INTRODUCTION

Ludwik Rydygier, alumnus of the University of Greifswald, professor of surgery at the Jagiellonian and Lemberg (Lviv) Universities and inventor of numerous novel surgical operative techniques, ranks among the outstanding European surgeons of the second half of the 19th century and the beginning of the 20th century, among such names as Bernard Rudolf Konrad von Langenbeck, Theodor Billroth, Carl Hueter, Friedrich von Trendelenburg and Jan Mikulicz-Radecki.

From early childhood Rydygier soaked up the atmosphere of Polish national identity created at home by his Catholic parents. He strived throughout his entire professional life for the independence of Polish surgery.

Rydygier's vocation for surgery was steadily growing. In autumn 1873 he returned to the University of Greifswald, where he presented his thesis on cardiac anatomy and physiology (1 December) and received his physician's diploma (8 December). Then he started experiments with frogs to study the effect of carbolic acid on infectious lesions. He showed that carbolic acid had proved to be an excellent anti-inflammatory agent. This study provided the grounds for his doctoral dissertation entitled “Experimental Studies of the Activity of Carbolic Acid” (Experimentelle Beiträge zur Lehre von der Wirkung der Carbol Säure). On 28 March 1874 Rydygier was awarded the degree of Medical Doctor of surgery and obstetrics.

In April 1877 Rydygier assumed the post of assistant at the University of Greifswald Surgical Clinic. On 8 July he filed a written application to register for his “habilitation”, the standard
post-doctoral academic qualification, at the University of Jena (established in 1558). Already on 8 January 1878 he presented the thesis entitled “A New Method for the Treatment of Pseudoarthrosis” (Eine neue Methode zur Behandlung von Pseudoarthrosen) prepared under the direction of his mentor Professor K. Huetter (6). The thesis was first published in the Polish version in the Przegląd Lekarski (1878). On April, 28, Rydygier was bestowed veniam docendi in surgery and became doctor, the second in the history of the University of Jena, and was appointed Senior Assistant at the Surgical Clinic headed by Professor Ried. He lectured on the principles of desmology. A year later he left Jena and went to live in Culm.

THE YEARS IN CULM (1879-1887)

On 5 October 1879 he bought a house in Culm, where he organised a 25-bed hospital surrounded by a beautiful park with a view of the Vistula River. The rooms were equipped with running water and signal system for patients, with bathrooms and toilets also installed in the corridors. The operating theatre was equipped with modern instruments, some of them invented by Rydygier, e.g., stomach and intestinal clamps. There was also space for a laboratory and the housing of animals for experiments. The first patients were admitted to the hospital on October, 7. Drs. L. Polewski, H. Laudowicz and W. Wehr were his assistants at that time and also later in Lviv. In the Culm hospital, Rydygier developed the principles of academic surgery. Every day between 9 and 11 a.m., patients were admitted to the outpatient clinic. About 2000 patients were admitted per year. Rydygier wrote annual reports on the clinic’s activities and submitted them for publication to the Przegląd Lekarski, He also encouraged his assistants to carry out research, to publish the results of their studies and to produce doctoral dissertations. In 1886 he published in Poznan a single-volume text-book on surgery in Polish. The text-book modelled on text-books by Huetter and Koenig included information of diseases of the head, neck and oesophagus. The first part of the second volume that appeared in 1893 included knowledge of spine, chest and breast diseases.

THE YEARS IN CRACOW (1887-1897)

On 3 September 1882, Jan Mikulicz-Radecki, strongly supported by T. Biliroth, assumed the post of Head of the Surgical Clinic at the Jagiellonian University. After five years Jan Mikulicz moved to Königsberg (Krolewiec) and Rydygier applied to succeed him. He defeated seven other candidates for the post, and on 2 July 1887 he took over the Surgical Clinic as its head; on 1 October, he became Professor of Surgery at the Jagiellonian University. During the competition procedures, Rydygier’s Polish identity was praised as much as his scientific achievements.

