

History of the Clinical Institute of Radiology in Ljubljana on its 80th anniversary (1923-2003) *Historia Magistra Vitae*

Vladimir Jevtič

Clinical Radiology Institute, University Clinical Centre Ljubljana, Slovenia

Background. *The manuscript presents a short history of the Clinical Radiology Institute in Ljubljana, University Clinical Centre, and the leading radiological institution in Slovenia since its establishment in 1923. Throughout its history the Institute has been faced with numerous obstacles. Its major problems have always included the lack of professional and economical independence, which has made it difficult for the Institute to keep up with the fast technological development of the world's radiology, as well as the shortage of radiologists and radiographers with the consequence of the excessive work load and difficulties in educational and research activities. Despite some serious problems the expertise of the Institute's leadership, together with the enthusiasm of all radiologists and radiographers, has enabled a continuous professional and technological development which is the basis of today's high quality diagnostic and interventional radiology. Many of the remarkable achievements would not have been possible without some extraordinary personalities who laid down the solid foundations of today's Institute.*

Conclusions. *Eighty years of Clinical Radiology Institute in Ljubljana is a history of the successful development of the republic's leading radiological institution, a success based on determination, unity and the professional integrity of all its members and management.*

Key words: radiology-history-trends; radiology department, hospital

In 1985 Wilhelm Konrad Röntgen discovered x-rays. Only five years later, in 1900, Dr. Edo Šljajmer already purchased the first x-ray apparatus for the general hospital in Ljubljana. It was a remarkable event, still worthy of con-

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Correspondence to: Prof. Vladimir Jevtič, MD, PhD, Clinical Radiology Institute, University Clinical Centre, Zaloška 7, SI - 1525 Ljubljana, Slovenia; Phone: +386 1 522 85 30.



Figure 1. Central part of the Clinical Institute of Radiology in Ljubljana.

sideration at present, when our Institute has acquired its first computerized tomography scanner with a delay of eight years and its first magnetic resonance scanner more than a decade after leading European centres, but we still lack a fully digitalized RIS and PACS system, the equipment that has long been available in many radiology centres in the south of Slovenia. It was not until 1920 that Dr. Josip Pogačnik purchased the second x-ray apparatus for the general hospital in Ljubljana. Both devices were installed in the department of surgery - a symbolic beginning of good cooperation between surgeons and radiologists, which has continued to the present. In those early days, surgeons performed also the work of today's radiologists and x-ray technicians (Figures 1, 2).

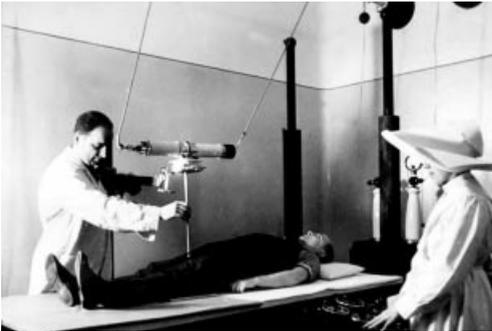


Figure 2. The second x-ray apparatus installed at the General Hospital in Ljubljana.

During the First World War, the use of x-rays spread rapidly, and many Slovene surgeons fighting in the Austrian army became familiar with this new diagnostic technique on the fronts. They later gave the initiative for the formation of an independent x-ray department in Ljubljana. This led to the establishment of the Roentgen Institute for Slovenia and Istria, founded in 1923 as the eighth independent unit of the hospital in Ljubljana. Its founder and first director, Primarius Aljozjij Kunst MD, the first Slovene radiologist, laid the foundations for radiology as a separate branch of medicine in Slovenia



Figure 3. Primarius Aljozjij Kunst MD, founder and first head of the Roentgen Institute in Ljubljana, 1923

(Figure 3). In those times, the Institute had its own Statute whose Article 28 guaranteed free x-ray services to the poor. This is sadly contrasted with our present situation, when the Clinical Institute of Radiology - an organizational unit of the University Medical Centre Ljubljana (UMC) - has neither statute instruments nor a permanent representative in the UMC's Medical Council, and x-ray services are becoming less and less accessible even to health insured patients.

Dr. Kunst, an exceptional personality, was the initiator of everything we have in Slovene radiology today. In 1921 he received a two-year scholarship from the Ministry of Health allowing him to pursue a specialist training abroad. He spent most of this time in Vienna, at the leading roentgen institute in Central Europe of the time, directed by a pioneer of roentgenology, Prof. Guido Holzknacht. At the end of his training period, Dr. Kunst visited several other renowned roentgen institutions in Berlin, Hamburg and Frankfurt. Looking at our present situation, we cannot but feel respect for our health administrators

of those times, who recognized the need to promote the transfer of new methods to our area by sending our experts to Europe's top institutions. Regrettably, throughout the past decade, the time of the explosive development in radiology marked by the introduction of a number of new diagnostic and therapeutic techniques resulting in the significant improvement of patient outcomes in nearly all branches of medicine, the UMC never allocated any special funds for the extended training of our radiologists in foreign centres. On returning to Ljubljana, Dr. Kunst had moved personally both x-ray devices from the Department of Surgery to the newly established Roentgen Institute, which he was to lead successfully until the year 1945. Although constantly overburdened with the routine work, he managed to transfer to the Institute many new diagnostic and therapeutic methods, and he also published a number of scientific papers (Figure 4).



