

# Ludwik von Rydygier (1850–1920) – pioneer of gastric surgery and his contribution to urology

*Thaddaeus Zajackowski*

Mülheim/Ruhr, Germany

## KEY WORDS

history of medicine ▶ Ludwik Rydygier ▶ gastric surgery ▶ urology

## ABSTRACT

The author presents the life and achievements of Ludwik von Rydygier and his contribution to European and world surgery. Rydygier was born in Dussocin, at that time a part of Prussia. He was educated at numerous Pomeranian schools and he graduated from Greifswald University in 1874. Ludwik Rydygier was the first surgeon in Poland and the second surgeon in the world after Jules Péan, to resect the stomach for cancer in 1880. In 1881, he was the first in the world to perform pylorus resection for pyloric stenosis due to gastric ulcer. Aside from gastric and general surgery, he also devoted himself to urological surgery. Rydygier took particular interest in plastic surgery of the ureter, perineal extraurethral prostatectomy and transperitoneal prostatectomy. He performed a large number of successful closures of the vesico-vaginal fistulae. He died at the age of 70 in Lemberg.

## INTRODUCTION

Nearly 90 years ago, on June 25, 1920, one of the famous surgeons of the turn of the 19<sup>th</sup> century, Ludwik von Rydygier died (Fig. 1). The surgeon was born as Ludwig Riediger. On July 2, 1887, he changed his name Riediger to Rydygier because he wanted his name to be spelled in a more Polish way. He is famous for his achievements in the development of the gastric surgery.

Apart from abdominal, thoracic, breast, and orthopedic surgery, he was active in the fields of antisepsis, gynecology, ophthalmology, anesthesiology, and laryngological diseases.

Rydygier was a driving force behind the building and organization of three surgical clinics: one in Culm, one in Cracow, and one in Lemberg. His name is linked with the organization of scientific conferences and the foundation of the Polish Surgical Society. He was the co-founder of the German Association of Urology. He was the founder of a famed surgeon's dynasty in Brazil. Among the surgical fields he impacted, Ludwik von Rydygier devoted himself to urological surgery as well [1, 2, 3, 4, 5].

### Early life

Ludwig Riediger was born on August 21, 1850, in Dossoczyn (Dusocin) near Graudenz (Grudziądz), West Prussia. He was the

second son of landowner Carl Riediger and Elisabeth née Koenig. In April, 1853 Ludwig's father sold the estate in Dossoczyn and bought another from Justine Kayser in Grabau (Grabowo), where the Riediger family moved. His elementary schooling began at home and continued at the Collegiums Marianum in Pelplin and in later at a secondary school in Konitz (Chojnice). He obtained his secondary school certificate in 1869, in Culm (Chelmo).

Riediger started his medical studies at Greifswald University, in that same year. These studies were at first troubled by financial problems – as he wrote to the Educational Aid Society for the Youth of Western Prussia; his parents were unable to support him at university. He was granted a scholarship, but in return was obliged to submit periodic brief scientific essays, written in Polish and connected to his studies. Riediger promised to repay this debt of gratitude and to promote the Polish language by writing articles for the "Physicians Gazette" (*Gazeta Lekarska*, GL). During the study, he became a co-founder and active member of *Polonia*, an organization promoting the Polish language, for which he was relegated from the University for one year. However, he did not interrupt his studies but continued them in Berlin and in Strasbourg. He received a physician's diploma in 1873 and the degree of Doctor of Medicine in Greifswald in 1874 for a dissertation titled, "Experimental Studies on the Activity of Carbolic Acid". In this dissertation he determined the toxicity of the carbolic acid used as an antiseptic and in the treatment of inflammation. Promoter: Professor Karl Hueter (1838–1882) [1, 3, 6, 7].

### Surgical training

Unable to find employment in Hueter's surgical clinic, Riediger then moved to Danzig (Gdańsk), where he worked in the Virgin Mary Hospital. He subsequently conducted an outpatient practice in Culm. He periodically performed more serious operations at the Hospital of the Sisters of Mercy in Culm.

In 1877, he started work at Greifswald Surgical Clinic, under his beloved mentor Professor Karl Hueter. In 1879, he qualified as a lecturer (Dozent) in surgery at the University of Jena, on the basis of the work "A New Method for the Treatment of Pseudoarthrosis". The method consisted of surgical exposure of the lesion site, removal of the interposed soft tissues, and replacement of periosteal flaps.

