From Russian Refugee to Iowa's First Neurosurgeon and Pioneer of Cranial Hemostasis: The Legacy of Anatole Kolodny (1892-1948)

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After immigrating to the United States from Russia in the wake of the First World War, Anatole Kolodny became the first surgeon in Iowa to specialize in neurological surgery. Kolodny was vital to the initial practice of neurosurgery in the state of Iowa and to the specific development of academic neurosurgery at the University of Iowa. In an effort to improve his surgical outcomes, Kolodny invented a hemostat that bears his name and is still used for cranial hemostasis. He also provided early outcomes of myelomeningocele repair and wrote extensively on bone sarcoma. Kolodny's achievements brought favorable attention to the university and altered the course of neurosurgery at the University of Iowa. Of significant importance, Kolodny influenced and trained Iowa's second neurosurgeon, Olan Hyndman, and this action led the way to the eventual recruitment of the university's first division head of neurosurgery. The purpose of this manuscript is to shed light on Kolodny's important contributions to the development of neurosurgery not only at Iowa, but also in the profession as a whole.

KEY WORDS: History of neurosurgery, Cranial hemostasis, Pediatric neurosurgery, Myelomeningocele, Sarcoma

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In 2016, the University of Iowa Hospitals and Clinics celebrated the 70th anniversary of the establishment of its Division of Neurosurgery and the subsequent arrival of Dr Russell Meyers as chief. During that 70-year period, the Division of Neurosurgery expanded substantially in clinical volume and research productivity and grew to become an independent Department of Neurosurgery in 1990. This achievement can be attributed to the leadership of the 4 chairmen: Russell Meyers, George Perret, John Van Gilder, and Matthew Howard.

Even though much is known about these 4 chairmen, little is known about neurosurgery at Iowa prior to 1946. According to an internally published retrospective review of skull fractures by Dr Earl Walker, the first neurosurgical operation in the state of Iowa took place sometime before 1920 (A. E. Walker, "Skull Fractures," Department of General Surgery Bulletin, 1934-1935). It is possible that other neurological surgeries were performed by a general surgeon in the state prior to this date, but we could find no evidence of such a procedure. The fact that neurosurgery was being performed so early at Iowa raises an inter-

esting question: who was the university's first neurosurgeon?

A review of billing records and university catalogs indicate that the first surgeon to specialize in neurosurgery in the state of Iowa was Anatole Kolodny, a Russian refugee who arrived in the United States in 1922. Thanks to a formal introduction from Harvey Cushing that same year, Kolodny was offered a position as a surgical pathologist at the State University of Iowa (SUI) and eventually rose to become the first surgeon to specialize in neurosurgery in the state. While at SUI, Kolodny published extensively on topics ranging from cranial hemostasis to pediatric neurosurgery and bone sarcoma, and these publications had a lasting impact on the practice of neurosurgery and medicine. The purpose of this manuscript is to document Kolodny's contributions to medicine as a whole and neurosurgery in particular.

BACKGROUND AND EDUCATION

Anatole Kolodny was born on November 24, 1892, in Kasan, Russia, to Josef and Tzivia

Kolodny. His father worked as a foreman on a farm, while his mother worked both at home and in the fields. Kolodny grew up with 7 siblings, one of whom Anatole would follow to the United States (along with 3 of his sisters).

Education was given extremely high priority in the Kolodny household and was protected at all costs. One example of that fervor is sustained in a family legend about the day that Anatole was told to lie about his age to keep him from being drafted into the Russian army. He pretended to be his elder brother's twin because only one twin could be drafted. Thus, Anatole was given priority to pursue an education while his "twin" brother went into the army. This act of deception ensured the stability of young Anatole's education.

Kolodny attended both secondary school and college in Vilnius, then a city in the Russian empire, now the capital of Lithuania, and he finished his undergraduate work by 1910 (Figure 1). Kolodny then pursued doctoral studies in philosophy at the University of Basel in Switzerland and eventually obtained a PhD in philosophy from the Imperial University of Dozpat in 1912. He soon entered medical school at the University of Kasan and was awarded a medical degree in 1916.