Figure 4. Dr. Alojzij Kunst attending a patient. One of his scientific articles published in *Zdravniški vestnik*, journal of the Slovene Medical Association.

In 1926, The District Social Security Office purchased its own diagnostic x-ray machine, and in the following year also the first therapeutic roentgen apparatus in Slovenia; both were installed in the Institute's out-patient department. This reflected the need to separate in-patient and out-patient radiology facilities, and laid the basis for our Institute's present-day out-patient department.

There were no x-ray films until 1929. In those days, photographic plates were used, and the outlines of examined organs were drawn on a protective screen, from which they were copied to paper. The early days of our Institute were characterized by the functioning of diagnostic and therapeutic services as a single organizational unit, by shortage of equipment, by poor working conditions, by the continual introduction of new methods, by the steady growth of the number of investigations, and by the cooperation with the order of Sisters of Charity whose members worked at the Institute as auxiliary technical staff.

Following the initial support from health authorities, the Institute soon began to face a number of problems, which were to hamper its normal development to the present day. The first and most important among them was the inability to keep pace with the dynamic development of radiology in the world by the prompt introduction of new techniques. Despite Dr. Kunst's unceasing efforts, the two original induction apparatuses remained the only equipment for over six years and were completely outdated by 1929, when the Institute finally obtained two new Siemens apparatuses: a Polyphos four-valve diagnostic device and a Heliodor, therapeutic unit. This was the beginning of one of the Institute's main problems, which was to persist to the present: a technological lag behind the developed western countries, caused mainly by the lack of understanding - on the part of health administrators - of the key role of radiology in the development and normal functioning of other clinical hospital departments, rather than by the shortage of funds.

Another major problem of the Slovenian radiology, a shortage of qualified staff, in particular of radiologists, has been present since the beginning. Slovenia's second roentgenologist Dr. Josip Hebein, who, like Dr. Kunst, also has great merits for the development of

our Institute and radiology in Slovenia, began his specialist training in the year 1924, when the annual number of patients visiting the Institute was already well above 6000. On completing his training in 1926, he took charge of the Institute's diagnostic services, while Dr. Kunst remained concerned mainly with the roentgen therapy. This pointed to the future division between diagnostic radiology and radiotherapy. The further professional growth of the Institute was significantly affected by Prof. Hebein's six-month study visit to Vienna, Prague and Berlin in 1928, sponsored by the local health authorities. His return to Ljubljana coincided with the purchase of a state-of-the-art diagnostic apparatus, the Siemens Polyphos. In the same year, the use of glass plates was abandoned, whereas the fluoroscopy of the lungs, heart and digestive tract was supplemented with x-ray films, and a number of new investigations including oral and intravenous cholecystography, intravenous pyelography, bronchography, fistulography, myelography, histerosalpingography and ventriculography were introduced.

The number of patients continued to grow, so that the Institute's two roentgenologists were soon unable to cope with their work. The third Slovene roentgenologist, Dr. Rudolf del Cott, joined the Institute in 1935, when the annual number of patients was already close to 14,000 (Figure 5). To the present day, excessive workloads have remained a major problem in radiology, often making this inno-

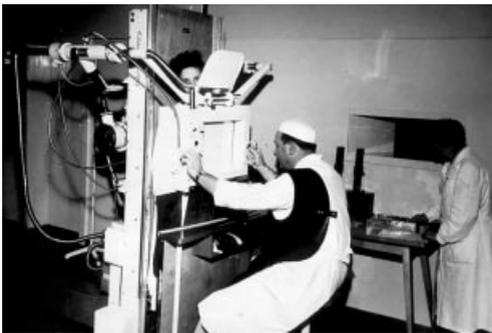


Figure 5. Primarius Rudolf Del Cott MD, 1935.

vative and dynamic specialty less attractive for young physicians, and interfering with the Institute's teaching activities and research.

In 1940, a compulsory course in general medical roentgenology and radiotherapy was introduced at the as yet incomplete Faculty of Medicine in Ljubljana. It was taught by Dr. Hebein. With Dr. Hebein's appointment as a part-time lecturer, the Institute became a training base and Slovenia's central radiology institution. In 1945, when the present complete Faculty of Medicine was founded in Ljubljana, Dr. Hebein was made the first Slovene professor of roentgenology (Figure 6).