He was appointed to the position of First Assistant at the local surgical clinic in Jena (Head: Professor Franz Jordan Ried, 1810–1895). In addition to this, he lectured in Jena for two semesters in desmology and the science of bone fractures. During his work in Jena, he went to Warsaw and for a few months to Vienna, where he got acquainted with surgical institutions and with the famous Professor Theodor Billroth (1829–1894) and his school. Especially he was interested in advanced gastric surgery experiments on animals. A year later Riediger left Jena and went to live in Culm.

In 1877, Riediger married Maria Borkowska (1836–1918). The marriage was a success, and in March, 1877 Maria officially gave her husband the power of attorney over all her possessions. The couple raised two children, their son Antoni became a surgeon [1, 5, 6, 7, 8].

### Professional life in Culm (1879–1887)

After settling down in Culm, Riediger used his wife's dowry to buy an imposing two-storey building, which he converted into a hospital, a private modern clinic for "surgical, ophthalmologic, and gynecological diseases" with 25 beds and an outpatient clinic open daily till noon. He arranged his private hospital like university clinic, providing space for an outpatient clinic and for the housing of animals for experiments. About 2,000 patients were admitted per year.

It was at this clinic that Riediger carried out two pioneering stomach operations on a human. On the 16<sup>th</sup> of November, 1880, he performed a pylorotomy on a patient suffering from cancer, reconstructing the continuity of the digestive tract. Unfortunately, the patient died from shock twelve hours after the operation. Julius Pean's operation in 1879 had a lethal outcome on the fifth post-operative day. Subsequently, on the 29<sup>th</sup> of January, 1881, Billroth carried out a similar operation, after which the patient survived.

The technique of excision of the pylorus with the reconstruction of digestive tract continuity by end-to-end anastomosis of the severed end of the duodenum to the resected end of the stomach was described for the first time by Riediger in Polish. Billroth described this surgical technique only 3 months later, in German-language literature. Billroth was the first to be successful. The second method with blind closure of the duodenum and gastro-jejuno anastomoses was the work of Billroth. All these operations were performed for cancer of the stomach.

On the 21<sup>st</sup> of November, 1881 Riediger performed the first pylorotomy on a woman with pyloric stenosis due to gastric ulcer. She achieved complete recovery. In the *Centralblatt für Chirurgie* on January 16<sup>th</sup>, 1882, Riediger described the case and his surgical technique in detail. Underneath this report, entitled "The first gastric resection in a case of gastric ulcer", E. Richter and co-editors (F. König and R. Volkmann) added the famous footnote – *Hoffentlich auch letzte* (hopefully also the last one). This grossly incorrect evaluation on the part of his contemporaries is not unique to the evolution of surgical methods and techniques. It proves our inability to recognize things that will develop in the future. In the beginning, most of the operations were performed on pyloric stenoses, but Riediger had already suggested this technique for patients with uncontrollable hemorrhaging ulcers and/or with perforating ulcerative disease, in 1882.

He was among the first to propose the excision of a necrotic intestine in the case of an incarcerated hernia. Riediger described his own experience with the resection of intestines due to iatrogenic bowel injuries, bowel invagination (intussusceptions), or tumors and its end to end anastomosis with gut results. In 1881, Riediger described 61 such cases, which he operated on successfully. Riediger was the first to perform gastroenterostomy on a duodenal peptic ulcer with stenosis, in 1884.

During his 9 years in Culm, Riediger published over 20 of his most important papers describing his experimental and clinical work. It was during this period of his life that he made his greatest scientific contributions, paving the way for a resplendent academic career [1, 3-7, 9-19].

### Working in Cracow (1888–1897)

On July 2, 1887, he changed his name from Riediger to Rydygier. In order to work in the territory of the Austrian Monarchy he gave up his Prussian citizenship to obtain Bavarian citizenship and moved with his family to Cracow. Rydygier took over the Surgical Clinic in Cracow from Johann Mikulicz-Radecki (1850–1905), and was appointed as its director as well as Full Professor at the Jagiellonian University.