At the beginning of Rydygier’s term the condition of the Surgical Clinic in Cracow was very bad, it had only 20 beds and employed one assistant and three nurses. He took an active part in establishing a new clinic whose design and idea were the effect of Jan Mikulicz’s efforts. In the cornerstone of the new building was set the Decree of 19 March 1897, issued by the Austrian Emperor, Franz Joseph, which was a new clinic. In his new clinic Rydygier introduced modern surgical techniques, which were the result of his own research and those of his assistants. He also encouraged his assistants to carry out research, to publish the results of their studies and to produce doctoral dissertations. In 1886 he published in Poznan a single-volume text-book on surgery in Polish. The text-book modelled on text-books by Huetter and Koenig included information of diseases of the head, neck and oesophagus. The first part of the second volume that appeared in 1893 included knowledge of spine, chest and breast diseases.

THE YEARS IN LEMBERG (1897-1920)

In 1897 Rydygier moved to Lemberg. By virtue of the Decree of 19 March 1897, issued by the Austrian Emperor, Franz Joseph, Ludwik Rydygier was appointed director of the Surgical Clinic at the John Casimir University in Lemberg. The clinic had 50 beds. Despite the fact that Rydygier was cautious in formulating his opinion about the value of radiological examinations, a radiological laboratory, established already in 1896, was still operational. In 1911 the Lemberg Clinic received from Vienna 2,472 mg of pure radium and Rydygier is recognised a radiotherapy (curietherapy) pioneer in Poland. On 15 December 1897 the Austrian Emperor granted Rydygier the title of Privy Councillor and on 18 March 1898 the Pope made him a Commander of the Order of St. Gregory. Meanwhile, the Polish Medical Association had granted him
Lesniewski introduced Professor Rydygier to Jozef Pilsudski, Commander-in-Chief of the Polish Army with a recommendation procedures observed by the students. Rydygier performed operating the staff continued their work in the outpatients' clinic. He used instruments, which did not damage tissues. After prior to an operation. When operating he used a scalpel not performance. He was not ashamed to refer to an anatomical atlas cited Polish authors, promoting at the same time the achievements interesting cases from among the patients. During his lectures he gathered in his office and reported on the condition of individual patients. This was followed by the second round with the Professor. After rounds, selected patients were presented at the outpatient clinic. Rydygier lectured to students with illustrations from interesting cases from among the patients. During his lectures he cited Polish authors, promoting at the same time the achievements of Polish doctors. After the lecture operations began, with surgical procedures observed by the students. Rydygier performed operations slowly, but very precisely, taking care of haemostasis. He stressed the significance of anatomy as a basis of good performance. He was not ashamed to refer to an anatomical atlas prior to an operation. When operating he used a scalpel not scissors. He used instruments, which did not damage tissues. After operating the staff continued their work in the outpatients' clinic. Rydygier paid much attention to good practice in the outpatients' clinic, using his most experienced assistants there.

In 1902, when Kocher and de Quervain were compiling the Encyclopaedia of Surgery, they asked Rydygier to write the chapter on surgical procedures on the pelvis minor and rectum. That was an indication of his reputation as an outstanding surgeon and a recognition of Polish surgery.

On 26 March 1919 the Minister of Defence, General Jozef Lesniewski introduced Professor Rydygier to Jozef Pilsudski, Commander-in-Chief of the Polish Army with a recommendation to promote him to the rank of Brigadier-General and to the post of Chief Inspector of the Polish Army’s Sanitation Service (Fig. 2). In 1920 he was nominated Surgeon Second Lieutenant-General in the Polish Army in Pomerania led by General Jozef Haller. At that time Rydygier wrote a text-book on war surgery that appeared in a published form after his death.

**RYDYGIER'S EXTRAORDINARY PERSONALITY**

Rydygier, inventor of modern Polish surgery, a brave and intransigent fighter for Poland, resourceful, an exceptionally gifted surgeon, organiser of three clinics of European standard in Culm, Cracow and Lemberg, demonstrated his very strong personality. In his position as head of the hospital and chief of surgical clinics he did not limit himself to the role of an outstanding Polish surgeon, and excellent operator, initiator of novel surgical techniques and very talented organiser, but he also got involved in education, research and publication. He proved to be an effective educator of medical students, a creator of new teaching methods. He loved young people and they loved him. We also know that Rydygier was very much interested in promoting Polish art and songs. He organised literary evenings and theatrical performances. He also had an excellent sense of humour.