Figure 6. Professor Josip Hebein MD, first Slovenian teacher of roentgenology.

In 1940, the General Hospital in Ljubljana was given a new name, the University Hospitals, and the Roentgen Institute was merged with the Institute for Research and Treatment of Neoplasms (established in 1938) to form the Roentgen and Radiology

Institute. The new unite was headed by Prof. Hebein. Since he was familiar with contemporary trends in the world in the following year, the Institute was at his initiative again divided into two independent units, the Institute of Roentgenology and the Institute of Oncology, whereby oncology was excluded from the structure of today's Clinical Institute of Radiology. In the same year, the United Nations Relief and Rehabilitation Agency (UNRRA) presented the Institute with a Philips four-valve diagnostic x-ray apparatus. This was the first new equipment since the purchase of the Polyphos 15 years previously. Shortly afterwards, the Institute acquired its first dental x-ray machine, which was put together from two older apparatuses.

In the post-war period, the number of patients grew steadily, and the need for additional staff was soon obvious. Following the departure of Sisters of Charity in 1946, the Institute was left with a single civilian x-ray assistant, Mrs. Hilda Matjašič - Naglič, who was later appointed chief of x-ray technicians. Dr. Zlatan Stare and Dr. Stanko Hernja joined the staff in 1948, Prof. Mira Vurnik in 1950, Prof. Jože Stropnik in 1953, Dr. Vinko Derganc and Dr. Ludvik Tabor in 1954, and Dr. Miran Gabruč in 1957.

It soon became clear that the Institute needed also the qualified auxiliary personnel. In 1949, Prof. Hebein organized the first course for x-ray assistants. In 1951, a college for x-ray technicians was established at his initiative, and he was appointed its first principal.

He was also the founder and first president of the Section for Radiology of the Slovenian Medical Society, established in 1950.

In the years 1951-53, the Institute's old building was reconstructed and a Siemens Neoheliophos four-valve x-ray apparatus was purchased. The Institute was divided into four units: for thoracic, abdominal and skeletal diagnosis and a unit for radiotherapy.

These were the beginnings of the subsequent division of radiology into subspecialties. Until Prof. Hebein's retirement in 1960, several other new x-ray devices were purchased, including a six-pulse Philips Maximus DLX.

The period until the year 1960 was marked by the final separation of diagnostic and therapeutic facilities, gradual modernization of equipment, introduction of a number of new examination methods, beginnings of subspecialization, and increase in the number of radiologists. It was the time dominated by two extraordinary personalities: Dr. Alojzij Kunst and Prof. Josip Hebein.

In 1961, Prof. Stanko Hernja was appointed Head of the Institute and Chairman of the Department of Roentgenology at the Faculty of Medicine (Figure 7). The Institute's further professional growth and development of the roentgenology curriculum were significantly affected by his repeated visits to Scandinavian medical institutions, where the centralization of radiology services, prerequi-



Figure 7. Professor Stanko Hernja MD performing x-ray procedure.

site to the development of modern radiology, was under way. Prof. Hernja was already the third head of the Institute who had the opportunity to pay extended study visits to foreign countries. In his time, the equipment was gradually modernized and a number of new units were opened, while the existing ones were merged in the process of gradual centralization of the radiology service. With the introduction of new methods, the spectrum of radiological investigations was growing rapidly. The early sixties represented the origin of the modern concept of subspecialization, manifested organizationally by the formation of a number of specialized diagnostic services. Formerly an Academic science, radiology was turning into a clinical discipline. Its links with other branches of medicine were growing stronger, the Institute was turning into a core facility, a meeting point for clinicians, as evidenced also by the growing number of radiological-clinical seminars held at the time (Figure 8). In 1965, the Institute opened a separate unit off its main premises, at the Department of Surgery. It was led by Prof. Jože Stropnik, who made major contributions to the development of several diagnostic fields and of the Institute as a whole. In 1965, the out-patient facilities were merged to form the out-patient radiology department. In 1970, a new unit was opened at the Institute of Gerontology and in 1971 another one at the Dr. Peter Držaj Hospital. In



Figure 8. Staff members of the Roentgen Institute and its head Professor Stanko Hernja, 1961.

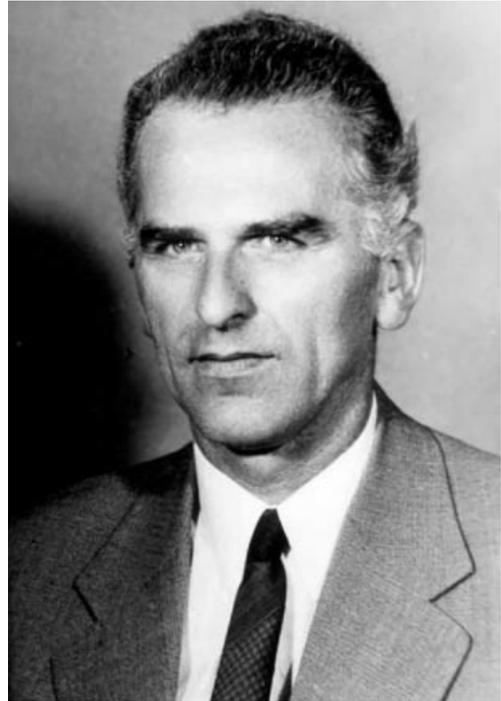


Figure 9. Professor Jože Stropnik MD, 1963.