That Kolodny was a cosmopolitan intellectual is evident in the fact that he spoke 6 languages fluently (Russian, English, French, German, Ukrainian, and Polish) and was also sufficiently proficient in English, German, and Russian to publish medical literature in all 3 languages. Kolodny's passion for literature and philosophy led to his admiration of Leo Tolstoy. According to another family legend, young Anatole was sufficiently precocious to write the great man with questions regarding appropriate religious practice.

FIRST WORLD WAR

In July 1914, 2 years before Kolodny would graduate from medical school, Europe was consumed by a war that would become one of the greatest conflicts in world history: The First World War. The Great War, as it was called initially, would change the trajectory of Kolodny's life, eventually leading him to pursue his intellectual endeavors in the United States and, by chance, to become Iowa's first neurosurgeon.

After graduation from medical school, Kolodny served with a Russian military brigade that was sent to the Western front and fought in the Nivelle Offensive. In October 1917, when word of the Bolshevik Revolution reached France, numerous Russian soldiers abandoned their posts. Although the details are unclear, it is believed that Kolodny remained loyal to the new government in Moscow and eventually served in the Red Army, but exactly where or for how long we do not know.

Kolodny also served on the Russo-Turkish front. At one point during the war, Kolodny sustained an abdominal gunshot wound and a bayonet wound to his left neck. He was captured and spent time in a prisoner of war camp, from which he later escaped with a group of Russian soldiers.

FIGURE 1. Kolodny in Russia. Top panel: young Kolodny (second from right) in Academy uniform with other students. Bottom panel, left: young Kolodny (furthest right on picture) with Red Cross badge. Bottom panel, right: Kolodny in Imperial Russian Army uniform during The Great War.

Russia eventually left the war, but peace brought little comfort; life in the emerging Soviet Union was brutal, and Kolodny chose to leave his native land. Details of his departure are unknown, but to escape the hardships of revolutionary Russia, he sought asylum in Germany and found work at the Pathological Institute of Berlin (letter from Kolodny to Halsted, June 12, 1922, Halsted Letters, Johns Hopkins University Archives).

RUSSIAN REFUGEE IN AMERICA

In early 1922, Kolodny boarded the vessel Mt. Clinton, bound for New York City. He stayed with his brother Aaron Kolodny in Brooklyn after his arrival. More importantly, prior to his arrival in New York, he made important contacts that were vital to his entrance and advancement into the American medical community. For example, Kolodny's arrival in the United States was preceded by a letter of introduction to Harvey Cushing from a

mutual acquaintance named Otto Holbeck (letter from Holbeck to Cushing, January 15, 1922, Cushing Letters, Yale University Archives). Apparently, Holbeck met Cushing in Bern in 1901 in one of Professor Emil Kocher's clinics and, 21 years later, reached out to Cushing on Kolodny's behalf.

In April 1922, Cushing responded to Holbeck's introduction by inviting Kolodny for an interview in Boston, and Kolodny enthusiastically accepted (letter from Kolodny to Cushing, April 4, 1922, Cushing Letters, Yale University Archives). Shortly after the interview, Kolodny wrote Cushing of his desire to work under his tutelage in Boston. He chose this option despite better opportunities for employment from multiple private hospitals in the New York City area. His reasoning to accept Cushing's offer over the others was clear in his letter: he believed that the private institutions in New York would not provide the clinical material necessary to perform a high volume of surgery (letter from Kolodny to Cushing, April 22, 1922, Cushing Letters, Yale University Archives). But Kolodny had misunderstood Cushing's offer. In fact, Cushing told Kolodny that he would be disappointed if he were to come to Boston because the position would not include clinical surgery work.