He was characterised by a patriarchal attitude towards his co-workers. He was a very strict boss and teacher, expecting work discipline from himself and his associates. He was obsessed with order and cleanliness especially with personal hygiene and hand washing. Rydygier loved law and order. He was very ambitious and could not stand reluctance or opposition. He did not smoke and did not like smoking around.

Rydygier was very much against allowing women to study medicine in general, and surgery in particular. During his term as rector of the University of Lemberg, he once voiced one of his well known sentences: “As long as a nightingale sings in Mydlnik and brings food to its female sitting in the nest, I won’t believe in equal rights for women.” He always knew how to make the most of every opportunity to tease female students (8).


It is worth mentioning that Rydygier published first in Polish language and then in German, it was also his practice to publish his works first in Polish journals. He was convinced that Polish achievements should primarily be known in the homeland.

Rydygier has remained a cult figure, enjoying interest, fame and popularity to this day. Numerous monuments have been erected to commemorate him. The city of Chelmno unveiled its monument on 14 June 1958 (10). The University Hospital in Wroclaw, the Regional Specialist Hospital in Cracow and the Surgical Clinic Library at the University of Lemberg, as well as many other places and streets in Poland are still named after him.

Lectures of great prestige named after Ludwik Rydygier have been delivered at the opening ceremony of each Meeting of Polish Surgeons. In 1992 The Ludwik Rydygier Association was founded by Professor Tadeusz Popiela, Head of the Surgical Clinic at the Medical Academy in Cracow, to commemorate the achievements of and pay tribute to this great surgeon.

**SCIENTIST, INVENTOR AND TEACHER**

Rydygier, a great supporter of surgical advancement, was convinced that surgery cannot progress without close links with...
internal medicine. In 1873, the first article on cricotracheotomy and findings concerning the treatment of typhoid fever was published in the Gazeta Lekarska. The same year the Przegląd Lekarski published his findings on the regeneration of liver tissues in hepatic cirrhosis.

In his contribution at the 7th Convention of German Surgeons in Berlin, Rydygier demonstrated cases of the asymmetry of the sacral bone and spinal curvature. He produced reports after each Congress he attended, and published them in the Przegląd Lekarski to inform Polish physicians about advances in European surgery.

The years in Clum are regarded as the most productive period in Rydygier’s life. He was the first surgeon in Poland and the second in the world after Jules P ean, to perform a pylorectomy on a patient suffering from cancer. He was the first in the world to perform pylorus resection for pyloric stenosis due to gastric ulcer. He established the principles for stomach resection, modifying the operating techniques and investigating the consequences of resection. Ludwik Rydygier was an innate researcher and surgeon.

Rydygier was interested primarily in the alimentary tract. His achievements in this area, especially those accomplished in cooperation with specialists in internal medicine like Professor J oze f Jaworski, were pioneering in the field known now as the brain-gut axis. In 1912 Rydygier published the results of his scientific studies in an extensive volume of 1750 pages, a collection of his 149 papers. P. Neuman of Lemberg was its publisher (11). His scientific legacy runs to over 200 published papers and a number of text-books.

**NARCOSIS, ASEPsis AND ANTISEPSIS**

The first general anaesthesia was performed by Morson on 16 October 1846. Already in 1847, Professors L. Bierkowski and L. Rydygier introduced anaesthesia in Cracow and Le Brun in Warsaw. Both professors used ether as a medium. In the Clum Clinic, Rydygier applied the so-called Billroth’ mixture, a composition of three substances (chlorophorm, alcohol and aetheris sulphurici), using the drop method and Schimmelbach’s mask.