1972, a round-the-clock radiology service was established, staffed by one radiologist. It may seem difficult to believe that it was only 30 years later, in 2002, following lengthy negotiations, that the UMCI's management acknowledged the need for the second radiologist to be available 24 hours per day.

In the years 1967-1973, the attention centred on designing and construction of new premises to house the central part of the Institute. In planning this state-of-the-art facility, Prof. Hernja was assisted mainly by Prof. Stropnik, Prof. Obrez and Prof. Tabor.

The Institute moved to the new premises in 1973. This ended the long process of the centralization of the radiology service, following the example of leading foreign centres, and laid solid foundations for the Institute's further professional growth. In that year, the Institute's 103 staff members provided services to nearly 100,000 patients. A number of new x-ray devices were installed, including

two 12-pulse apparatuses. The main credit for all these achievements, in particular for the centralization of the radiology service and the formation of subspecialties, goes to Prof. Hernja. Another of his major achievements was the appointment of four additional teachers for radiology at the Faculty of Medicine - a testimony to his open character, seeking self-confirmation also by promoting the professional growth by his colleagues (Figure 10).



Figure 10. Professor Stanko Hernja and Professor Ivo Obrez attending the ceremony at Professor Hernja's retirement in 1973.

The nomination of Prof. Ivo Obrez (Figure 11) as Head of the Institute in 1974 marked the beginning of a period of the intensive development of invasive radiology, which brought the Institute the international recognition. Prof. Obrez made frequent visits abroad, especially to world famous centres in the USA, which led to the introduction of a number of new radiological methods, especially in the field of the invasive diagnosis and therapy. Being one of the world's pioneers of interventional radiology, an important new domain, which shifted the radiologist's interest from diagnosis also to therapy, he laid the foundations for this new field at the Institute. His international reputation and close contacts with foreign experts are reflected in his extensive bibliography and in the numerous awards he received for his work. The processes of integration and ex-

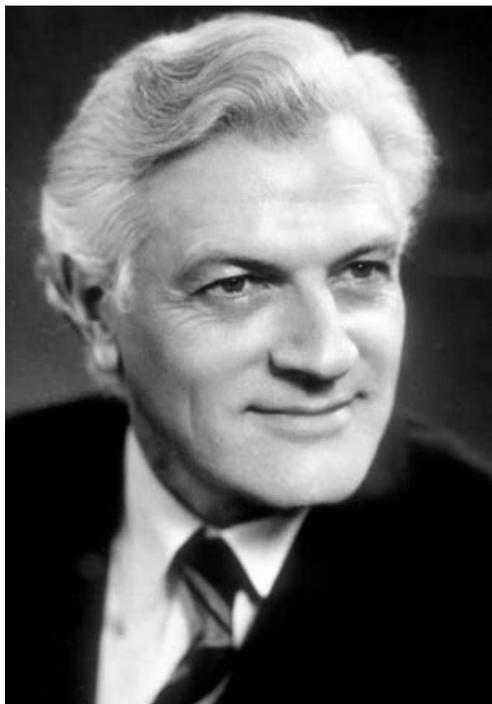


Figure 11. Professor Ivo Obrez MD, Head of the Institute of Radiology, 1974-1989.

pansion of the Institute continued. In 1976, a separate radiology unit was set up at the Department of Gastroenterology. Another landmark event was the opening of a fully equipped x-ray unit at the Emergency Centre in 1977. Among the most important technological acquisitions of the time were a Siemens Somatom 2 computed tomograph (1980) and a Toshiba ultrasound apparatus (1981). Unfortunately, the profession had once again proved incapable of convincing the administration of the importance of new technologies: the CT scanner was installed with a delay of eight years after the developed world and even several years after centres in the neighbouring Yugoslav Republics. These acquisitions set off the development of an important segment of present-day radiology, the digital imaging techniques, and paved the way for the introduction of various new radiological examinations and procedures. Along

with the introduction of new technologies, the number of patients continued to grow. In 1983, the Institute was comparable to the world's leading centres for radiology: it was a complex system of 21 units and activities, employing 32 radiologists and 70 x-ray technicians. In 1986, the Institute purchased its first digital subtraction angiography (DSA) system (Siemens), an important acquisition that made progress in the interventional radiology possible. The apparatus is still in operation today, after 18 years of use. In 1989, the Institute had a staff of 172, including 36 radiologists and 73 x-ray technicians; these numbers were to be surpassed only in 1995.

