, "Die mechanischen Blutstillungsmitteln" (Mechanical methods of phlebotomy), won first prize in the student research competition in 1872 and was presented as part of his doctoral dissertation at the University of Würzburg. Returning to Wrocław, Albert received his medical diploma at age 23 (Smereka, 1979). A few weeks later, young Doctor Adamkiewicz relocated to Królewiec to accept the position of Assistant in the Department of Physiology and Clinical Medicine at the University of Królewiec.

For the next 2 years, Adamkiewicz continued his studies in general physiology and mastered the principles of experimental design. He also found time to practice medicine. In 1875, at age 25, he was promoted to Director of the Clinical Laboratory in the Department of Clinical Medicine. In 1876, Adamkiewicz successfully defended his dissertation. Now as an Assistant Professor in Physiology, he began the independent research that would make him famous. In the fall of the same year, Professor Carl Friedrich Otto Westphal from the Department of Neurology at "Charité" Hospital (Humboldt University of Berlin) offered Adamkiewicz a position as Senior Physician in his department (Meissner and Hasik, 1989). This position allowed him to pursue his research on the central nervous system, which led to his second disserta-

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Fig. 1. Albert Wojciech Adamkiewicz at about age 60.

tion, his Habilitationsschrift, which promoted him to Privatdocent (Associate Professor) in Pathology at the university (Operacz et al., 1995).

Already well known as a physiologist, neuropathologist, skillful physician, and popular lecturer, in 1880 Adamkiewicz received an invitation to head a newly created Department of General and Experimental Pathology at Collegium Medicum of Jagiellonian University in Kraków (Poland). This university, founded by the Polish King Casimir the Great in 1364, was one of the most prestigious universities in Europe, especially its medical school, which was renowned for its excellent medical and pharmaceutical programs. Adamkiewicz accepted the offer, and by the age of 30, he was a full professor and chair of this department (Abakanowicz and Beynart, 1935; Meissner and Hasik, 1989). Quickly overcoming his deficiencies in the Polish language,<sup>1</sup> Professor Adamkiewicz earned the respect and admiration of his students and colleagues as

<sup>1</sup>During the partition of Poland between 1772 and 1795, the entire territory of the Kingdom of Poland was divided between Prussia, Austria, and Russia. Adamkiewicz was born, raised and educated in the region of Poland acquired by Prussia in 1793. The Polish provinces under Prussian government were germanized; German language was proclaimed the exclusive language of education, therefore Adamkiewicz was more fluent in German than his native

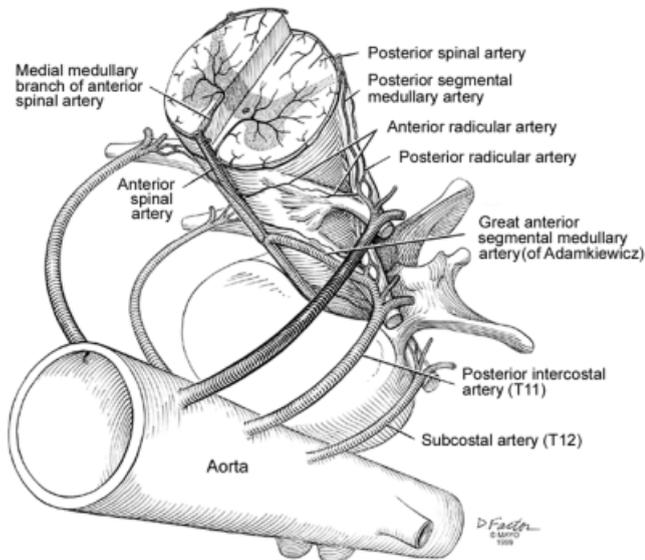
an excellent educator, lecturer, and laboratory instructor, well known for supplementing his lectures with scientific experiments (Abakanowicz and Beynart, 1935).