I. Semmelweis and J. Lister began to introduce the principles of aseptic and antiseptic procedures. In 1867 Lister, describing the principles of antisepsis, recommended the use of carbolic acid. As mentioned earlier, the anti-inflammatory effect of carbolic acid was the subject of Rydygier’s doctoral dissertation.

A precise washing of the patient with soap and water and spraying with carbolic acid before each operation was a routine practice in the Clum Clinic. Before operation all surgical instruments were disinfected in a 5% solution of carbolic acid and after each operation they were properly washed. The patient was covered with clean oilcloth with an opening in the place of incision. During the operation, Rydygier used gauze moistened with a 2% solution of carbolic acid to cover the intestines. He also recommended sterilisation of instruments in water with sodium carbonate. Changing surgical clothes every day was compulsory. He limited the number of persons in the operation theatre to the absolute minimum. Asepsis everywhere and for everyone, as well as strict adherence to hygiene standards were the fundamental principles promoted by Rydygier.

Rydygier denied the necessity of rubber gloves, face masks and caps, being convinced that all those “inventions” were leading to the negligence of personal hygiene among surgeons, whereas cleanliness and hygiene were regarded by Rydygier as essential determinants of the patients’ protection against postoperative wound infections. Throughout his life he was convinced that aseptic and antiseptic principles should be the basis of surgical education. Owing to his adherence to hygiene standards and discipline, Rydygier managed to reduce perioperative mortality to 4% in the Clum Clinic.

**STOMACH AND INTESTINAL SURGERY**

On 16 November 1880 Rydygier performed an operation on a male patient, aged 64, suffering from cancer, using the technique of removing the pylorus together with the tumour. The patient died twelve hours after the operation (12). The autopsy did not show any symptoms of peritonitis and the end-to-end anastomosis (gastrodouodenostomy) was air-tight.

Rydygier published the findings on the resection of pyloric cancer first in Polish in Przegląd Lekarski (11 March 1881), then in the German journal Centralblatt für Chirurgie (26 March 1881). In this article Rydygier described the technical obstacles faced during the operation and how to overcome them.

On 29 January 1881 Billroth performed an operation on a female patient suffering from pyloric cancer. The patient survived the operation. Few days later he wrote a letter to the Editors of the Wiener Medizinische Wochenschrift to inform them about his success. Since Rydygier’s report was published two months later, not Rydygier but Billroth was proclaimed the pioneer of gastric surgery involving gastroduodenostomy.

Throughout his life Rydygier tried to regain his precedence over Billroth, but he ultimately failed. He made an honest and genuine proposal to term resection with duodenum anastomosis - “Rydygier’s method” and that with gastroenterostomy - “Billroth’s method”. In the Introduction to the collection of his 149 papers, published in 1912, Rydygier wrote, “One who would absolutely want to emphasise that Billroth’s position and the success of his operation contributed to a much faster acceptance of this kind of operation, one could name it the Rydgier-Billroth operation, but my name should never be passed over.” (9).

On 21 November 1881 in Clum Rydygier performed the world’s first pylorectomy on a 50-year-old female patient with pyloric stenosis due to gastric ulcer and medical history of the narrowed post-ulcer pylorus. The patient was discharged from the hospital on 4 January 1882 in healthy condition. His success paved the way for surgical treatment of gastric and duodenal ulcer diseases with possible complications (haemorrhage, perforation or pyloric stenosis). In the same year Rydygier published the first description of this operation in the Przegląd Lekarski and later in the Berliner Klinische Wochenschrift (issue 5/1882) (7, 13, 14).

In the Centralblatt für Chirurgie issue of 18 March 1882, the report entitled “The First Gastric Resection Due to Gastric Ulcer” was published with a footnote “hopefully also the last one:” added by the Editors. Nevertheless Billroth supported Rydygier’s idea of performing gastric resections in cases of benign gastric and duodenal ulcer diseases. On 2 August 1884 Rydygier performed another gastric resection because of pyloric stenosis.