The period from 1974 to 1989 was characterized by the reintroduction of therapeutic activities (mainly in the field of interventional radiology), by the initial experience with digital technologies (primarily CT and US), by the introduction of a number of new radiological methods, by the further expansion of the radiology service, and by the international recognition of the Institute. The year 1989 was marked by the untimely death of Prof. Ivo Obrez, who is remembered as an innovative teacher, excellent lecturer and a cosmopolitan with numerous friends among leading European and American radiologists of the time.

After the retirement of Prof. Hernja in 1981, Prof. Ludvik Tabor, an outstanding skeletal radiologist, became Chairman of the Department of Radiology at the Faculty of Medicine, a position he was to hold until 1993 (Figure 12).

In 1989, the Institute of Roentgenology was renamed the Institute of Diagnostic and Interventional Radiology, in order to emphasize its two basic activities: diagnosis and therapy. Of all branches of clinical medicine, radiology is most vitally linked to the technological development and has, therefore, experienced the fastest progress over the past three decades. Keeping pace with such dynamic growth means, that new technologies



Figure 12. Professor Ludvik Tabor MD, Chairman of the Department of Radiology at the Faculty of Medicine in Ljubljana, 1981-1993.

must be adopted into practice without delay. Unfortunately, this requirement was not met in Slovene medicine during the past decades. The Institute's greatest handicap in 1989 was its technologically outdated equipment: approximately 85 per cent of the conventional x-ray devices had been in use for 17 to 20 years. The inappropriate, defective equipment precluded the quality diagnostic work and no longer afforded the adequate safety for the patients and staff. Following lengthy demonstrations that the Institute was on the verge of technological collapse, the authorities finally agreed to provide the funds needed for its modernization. The described approach to the replacement of old equipment, which I will call the »cataclysmic« model, is yet another feature that has been recurring throughout the Institute's history. As a rule, it is only the complete technological and tech-

nical obsolescence of the equipment that triggers the administrative processes leading to the purchase of new devices. Even today, when Slovenia is entering the European Union, we still lack valid standards to govern the replacement of the so-called large radiology devices, which are of strategic significance for the entire health service. In 1989, having obtained the necessary funds, the Institute was faced with the difficult task of designing the »package« of new equipment to be purchased. Its medical council selected two internationally renowned manufacturers, the Siemens and the Philips companies, that had supplied most of its equipment throughout its history. In connection with this purchase, it should be pointed out that this was the last equipment to be selected according to professional criteria. In all subsequent purchases, the selection of even the most complicated devices for the only university hospital in the country was a lengthy bureaucratic process with the lowest price being practically the sole criterion. It is also of interest that on the repeated requests from the Institute's medical council, the authorities agreed to invite tenders for the equipment, so that this was the first purchase of medical equipment in the post-war period made on the basis of an official invitation to tender. Fourteen devices were purchased. They were installed in a new section of the Institute with a surface area of 700 sq. m., whose construction took about a year (Figure 13). The most important among them were: a magnetic resonance tomograph (Magnetom 63 SP, 1.5 T, Siemens) - the first of its kind in Slovenia, a high-capacity CT scanner (Somatom Plus, Siemens), and two apparatuses for digital subtraction angiography (DSA). The DSA equipment finally created normal conditions for the further development of invasive radiology in all relevant specialties, including cardiology. Magnetic resonance tomography, one of the most important radiological technologies in the history of medicine, had been used widely in the devel-



Figure 13. Construction of the extension to the Institute of Radiology, 1993; the extension presently houses two MR scanners and a new multidetector CT scanner.

oped Europe and even in some Balkan countries for a decade before its introduction in Slovenia. All these devices contributed significantly to the quality of diagnostic and therapeutic services in nearly all departments of the UMC. Despite the complicated technology, MRT began to be used for the routine diagnostic work already two months after the installation. The swift technological development of radiology over the past decade may also be illustrated by the following comparison: the MRT scanner purchased in 1993 weighed 40 tons, while our new apparatus installed in 2001 weighs only six tons (Figure 14).