When a desirable training opportunity did not materialize with Cushing, Kolodny wrote to William Halsted at Johns Hopkins and requested a position under his supervision (Kolodny to Halsted, June 12, 1922, Halsted Letters, John Hopkins University Archives). Halsted did not reply, and Kolodny received a note informing him that Halsted was on vacation and would not return until October. Blocked from opportunities to work with either Cushing or Halsted, Kolodny stayed in New York City and pursued employment as a resident surgeon at the Beekman Street Hospital, where he worked from April to October, 1922.

Kolodny's early correspondence in the United States demonstrate his ambitious desire for a busy surgical practice combined with challenging investigative work—the classic phenotype of

the academic neurosurgeon. It is this ambition that ultimately led Kolodny to pursue work at the State University of Iowa Hospital, even though it was not at the time closely associated with academic medicine or advanced surgical practices. To be sure, there was a Department of Surgery at Iowa, but no neurosurgical practice. For someone with Kolodny's pioneering spirit and ambition, however, Iowa was fertile ground to launch a career in academic neurosurgery.

In September 1922, Kolodny accepted a position as an Instructor of Surgical Pathology at Iowa (Figure 2). Cushing had highly recommended Kolodny (despite having met him only once) for this position and encouraged him to accept it, as he felt this would give him an excellent opportunity to get involved with surgical work (Cushing to Mulsow, September 16, 1922, Cushing Letters, Yale University Archives). On October 10, 1922, therefore, Kolodny became a surgical pathologist at the SUI. It is interesting to note that William Cone, who would later become a key figure in the development of neurosurgery, was appointed as an instructor of neuropathology and psychiatry at Iowa in the same year, and it is possible that Cone had interactions with Kolodny.

1924: THE SUI'S FIRST NEUROSURGEON

It is uncertain what type of neurosurgery was performed at Iowa prior to Kolodny's arrival, but it is clear that, once in the Department of Surgery, Kolodny sought to focus his practice on neurosurgery and what would now be considered orthopedics. From a letter Kolodny wrote in 1926, it is evident that his vision had always been to pursue specialization in neurosurgery. "Since my graduation," he wrote, "it has always been [my] ambition to devote my life to neurology and neurological surgery." (Letter from Kolodny to W. E. Dandy, June 21, 1926, Walter E. Dandy Papers, Johns Hopkins University Archives)

FIGURE 2. *Life in Iowa City at SUI. Left: Anatole Kolodny examining a specimen in the pathology laboratory at SUI. Right: Anatole Kolodny holding his daughter Olga Kolodny (later Olga Colbert) in Iowa City, IA.*

Interestingly, it appears that shortly after his arrival, Kolodny came to doubt his decision to come to Iowa. In the summer of 1923, while he was still working as a surgical pathologist at Iowa, Kolodny applied for a physician position at the Mayo Foundation (letter from L. B. Wilson to H. Cushing, July 11, 1923, Cushing Papers, Yale University Archives). Once again, Kolodny received an excellent recommendation from Harvey Cushing for the position at Mayo (H. Cushing to L. B. Wilson, July 16, 1926, Cushing Papers, Yale University Archives). It is uncertain whether or not Kolodny was offered a position at Mayo, or how Kolodny's job search contributed to his position at Iowa. It is clear, however, that Kolodny transitioned from a surgical pathologist to an instructor of surgery at Iowa by the end of 1923.

Early in his career at Iowa, Kolodny's investigative work was aligned closely with what would now be considered orthopedics, and, specifically, he developed a special interest in bone tumors.¹⁻³ Kolodny had accumulated enough expertise and experience with bone tumors that by 1927 he published a seminal work entitled "Bone Sarcoma: The Primary Malignant Tumors of Bone and the Giant Cell Tumor,"⁴ in which he reviewed an extensive number of cases of bone sarcoma from the American College of Surgeons patient registry. This text was so important that, following its publication, Kolodny received a written commendation from the board of regents of the American College of Surgeons for his work (letter from Board of Regents of American College of Surgeons to Kolodny, October 4, 1927, letter in possession of Olga Jeffrey).