Adamkiewicz's research interests included the blood supply to the CNS, especially the spinal cord and medulla oblongata, neuroanatomy, neurohistology, and the pathogenesis of cancer. He first described an anastomosing system of arteries around the spinal cord that he termed the "vasocorona" or vascular crown (Adamkiewicz, 1881, 1882). He also described the large unilateral artery of variable origin (80% of cases on the left side) from one of the thoracolumbar segmental arteries (Fig. 2). As reported by Carmichael and Głowiczki (1999), this great anterior segmental medullary artery arises either from the spinal branch of the lower posterior intercostal arteries (T9 to T11), subcostal arteries (T12) or, less frequently, from one of the upper lumbar arteries (L1 to L2). It enters the vertebral canal through the intervertebral foramen at the lower thoracic or upper lumbar level supplying the lower two thirds of the spinal cord (Moore and Dalley, 1999). Injury to this artery in any surgical procedure performed on the thoracic or abdominal aorta or the spine may lead to loss of blood supply to the spinal cord with devastating results such as paraparesis, paraplegia, sensory deficits, and loss of bowel and bladder control (Milen et al., 1999). An understanding of the anatomy and topography of this artery is essential to protect the spinal cord during operations that involve dissection of the posterior mediastinum or retroperitoneal space (Wan et al., 2001). The great anterior segmental medullary artery (*Arteria medullaris segmentalis anterior magna*) has been variously referred to as the segmental medullary artery (*Arteria medullaris segmentalis*) (Federative Committee on Anatomical Terminology, 1998),<sup>2</sup> great radicular artery (*Arteria radicularis magna*), *Arteria radiculo-medullaris*, or artery of the lumbar enlargement. In the surgical nomenclature, however, it will probably be best known as the artery of Adamkiewicz.

Adamkiewicz's career flourished in Kraków. He received several prestigious international and national

Polish language. Poland was reunified and regained independence in 1918 (Wandycz, 1974).

<sup>2</sup>The First Edition of the Terminologia Anatomica (1998) entry in the Index of Eponyms (p. 163) under "Adamkiewicz, Artery of" is erroneously cross-referenced to "A12.2.11.015 A. radicularis anterior/Anterior radicular artery" when it should have been cross-referenced to the term immediately below that one, "A12.2.11.016 A. medullaris segmentalis/Segmental medullary artery." The distinction between radicular arteries and segmental medullary arteries is clearly made in the footnote on p. 87 establishing the artery of Adamkiewicz as a type of segmental medullary artery.



**Fig. 2.** Blood supply to the spinal cord with marked origin and course of the great anterior segmental medullary artery (modified from Carmichael and Gloviczki, 1999). Reproduced with permission of the Mayo Foundation.

awards; he wrote and published in four languages: Polish, German, French, and Latin. Adamkiewicz joined many scientific and medical societies in Królewiec, Berlin, Leipzig, Kraków, Wiesbaden, and Wrocław (Operacz, 1995). In 1886, he was nominated and became a member of the prestigious French *Société de Biologie*.

But this stellar research career was not to continue. In the early 1890s, Adamkiewicz presented a series of lectures and later published several papers describing the discovery of a cancer-causing parasite that he named “*Coccidium sarcolytus*” (Adamkiewicz, 1893, 1894). Fascinated by the work of the German bacteriologist Robert Koch, Adamkiewicz proposed treating cancer with injections of a specially prepared serum that he named “cancroin.” The enormous publicity of his discoveries triggered severe critiques of his work by the Jagiellonian University faculty, who deemed the publication of his studies premature. Because of increasing conflict with his peers at the medical school, Adamkiewicz left his post at Jagiellonian University in 1892 (Abakanowicz and Beynart, 1935). With the approval of the Ministry of Health, he relocated to Vienna for a sabbatical in the Department of Surgery directed by his friend Professor Eduard Albert. Here, he initiated clinical trials with his newly discovered anticancer serum, which turned out to be a fiasco (Abakanowicz and Beynart, 1935). The unsuccessful results of his clinical trials and loss of support from the scientific community permanently closed the door for him to return to Kraków. In 1893, at age 43, he retired from active research citing his deteriorating health (Operacz, 1995).

For the next 30 years, Adamkiewicz quietly practiced medicine as the head of a ward at the Rothschild Jewish Hospital in Vienna and continued to publish his clinical observations. Adamkiewicz died in Vienna on 31 October 1921. But the artery of Adamkiewicz remains alive in the consciousness of surgeons, anatomists, and medical students.

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