In 1993, the Institute had 24 organizational units and activities, which over the year provided a total of 323,888 radiology services, ranging from the simplest x-ray films to the most complicated interventional procedures. Its staff, having been decreasing for several years, was on the level of the year 1978. In the

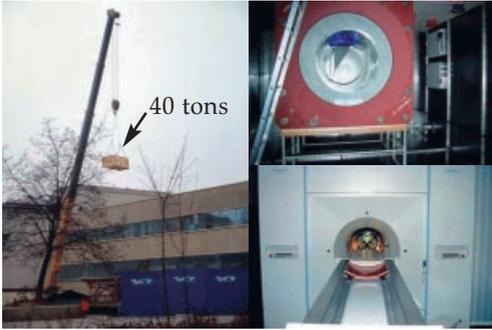


Figure 14. Installation of Slovenia's first MR scanner at the Institute of Radiology in 1993.

following years, every effort was made to recruit additional personnel, but it was only with great difficulty that the Institute slowly approached the staffing standards of comparable neighbouring countries. Manpower shortage has remained a major concern to the present day. This is yet another proof of the inability of the profession to ensure normal conditions for the undisturbed work within the current rigid system of the centralized hospital administration. It seems, however, that the health authorities, having kept us for many years from employing additional staff, have finally become aware of the problem, for in the Ministry's recently published White Book, radiology is finally officially listed among skill shortage professions (Figure 15).

In 1993, the Institute again changed its name, from Institute of Diagnostic and Interventional Radiology to Institute of Radiology. Having renovated our equipment,



Figure 15. Physicians of the Institute of Radiology, 1993

introduced a number of new diagnostic and therapeutic methods, and set up a well-organized radiology service in the UMC, we felt that it was no longer necessary for the Institute's name to show what belonged among the activities of a state-of-the-art Central European radiology centre. Unfortunately, we were wrong. Over the past years, different clinical specialties, which - unlike radiology - obviously have no staffing problems, have shown a growing appetite for the most attractive segments of radiological diagnosis and therapy. In the absence of valid professional and economic arguments, politically influential representatives of these specialties have devised ingenious ways to achieve their goals within the bureaucratic labyrinth of our health service. Examples of this are the so-called »special knowledge« sections in training programmes for individual specialty fields, which have no parallel in European medical curricula, or the practice of individual departments purchasing their own radiology equipment, which is diametrically opposed to the concept of a centrally organized radiology service adopted in European university hospitals, or the megalomaniac planning of departmental radiology units equipped with the most sophisticated devices, when the UMC is for the lack of funds unable to replace even its most basic x-ray machines.

The technological renovation of the Institute was followed by a period of intensive professional development. Over the past decade, we have introduced into the UMC and Slovenia a number of new diagnostic methods and interventional procedures that have had a significant impact on nearly all segments of clinical medicine. The most important among them are magnetic resonance imaging (from the basic techniques, plain and contrast enhanced angiography and various investigations of the heart, to demanding morphological and functional studies of the brain and MR spectroscopy), CT studies

made possible by a modern spiral scanner and a recently acquired multidetector scanner, and complicated interventional procedures such as TIIPS, aortic stenting, percutaneous carotid angioplasty and the recently introduced endovascular treatment of intracranial aneurysms.

Over the past decade, a number of senior radiologists have retired, and a change of generations is successfully under way. Generally, all advertised posts have attracted many candidates with a high grade average from their undergraduate training and often a completed Master's degree. The Institute has thus acquired quality junior staff, who now successfully carries on the work of their predecessors and represents the most important basis for the further growth and development of our institution.

In cooperation with the Department of Radiology of the Faculty of Medicine in Ljubljana and the Slovenian Radiology Association, we have revised the specialist training programme, which now follows a five-year curriculum, in keeping with the guidelines provided by the European Association of Radiology (EAR) and the Union of European Medical Specialists (UEMS). At present, the Department of Radiology has one full professor, one associate professor and nine assistant professors. Two additional faculty members have successfully defended their doctoral theses. Eleven radiologists have earned a Master's degree, and four are currently enrolled in the Master's degree programme. Four radiologists were recently awarded the title *Primarius*. The Institute's intense professional activity is reflected in its extensive bibliography with an average of 400 items published during a period of four years, which exceeds the formal requirements. In 1995, this provided the basis for the Institute's promotion to the status of a Clinical Radiology Institute.

The Institute's active presence on the European and international radiology scene is

evidenced by the large number of international meetings held in Slovenia over the past years, including several traditional annual Alps-Adria radiology conferences, two congresses of the Slovenian Association of Radiology with international participation, a Halley course organized jointly with the European Congress of Radiology (ECR) and the EAR, a congress of the European Society of Musculoskeletal Radiology (ESSR), and an ultrasound workshop, to mention but a few. In the past years, the Institute was visited by a number of world's top experts in different fields of radiology. Finally, the appointments of Prof. V. Jevtič as the president of the ESSR (1998), coordinator of national radiology societies for southern, central and eastern Europe (2002), and member of executive councils of the ECR (2000) and EAR (2002) may also be regarded as an acknowledgement of our professional achievements.