In 1926, with support and encouragement from Dr Charles Rowan, the chair of surgery, Kolodny took a leave of absence from Iowa to obtain further training in "the fundamental principles of neurology and neurological surgery" (Kolodny to W. E. Dandy, June 21, 1926, Dandy Papers, Johns Hopkins University Archives). On October 1, 1926, he began an unpaid leave from Iowa to pursue this training. Although he originally intended to work with Professor Marburg in Vienna to further his skills in neuropathology, there is evidence that Kolodny was urged away from this plan to instead work under Walter Dandy at Johns Hopkins (Kolodny to W. E. Dandy, June 21, 1926, Dandy Papers, Johns Hopkins University Archives).

In November 1928, Kolodny left Johns Hopkins and began further training at Queens Square on the service of Dr Gordon Holmes. At Queens Square, Kolodny pursued investigative work studying case files of patients with tumors of the frontal or temporal lobes to describe the natural history and symptomatology of tumors in these brain regions.^{5,6} After training with Dandy at Hopkins, Kolodny must not have been satisfied with the facilities at Queens Square, because he wrote to Dandy that "the roentgenograms [at Queens Square] do not even approach the Hopkins' in quality" (letter from Kolodny to W. E. Dandy, February 12, 1928, Dandy Papers, Johns Hopkins University Archives). Kolodny also expressed a desire to review some of Dandy's surgical techniques that he had seen previously. For that reason, Kolodny left Queens Square to return to Johns Hopkins prior to coming back to Iowa.

FIGURE 3. Illustration of Kolodny's use of hemostats for cranial hemostasis. Reproduced with permission from the *Journal of the American Medical Association*. 1929. 92(12): 981-982. Copyright©1933 American Medical Association. All rights reserved.

One of Kolodny's most important contributions to neurosurgery was in techniques for cranial hemostasis (Figure 3).⁷ While at Hopkins with Dandy, Kolodny designed a curved hemostat that was specialized to stop bleeding from galeal arteries during craniotomy. Previously, surgeons had utilized straight hemostats that tore the galea when used for hemostasis. The Kolodny hemostat, as it later became known, was curved and therefore achieved galeal hemostasis during cranial approaches without tearing the dura. This hemostatic technique was used by Dandy at Hopkins and was published in JAMA in 1929.⁷

In addition to his contributions in cranial hemostasis, Kolodny also had a special interest in pediatric neurosurgery, specifically in repair encephaloceles and spina bifida.^{8,9} Between 1905 and 1929, several manuscripts reported spina bifida mortality rates of 50% or higher and that made the decision for operative repair of myelomeningocele and other neural tube defects controversial in the neurosurgical community.^{10,11}

FIGURE 4. Child born with occipital encephalocele and myelomeningocele. Left panel: pathologies demonstrated in the child at 4 months of age, just prior to repair of both abnormalities. At 4 years of age, the child was able to walk and had mild cognitive impairment. In contrast to many of his contemporaries, Kolodny was a strong advocate for myelomeningocele closure. Reproduced with permission from the *Journal of the American Medical Association*. 1933. 101(21): 1626–1630. Copyright© 1933 American Medical Association. All rights reserved.

Kolodny strongly advocated for operative repair of myelomeningocele and occipital encephaloceles, stating that “with proper [technique] and management the mortality may be greatly reduced and that the ultimate prognosis of patients operated on is most favorable.”⁸ In his series, Kolodny reported that 46 of 60 children with 9 months of follow-up after repair of encephalocele or myelomeningocele were in “good condition”⁸ (Figure 4). Given the incidence of untreated hydrocephalus that likely occurred in this patient group, it is uncertain how Kolodny achieved such satisfactory results for his time. Having said that, Kolodny’s advocacy for patients with spina bifida in this setting was important at a time when spina bifida was considered a hopeless condition and many children with spina bifida were left to die.