While in Cracow, Rydygier accomplished the unfulfilled dream of his predecessor – he managed to secure sufficient funds from



Fig. 1. Ludwik Rydygier, 1901 [4].

the authorities in Vienna to build a surgical clinic that satisfied all the requirements of medicine in that era.

In recognition of this achievement he was elected Dean of the Faculty of Medicine for the academic year 1888/1889. In the course of almost a decade of work in Cracow he distinguished himself by continuing his scientific endeavors and, above all, by his social and professional initiatives and teaching activities [1, 3, 6, 7, 8].

### Activity in Lemberg (1897–1920)

Following the establishment of the Faculty of Medicine at the University of Lemberg (now Lviv, Ukraine), and at the request of the Lemberg University's administration and the authorities in Vienna, Ludwik Ritter von Rydygier accepted the directorship of the Surgical Clinic in Lemberg on March 19, 1897. During the academic years 1898/1899 and 1911/1912, he served as Dean of the Faculty of Medicine, and in academic year of 1901/1902 as Rector of the University of Lemberg.

During World War I, Rydygier left Lemberg before the advancing Russian army and assumed the post as Chief Surgeon at a military hospital in Brno (Brünn), in Mähren (Moravia), from 1914 to 1916. He obtained the rank of Brigadier (General Surgeon) in the Austrian army. After the Russians had been driven out by Austrian forces in 1916, Rydygier returned to Lemberg to reorganize the devastated surgical clinic, which then re-opened in 1917.

In November, 1918, he fought the Ukrainians while defending Lemberg and was nominated Surgeon Second Lieutenant-General in the Polish Army. In the 1920, he played an active role in the war against the invading Bolshevik (Russian) army as Chief of medical service for the Polish army in Pomerania. In that same year, he began to set up military hospitals in West Prussia. He wanted to spend the remaining years of his life in Tczew (Dirschau), Prussia, where he was planning to open a private hospital. To accomplish this he sold his extensive estate in the parish of Fujna, in Żółkwie near Lemberg, but that very night he saw a financial crash when the Deutschmark's value fell to almost nothing, and in the morning after the transaction the Professor awoke to find himself ruined. In a state of enormous mental distress, while attempting to have the sale declared invalid at a Lemberg notary's office, Rydygier suddenly collapsed and died [1, 7, 8].

### Rydygier's contributions to urology

Ludwik von Rydygier introduced X-rays, cystoscopy, and ureteral catheterization as routine diagnostic methods in his clinics.

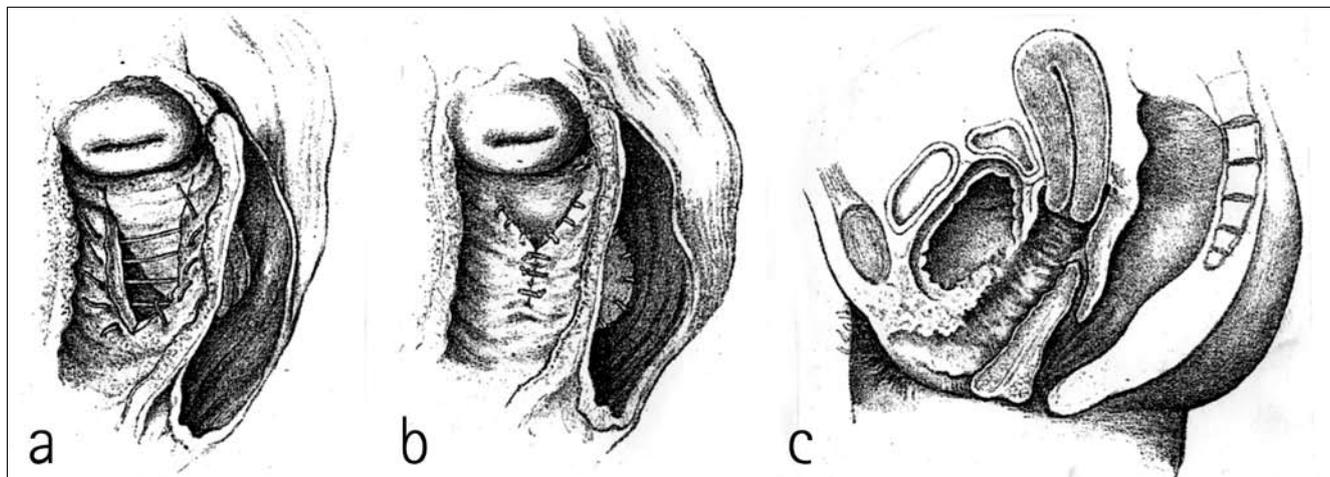


Fig. 2 a-c. Operation steps Vesico-Vaginal-Rectal Fistulae [4, 22].