L. Rydygier and J. Jaworski studied the effect of stomach resection and posterior gastroenterostomy on the secretory and motor functions of the stomach. They found that the stomach’s functions were not significantly affected by this kind of surgical procedures. At that time Rydygier proposed four indications for gastric resection: antral cancer, gastric ulcer, perforated gastric ulcer and bleeding ulcers. The two latter indications were revolutionary in those days.

In 1884 gastroenterostomy was first performed by Rydygier to cure chronic peptic ulcer disease. In 1887 Rydygier recommended the excision of the ulcer and its simple closure in the case of its perforation. At the International Congress of Physicians held in Paris, Rydygier presented the results of one hundred gastric operations he had performed. In those years, most difficult in our history, Rydygier was a remarkable ambassador for Polish surgery in Europe.
In peptic ulcer disease, hydrochloric acid plays an essential aetiological role. In 1910, Karl Schwarz expressed his famous statement, “no acid no ulcer”. The excretion of hydrochloric acid in the stomach is reduced after cutting the vagus nerve. To decrease gastric excretion during the treatment of peptic ulcers, new surgical techniques were being applied, for example stomach excision to reduce the secretory area, total vagotomy or selective vagotomy. Numerous foreign (e.g., Bilroth, Woller, Doyen, Pean Roux, Dragedt, Hager) and Polish surgeons (e.g., Rydygier and Mikulicz-Radecki) of the second half of the 19th century and the first half of the 20th century were very much involved in the treatment of peptic ulcer disease (15).

On 15 February 1881 Rydygier, first in Poland and fourteenth in the world, performed a segmental resection of the small bowel with end-to-end anastomosis. In the treatment of incarcerated hernia with intestinal necrosis, Rydygier recommended the partial resection of the intestine with primary anastomosis instead of an ileostomy or colostomy, and in the treatment of intestinal invagination the resection of the invaginated part of the bowel.

Rydygier published papers on the treatment of haemorrhoidal disease and on the technique of intermesenteric suture in anastomosis of bowel stump after its partial resection. In 1909 Kausch, describing this technique, erroneously attributed it to Mikulicz, not to Rydygier. In 1893 Rydygier described a modified posterior access to the rectum. The sphincter-saving rectal resection was a pioneering technique also invented by Rydygier. Rydygier strongly emphasised the significance of performing a digital rectal examination of each patient, especially in patients suspected of rectal disorders.

OTHER FIELDS OF INTEREST AND ACTIVITIES

Rydygier encouraged his colleagues to treat acute appendicitis surgically. The surgical treatment of diseases of the spleen was another of Rydygier’s important achievements. It was he who had invented and described the splenopexic technique, involving the placement of mobile spleen in the peritoneal pocket (11, 13). In Blakiston’s New Gould Medical Dictionary, edited in 1957, there is an entry for this technique “invented by the German surgeon Rydygier” – one more distortion of his background.

Urology was another field of Rydygier’s interest. In 1900 he described the technique of intracapsular prostate resection and five years later he gave a keynote speech (in French) at the International Congress of Surgeons held in Paris, on the treatment of prostatic adenoma. He was also a supporter of transperitoneal incision of the urinary bladder due to advantageous healing effects of peritoneum on the bladder wound (13, 14).

Rydygier greatly contributed to the advancement of gynaecology, breast surgery and orthopaedic surgery (16). Already in 1879 he performed successful ovariectomies in two cases of ovarian tumour. He recommended laparotomy, being against the transvaginal removal of the uterus. He treated vesicovaginal fistulas and modified the surgical technique for incision in mastectomy.

In their Biographical Dictionary of Physicians, published in 1887, Gurtl and Hirsh included Rydygier’s biography to acknowledge their recognition of his enormous contribution to European surgery.

RYDYGIER’S DYNASTY

At the beginning of 1877 Rydygier married Maria Borkowska, who was fourteen years older than he; the couple raised three children. Helena Maria, born on 3 October 1876 and died in childhood, Antoni Ludwik, born on 28 October 1878, medical doctor, died in 1966 at the age of 88, and Jozef Aleksander, born on 19 February 1882, engineer. All of them were born in Culm.