Kolodny had a lasting impact on academic medicine at Iowa by clearly demonstrating the value of having a surgeon on the faculty who specialized in neurosurgery. Kolodny, in fact, mentored and advised Olan Hyndman to become Iowa’s second neurosurgeon. Hyndman began his surgical internship at Iowa in 1927 and had numerous interactions with Kolodny during his training. After Kolodny’s departure, Hyndman also pursued training with Dandy, subsequently had a neurosurgery practice at the University of Iowa, and became the first neurosurgeon at the new Veterans Administration Hospital in Iowa City.

In 1929, Kolodny left the university to go into private practice in Sioux City, Iowa. His reasons for leaving are unclear. At the time, there was tension between physicians and university administrators about mixing academic medicine and private practice. On one hand, the university allowed the ability to teach and pursue investigative work. On the other hand, private practice provided a more diverse patient population with greater financial incentives. With marriage and the birth of his first child in 1929, Anatole was likely drawn away from the university to provide better support and stability for his family. Though he would continue to publish, Kolodny never returned to academic neurosurgery.

PERSONAL LIFE AND PRACTICE IN MANHATTAN

Despite important academic contributions during his time at SUI and in Iowa, Kolodny always had a strong desire to return to New York City. Thus, in 1934, he moved back to New York to pursue private practice in Manhattan. Kolodny had a broad general surgery practice but also continued to subspecialize in neurological surgery. He published very little while in New York, and it is uncertain why he decided to change so substantially the nature of his career. Despite slowing his publication rate after leaving Iowa, he did make several additional important contributions to neurosurgery.^{12,13} It is likely that his marriage and raising children contributed to his career change (see below). During this time, there certainly would have been an opportunity to stay at Iowa, since the Department of Surgery was eager to have neurosurgery as part of its curriculum. This fact is evident in the promotion of Olan Hyndman to the faculty shortly after Kolodny’s departure.

In 1928, Kolodny married Ellen Plass of Rhinebeck, NY (Figure 5). Ellen was an operating room nurse at Johns Hopkins, and Kolodny must have met her during his time training with Dandy. Anatole must have been smitten by Ellen, as he pursued courtship with her despite her initial lack of interest in him. After a short courtship, Anatole and Ellen married in a courthouse in Baltimore and then moved back to Iowa City. The Kolodnys had 2 children: Olga and Anatole. With the onset of World War II, an apprehension of anti-Semitism led Anatole to legally change young Olga and Anatole’s last name from Kolodny to Colbert.

FIGURE 5. Family life in Rhinebeck, NY. Left: Ellen (Plass) Kolodny. Right: Ellen Kolodny, their child, and Anatole Kolodny in Rhinebeck, NY.

Kolodny was devoted to his family, but seemingly had few interests outside of medicine. He often left home for the hospital before 7 am and would not return until 8 pm. The sole exception was classical music, and this love led him to encourage his daughter Olga to attend Juilliard. He was a strict disciplinarian who required his children to study rigorously. When his daughter Olga would come home with Bs, Anatole found it inexcusable and encouraged her to study harder. Kolodny built a home for his family in upstate New York (Rhinebeck, NY), where his daughter continues to live to this day.

In the late 1940s, nearly 2 decades after leaving Iowa, Kolodny diagnosed himself with a gastrointestinal malignancy. Although experimental surgery at the Massachusetts General Hospital left Kolodny extremely weak for several months, he nonetheless continued to practice medicine. In fact, he took his determination to practice medicine to exceptional lengths. When he became so weak that he could no longer drive his car, Kolodny had his daughter drive him to the hospital, and he continued to practice as a surgeon until he was completely incapacitated by his illness. One morning in 1948, several months after the operation to remove his cancer, Kolodny woke up from sleep with severe pain in his throat. He told his wife Ellen that his cancer had metastasized. He died within a few months.

CONCLUSION

Given his contributions to the development of neurosurgery both at Iowa and beyond, Anatole Kolodny should be remembered by the neurosurgical community. The Kolodny hemostatic forceps is a prime example of the necessity of invention in academic neurosurgery. This necessity continues to the present day but was particularly important for early neurosurgeons. Anatole Kolodny is to be saluted and remembered as an early pioneer of this important element of any academic neurosurgical practice.

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