He operated on neoplasms, bladder stones, and tuberculosis using transperitoneal access. For prostate adenomas, he favored perineal access. He carried out plastic surgery in patients with stenosis, neoplasms, and ureteral damage or defects. He operated on congenital malformations of the ureter, kidneys, bladder, urethra, and he successfully repaired vesicovaginal fistulas.

On December 5, 1887, Rydygier removed a bladder stone by a transperitoneal incision (*sectio Alta interperitonealis*). He closed the bladder using furrier's suture and catheterized it for a time. This method was partly accepted in Poland, but western European surgeons did not follow in Rydygier's footsteps. It was only in 1908 that the celebrated American surgeon Charles Mayo (1865-1939) used Rydygier's method to remove tumors and stones from the bladder. In 1891, Rydygier presented another new concept in urinary tract surgery, namely grafting the ends of a ureter damaged over a fairly long distance into the abdominal integuments and, in a second stage of the operation, making up the loss with a duct formed by a flap of skin.

In 1897, Rydygier moved to Lemberg, at which time he modified the procedure of prostatic adenoma removal. The method consisted of making a median incision, from the scrotum as far as the anus, and intracapsular removal of the adenoma while preserving two bands of gland tissue to ensure continuity of the urethra. He called this type of operation *resectio prostatae intracapsularis*.

A condition to which Rydygier devoted much of his time was urinary fistulas, especially vesicovaginal. He was already interested in this problem when he was in Culm. In a short paper he described 21 patients with vesicovaginal fistulas and discussed the more complicated cases. He considered prolonged labor to be the most common cause of such fistulas, not so much the use of obstetric instruments and forceps. When operating on the fistulas he gave preference to the method of Gustav Simon (1824-1876) due to its simplicity, ease of performance, and effectiveness. He believed that excision of the scar and careful avivement of the fistula surfaces was an important condition for a successful outcome. He described his own method for repairing ureterorectal and ureterovaginal fistulas by ureterocystoneostomy. Usually, he implanted the ureter directly into the bladder. In case of a "short ureter", he preferred the Boari method.

He operated on vesico-vagino-rectal fistulas (cloacae) by forming a triangular flap intended to act as a valve to prevent the entry of fecal matter into the urinary tract. Finally, he closed the vaginal orifice. At that time many surgeons discussed enlarged fistulas and closed *introitus vaginae* in these cases only (Figs. 2a, b and c).

Nephralgia, or painful kidney for which no definite cause can be found, was a common diagnosis at that time. Incision of the renal

capsule (capsulotomy) or encapsulation of the kidney to relieve the pain was a frequent operation in patients at Rydygier's clinic also. The results of capsulotomy and nephrotomy were proven with animal experiments by Rydygier's scholar, M. W. Herman in Lemberg.

During World War I, the technique was revived in Germany for the treatment of trench and acute nephritis – "nephritis dolorosa". The operation was also used until the 1970's by some surgeons and urologists in cases of progressive oliguria and anuria until the advent of dialysis and the artificial kidney.

Rydygier showed interest in hydrotherapy and gave a lecture entitled "Truskawiec and Urinary Tract Disorders". He recommended the paraffin-flavored local spa water *Naftusia*, in certain forms of kidney irritation due to a predisposition to gout and to urolithiasis" [2, 4, 5, 8, 20-24].

#### Scientific and educational activity

Ludwik Rydygier's scientific legacy runs to over 200 published papers, beginning with case reports dating back to his student days. Warsaw's surgeon, Polycarp Girsztowt (1827-1877), encouraged Rydygier to publish papers in Polish and helped him in this work. In 1912, Rydygier published the results of his scientific studies in an extensive volume entitled "Sammlung der von Dr. Ludwik Ritter Rydygier von Ruediger k.k. Hofrat und Professor für Chirurgie bis jetzt veröffentlichten Arbeiten", a voluminous (1750 pages) collection of 149 of his papers.