Rydygier evidently and openly favoured his son Antoni, whom he groomed as his successor. Antoni after his “habilitation” headed the Surgical Clinic in the Graudenz (Graudziadz) hospital. Unfortunately, in 1921 he was forced by his pro-Russian sympathies to leave Poland. He emigrated to Brazil with his wife and two daughters Ludwika and Janina. Two of Antony’s sons were born in Brazil, Ludwik (1922) was a surgeon and Antoni (1927) was an engineer. Professor L. Rydygier’s great-grandson, Ricardo Rydygier a gynaecologist, was invited with his family by Professor T. Popiela (Head of Surgical Clinic at the Medical Academy, Cracow) to attend as honorary guests the Jubilee Meeting of the Association of Polish Surgeons held in Cracow in 1989.

ANNUAL MEETINGS OF POLISH SURGEONS

In 1888 Rydygier put forward a valuable initiative to hold Annual Meetings of Polish Surgeons in Cracow. The main motive of this initiative was to attract surgeons from all three parts of partitioned Poland. The organisation of the First Annual Meeting of Polish Surgeons was linked with the opening of the Surgical Clinic at the Jagiellonian University (16-17 October 1889). Rydygier was then elected Permanent Chairman of Annual Meetings. The Statute of the Convention comprised essential principles. The most important provisions included that meetings should be held for no longer than three days with a limited number of social events; contributions should be professional and never read; exemplary operations and case studies should be presented and discussed at individual meetings; much time should be devoted to discussion; no other scientific meetings should be organised in the interim to avoid the dispersion of members, knowledge and scientific achievements or diminishing the prestige of Annual Meetings. It was customary to publish conference proceedings after each Annual Meeting of Polish Surgeons.

Between 1889 and 1903 Annual Meetings of Polish Surgeons (1st–13th) were organised regularly. The Annual Meetings were characterised by their cordial atmosphere and friendly relations among surgeons (17). During the years 1904–1906 their organisation was suspended because of the war in Imperial Russia, but in July 1907 the Meetings were resumed and successive meetings were held in Lemberg (1908), Cracow (1909), and Warsaw (1910). The 17th Annual Meeting of Polish Surgeons, the last in Rydygier’s time, was organised in Cracow in 1911. After this the organisation of annual meetings ceased for unknown reasons until 1921 (17).

The 18th Meeting was organised in Warsaw in 1921. It was chaired by Professor M. Schramm. Opening the general session, Schramm recalled the merits and achievements of Professor Ludwik Rydygier and paid tribute to the Permanent Chairman of the previous meetings. Subsequent meetings changed their name to Conferences of the Association of Polish Surgeons and in 1921 they began to be formally organised in Independent Poland.

The year 2010 is marked by three anniversaries of great importance: 160 years ago Rydygier was born, 130 years ago he performed the first gastric resection on the patient with the complicated peptic ulcer and 90 years ago he passed away.

One of Rydygier’s motto may conclude the story of his life of meritorious services that paved the way for surgical progress in Poland and abroad, “Let’s summon up all our strength to raise high the name of Polish science and surround it with splendour so that neither brutal force nor the furious hostility of ignorant souls can diminish its value and shade its brightness.”(4).
Rydygier died quite suddenly of cardiac infarction in Lviv on 25 June 1920. He was buried in Lyczakowski Cemetery, in the section reserved for the defenders of Lviv (quarter II, grave no. 72) near the catacombs containing the ashes of 72 of Lviv’s defenders. In later years the grave was devastated and razed to the ground. Now his grave has been restored, due not least to lengthy efforts by the Main Board of the Association of Polish Surgeons.

Acknowledgements: The author would like to express his deep thanks to Professor Stanislaw Dabrowiecki and Associate Professor Janusz Legutko for their kind assistance in elaborating this paper.

A preliminary report of this work was presented at the 5th Symposium on “Brain - Viscera Axis: Basic and Clinical Aspects”, Cracow, Poland, September 25th, 2010.

REFERENCES


8. Legutko K. Personal communication.


Received: September 24, 2010
Accepted: January 31, 2011

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