In the period between 1993 and 2003, as in previous years, the method of replacing the outdated radiology equipment has conformed to the »cataclysmic« model, with the profession playing a purely symbolic role. The sole task of the Institute's medical council and its head is to draw up the annual plan of purchases, which practically does not change from year to year. The annual plan is merely a list of professionally grounded suggestions made by radiologists, for which the administration has little or no understanding. It is only the complete failure of an apparatus that sets off the lengthy, complicated bureaucratic procedures leading to its delayed replacement. Regrettably, this applies also to major devices that are of strategic significance for the entire UMC. In 2001, two x-ray machines, both over 20 years old, located in the most busy radiology unit of the UMC's emergency centre, were replaced only after a repeated failure, creating major problems for the entire hospital; they were substituted with conventional devices, since the allocated funds did not suffice for the purchase of digitalized

equipment, such as had been available for many years in most comparable centres in our neighbouring countries. Our two new DSA devices, bought for the needs of invasive radiology and cardiology, were obtained only after the repeated failure of the two existing machines, which had for 10 years constituted the UMC's only equipment for the invasive radiology. Similarly, our new 16-section CT scanner was purchased after its 10-year-old predecessor had been out of operation for a year and a half, during which time all emergency examinations for the entire UMC were performed with a single eight-year-old scanner operating in extremely unfavourable conditions. Because of shortage of funds, our new MRT scanner, bought in 2001, is now shared with »researchers« of the Faculty of Medicine - an unfortunate combination that still lacks a clear legal and financial framework. Its choice was entrusted to a 10-member committee including only one radiologist, which decided on the device with the lowest price, disregarding the professional opinion of the Institute's medical council. This brings us to yet another feature shared by all our recent acquisitions: in all purchases made over the past decade, price was by far the most important criterion, carrying between 90 and 100 percent of weight. This means that all radiology equipment purchased for the UMC, a tertiary care hospital, is of the lowest price range - a practice that is unknown in developed European countries. Apart from the above-mentioned devices, we were recently able to obtain only some smaller items, including a few portable x-ray machines and US scanners. Consequently, the Institute is now in a similar situation as in the year 1989. After 10 years of use, our first MR tomograph is technically and technologically outdated and its first major defect would probably mean its end since spare parts are no longer available. With the current waiting periods for out-patient MR examinations exceeding a year and a half, its failure would mean a ca-

tastrophe. Our basic x-ray machines, used for skeletal and chest radiography, indispensable to all clinical activities in the UMC, are over 20 years old and have been repeatedly judged unsuitable for further use by the national health inspectorate. The formal tendering procedure takes more than a year. Because of limited funds, we will have to go on purchasing mostly conventional equipment, rather than state-of-the-art digitalized systems.

At present, the Clinical Institute of Radiology is divided into seven sections, 17 units, three services and two activities, which together perform annually nearly 300,000 diagnostic investigations and interventional procedures. In the past two years, the Institute has finally managed to increase its staff, which now includes 36 radiologists, five registrars, 101 x-ray technicians, 20 nurses and 36 other employees. Besides the central facility accommodated in the main UMC building, the Institute has several separate units, located off its main premises. The radiology service of the Department of Vascular Diseases, formerly housed in a special building in another part of the city, was integrated into the main facility at the beginning of this year. The radiology service of the Department of Gynaecology will probably also be moved shortly to the Institute's central premises.

The period from 1993 to 2003 was marked by the expansion and renovation of the Institute's premises and by the adoption of several completely new technologies, in particular magnetic resonance tomography, multi-detector computed tomography (MDCT) and digital subtraction angiography, which paved the way for the introduction of a number of new diagnostic methods and interventional procedures to the UMC and to Slovenia. After the retirement of the senior generation of its staff, the Institute managed to acquire quality young personnel. The past decade saw a marked increase in the number of masters and doctors of radiological science, and the appointment of many new as-

sistant lecturers for radiology at the Faculty of Medicine. Also the number of radiologists bearing the title *Primarius* increased over the past years. The programme of specialist training has been harmonized with the EAR and UEMS guidelines. Thanks to its intense professional activity, the Institute is now on a par with leading radiology centres in Europe (Figures 16 and 17).

The notable achievements of the Clinical Institute of Radiology over the past decade were the result of joint efforts of all its staff. On many occasions, the staff members found the courage to unanimously oppose and reject bureaucratic decisions that threatened to disrupt the Institute's normal operation and development. Our results are indeed remarkable, especially, when viewed in the light of the circumstances in which they were achieved, the chaotic state of Slovene medi-



Figure 16. Physicians of the Institute of Radiology, 2003.



Figure 17. The Institute's future is in the hands of its junior specialists and registrars.

cine, and the outdated centralized model of management of large medical centres, imposed by our colleague physicians - politicians. This led to the gradual loss of professional and economic independence of all clinical disciplines including radiology. As an anecdote, let me mention that, despite our Institute's well-documented immense professional achievements, »reformers« of the Slovene health care system within the UMC have made two attempts, first in 1990 and again in 1996, to include our Institute in the Centre's organizational structure among the »auxiliary and maintenance services«, on a par with the Dietetics and Nutrition Service. On both occasions, the proposal led to a referendum, in which all employees of the Institute voted in favour of initiating a legal procedure leading to the exclusion of the Institute from the UMC. We can only speculate where the imagination of Slovene health-policymakers might place us in the future. It is of interest, however, that throughout the Institute's history, Slovenia's top politicians honoured our major achievements with their presence at all landmark events (Figures 18, 19, 20).