He recommended diagnostic laparotomies using medial incisions and closed them without drainage. Rydygier was the second man, after César Roux (1857-1934), to perform reconstruction of the esophagus with a part of the jejunum translocated to the anterior part of the thorax.

In his practice, he invariably strove to make use of the latest scientific advances. In 1890, he brought a batch of tuberculin to Cracow for therapeutic purposes. Four years after their discovery, he used X-ray equipment for diagnosis of bladder calculi and bone fractures, in 1899. In 1911 he carried out the first therapeutic experiments with radium.

He established a school of surgery and associates of the clinics he directed published an excess of 400 papers. A whole generation of outstanding Polish surgeons grew under his guiding hand [1, 2, 4, 6, 7, 8].

#### Founder of the Polish Surgical Society and co-founder of the German Association of Urology

Rydygier's creative life in the field of scientific and educational endeavors is only part of the story. In his position as the head of a hospital, and later as a chief of surgical clinics, he did not limit

himself to the role of an effective educator of medical students and famous practical surgeon – he immediately decided to attract surgeons from all three parts of partitioned Poland. To this end, he decided to hold annual conferences for Polish surgeons. The first such conference took place in 1889, in Rydygier's own newly opened surgical clinic in Cracow, on his initiative and under his guidance. At this meeting, he was elected as Chairman for that and all future surgical conferences. He lived to see 17 annual conferences, which lasted 3 days and over which he always presided.

Rydygier visited German Surgical Association conferences regularly. He was very active there, reading papers and bringing his vivid contribution to discussions. He was a member of the Editorial Board of *Deutsche Zeitschrift für Chirurgie* and a member of the German Surgical Society. Rydygier was a co-founder of the German Association of Urology (GAU) and in 1906 was elected as one of its Committee (Board) members [1, 7, 8, 25].

### Honors and awards. The German origin, Polish patriot

Professor Rydygier received many honors from his fellow surgeons, Austrian authorities, the Catholic Church, and, from the newly reborn, Polish state. Several Polish and foreign medical societies made him an honorary member and his achievements at social activities were also recognized. The Austrian Emperor, Franz Joseph, raised him to nobility with the title of Privy Councillor and awarded him the Order of the Iron Crown Class IV. The Pope made him a Commander of the Order of St. Gregory.

Ludwik Rydygier has remained a cult figure, enjoying interest, fame, and popularity to this day. Hospitals, lecture halls, operating rooms, libraries, and streets in a number of Polish towns are still named after him in addition to medals and memorial plaques that adorn many places to remind people of where this great man and scientist had once lived and worked.

Ludwik Rydygier was indeed of German origin, from a noble Prussian family (Junkers), Rüdiger von Rüdigen. His ascendants came from Thuringia to Danzig. In spite of German roots, he was also an exemplary advocate of Polish culture as a promoter of Polish language and patriotism. In his work and professional activity he served both, the Austrian Monarchy and Poland. Rydygier was also fortunate in another respect – he became the founder of a dynasty of surgeons in Brazil, now in its' fourth generation [1, 5, 7, 8].

### The final years

During the defense of Lemberg in 1918, Professor Rydygier lived through a personal tragedy when a stray bullet wounded his wife Maria. Maria Rydygier had already been ill for some time when this accidental wound hastened her death, on the 24<sup>th</sup> of November, 1918. She was buried in Lemberg's Łyczakowski Cemetery.

Rydygier himself passed away in Lemberg (Lviv) on June 25, 1920. He was also buried in Lemberg's Łyczakowski Cemetery, in the quarter reserved for the defenders of Lemberg.

In 1989, the new Medical University in Bydgoszcz (Bromberg) adopted the name of this renowned Polish surgeon. The authority of the Medical University of Bydgoszcz looks after Rydygier's tomb [1, 5, 7, 8].

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## Correspondence

Thaddaeus Zajaczkowski  
16, Klaus-Groth Street  
D-45472 Muelheim an der Ruhr, Germany  
phone: +49 0 208 63 249  
t.zajaczkowski@gmx.de