Historia magistra vitae. And what can the more than 80-year-long history of the Clinical Institute of Radiology teach us? The problems



Figure 18. Mr. Božidar Voljč MD, Minister of Health, with the management of the University Medical Centre Ljubljana at the inauguration of the Centre's first MR scanner in 1993.



Figure 19. President of the Republic of Slovenia Mr. Milan Kučan at the inauguration of the Institute's first spiral CT scanner in 1996.



Figure 20. Mr. Borut Pahor, President of the National Assembly of the Republic of Slovenia, at the inauguration of the Institute's first 16-slice CT scanner in 2003.

encountered today in our efforts to create the conditions for normal professional growth and operation of the Institute bear a striking similarity to those faced by our predecessors. The fundamental problems of our Institute lying at the root of all its other difficulties are connected with the degree of its economic and professional dependence, which has been increasing throughout its history. The practice of centralistic, bureaucratic decision-making in questions of equipment and personnel is a flaw common to all health management systems that have existed in Slovenia to date. Radiologists were rarely at liberty to make independent decisions, leading to timely replacement of outdated, defective equipment. Radiology is a technology-de-

pendent discipline undergoing an extremely dynamic development. The inability of Slovene radiologists to keep abreast of technological advances in the world is one of our most serious and constant drawbacks. What causes worry, however, is the fact that our lag behind the developed world is increasing. Dr. Šljajmer bought the first x-ray machine only five years after the discovery of X rays; our first magnetic resonance tomograph was purchased with a delay of 10 years, and fully digitalized radiological department will be completed with an even greater delay. A formal depreciation fund for expensive radiology devices was never set up. Time and again, the Institute was on the verge of the complete technological collapse by the time health authorities approved the purchase of new equipment. Technological renovation never proceeded in parallel with technological advances in the world; it always progressed by fits and starts, in the form of the so-called »equipment packages«, received after varying periods of a complete technological stagnation.

An equally serious problem has been the shortage of radiologists, resulting in excessive work loads, overburdening of senior staff with routine activities, and the excessive exposure of the staff to radiation. Moreover, manpower shortage has posed major obstacles to the Institute's educational and research activities. Staffing standards permitting international comparison, which are of vital importance for any profession, were never adapted by medical authorities. They would show clearly where we belong. In respect of equipment, we rank among undeveloped countries. The stage of development of radiology is also a reliable index of the state of medicine as a whole. By drawing a few parallels, we find that Slovenia has one MRT scanner per 400,000 inhabitants, while the corresponding ratio in Austria is about 1 : 80,000. Further comparison of figures reveals that Slovenia has one CT scanner per 150,000

inhabitants, while comparable standards in the countries of Western Europe call for one CT scanner per 70,000 inhabitants. We still lack fully digitalized information storage and processing system, available in many centres in the Balkans. Although (but) a few months separate us from Slovenia's entry into the European Union, the harmonization of our regulations with the EU and UEMSA guidelines is still far from completion.

And what lies ahead? In 1993, at the celebration of the Institute's 70th anniversary, I was unfortunately right in forecasting that »a considerable time will pass and a number of problems will need to be overcome before our Institute can be organized in a similar way as comparable centres in Western Europe. The search for new organizational forms and developmental strategies for our large medical centres and our health service as a whole will be a time of instability for all specialties, including radiology.« It is more than obvious that the Slovene health service and the UMC are going through a crisis that is not likely to be resolved in the near future. One of the main causes for the crisis is undoubtedly the current authoritarian model of management of medical institutions with the complete loss of professional and economic independence of individual specialties. Nevertheless, politicians, unfortunately assisted by our own colleagues, predict a change in the UMC's statute, whereby the Centre's management, appointed by the authorities, will be empowered to nominate heads of individual departments, the core of Slovenia's medical profession. The anticipated changes are bound to aggravate the present crisis.

Conclusions

Despite the black scenario, I am an optimist. Looking back at the history of our Institute, I feel confident about its future. Our political system has changed repeatedly over

the past decades, but it always contained medical bureaucrats who rarely showed the understanding for our problems and rarely contributed to the development of our profession. Despite difficulties, our Institute and radiology as a whole have continued successfully in our path. This will not change in the future. However, as in the past, nothing will be given to us for free. The main condition for the further successful development of the Clinical Institute of Radiology is the unity and professional integrity of all its staff members and management, who are fortunate enough to work in one of the most exciting branches of medicine in the 20th and 21st centuries.