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NATIONAL AND INTERNATIONAL SEVERE CONFLICTS: IMPACT ON MEDICAL IMAGING GROWTH.

A preliminary approach from the 112-year-story of medical imaging at the Groupe Hospitalier Necker-Enfants Malades.

Jean-François Moreau, M.D., F.A.C.R[1].
Department of Radiology, Hôpital Necker, Paris, France

1 JF Moreau, M.D., O. Hélénon, M.D., J. Chabriais, M.D., J-M. Correas, M.D, K. Hamida, M.D.. Poster exhibited at the RSNA'99.

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Jean-François Moreau, M.D.
O. Hélénon, M.D., J. Chabriais, M.D., J-M. Correas, M.D, K. Hamida, M.D.
Department of Radiology, Hôpital Necker, Paris, France

Introduction

Since 1896, the year of the first papers on medical X-rays films, numerous severe national and international conflicts (wars, socio-economical crises, political crises) developed in France. During the current decade, disencouraging speeches have targeted radiology because of the increasing cost of health cares. The present study aims to provide sources of hope to the young generations by a search in tentative positive correlations between the economical cycles and the introduction of new technologies in medical imaging all along the XXth century, using the long story at the Necker-Enfants Malades Hospitals.

The Groupe Hospitalier Necker-Enfants Malades is a twin hospital located in between the Montparnasse Station and the Eiffel Tower on the left bank of Paris. Hôpital Necker was founded in 17?? to treat curable adults patients, especially the soldiers of the Napoleon Army. Famous physicians, such as the surgeon Civialle and the clinician Laënnec, practiced there. The Hôpital des Enfants Malades, founded in 1802, was the first french pediatric hospital.

On the 16th of April 1896,

four months after the discovery of X-rays by W-C Roentgen,
Hôpital Necker entered the world of medical radiology.

Felix Guyon, first french Professor of Urology & Chairman at Necker, presented at the "Académie Nationale de Médecine" the first and superb radiological description of renal and biliairy calculi visible on radiographies performed by **James Chappuis**, a Professor of Physics at the "Ecole Centrale des Arts et Manufactures", and **F-J Chauvel**, a resident in surgery. Both of them had performed six weeks earlier the first radiography of a fetus at the Maternité Beaudelocque.

IN 1898,

GASTON CONTREMOULINS,
THE GODFATHER OF THE FRENCH TECHNOLOGISTS,
FOUNDED AN OFFICIAL LABORATORY OF RADIOLOGY AT NECKER.
HE ALSO LOST THE 40-YEAR-WAR BETWEEN PHYSICIANS, PHYSICISTS AND TECHNOLOGISTS.

G. Contremoulins (1868-1950) was a photographer who worked with the famous physiologist E-J Marey on chronophotography before he discovered enthusiastically the potentials of X-rays.

Associated with the surgeon Charles Remy, he pionneered many radiological studies performed on the years 1896-1897, one of these awarded by the "Académie des Sciences".
He chaired the biggest official laboratory of radiology created in Paris in 1898. The choice of the Hôpital Necker resulted from the early equipment of the Eiffel-style urology builing with electricity. Contremoulins'celebrity and skills gave him large civic grants and a huge number of customers. He made many technological breakthroughs but, he failed to be competent in clinical medicine and did not get into radioscopy and radiotherapy.
Quickly, more and more severe conflicts to control the radiological power develop between the technologists leaded by Contremoulins and the clinicians leaded by Antoine Béclère. Contremoulins'lobbying was noisy especially at the "Académie des Sciences" but, in 1909, Minister George Clemenceau, adviced by the Academic "Commission Bouchard", gave the monopoly of the direction of governmental and official laboratories of services of radiology to medical doctors.
In 1915, Béclère ousted Contremoulins from the radiological regulation of the military corps of Paris, because of his inadequate technique for screening foreign bodies, increasing therefore their mutual hate.
Progressingly, Contremoulins lost power and influence but remained well-considered at Necker because of the high-quality of his radiographies. He helped the orthopaedic surgeon Robineau to develop original treatments based on his so-called "metroradiology" and featured the iconography of Sicard & Forestier's book on Lipiodolography.
His laboratory closed definitely when he got retired in 1934. He created a new lab and a still active school of technologists at the Hôpital Saint-Germain-en-Laye. The French technologists never found such an impressive leader and, contrary to some other countries such as the UK and the USA, have lost definitively the right to practice radiology without the control of a physician. By the way, they never could obtain the legal right to perform radiotherapy, echography, nuclear medicine by their own either.

1896 - 1968

THE URORADIOLOGY SAGA WAS UNDER UROLOGY CONTROL

The school of urology at the Hôpital Necker dominated the French urology for 150 years from the Napoleon Empire. Thus, uroradiology developed under urological control. Felix Guyon's successor, the Cuban-native Joaquim Albarran invented with Imbert in 1897 a new cystoscope making possible the catheterism of the ureteral meatus, then the retrograde ureteropyelography with gas or opaque materials. Thereafter, respectively before and after World War 2, two chairmen, Legueu with Fey and Truchot, and Gouverneur with Porcher and Hickel published books and articles dedicated to uroradiology.
Intravenous pyelography developed after 1929 and gave the Necker radiology a new impulse. Robert Coliez, a radiologist established at the Necker Centre des Tumeurs, introduced in 1930 the mechanical compression of the ureters. Immediately a controversy started between the promotors of compression (most of the French urologists) and its detractors mainly conducted by Roger Couvelaire according to the interest put in the dynamic versus purely morphologic studies of the upper urinary tract.

IN 1968

THE NEPHROLOGIST JEAN HAMBURGER GAVE THE RADIOLOGIST J-R MICHEL A FULL CONTROL OF THE URORADIOLOGY AT NECKER

Jean Hamburger, the foundator of nephrology as a discipline and a pionneer of renal transplantation, detected in the early 60ies the talent of Jean-René Michel, a pediatric radiologist belonging to the J. Lefebvre's staff. He superimposed the insertion of a fully independant service of radiology in the impressive new "Palais du Rein" linking the nephrology and urology departments opened in 1968, just after the "May 68 Event".
J-R Michel conceived a genuine 8-room multimodality ward, including angiography, suppressing the urological unit, then fully controlled by the radiologists. Under Michel's authority, IVP had become IVU. Daily producing up to 50 IVUs, 20 retrograde or suprapubic uretrocystographies, 6 renal angiographies, the school of Michel has leaded the French uroradiology because of the case materials, the capacity to control the renal and the general toxicity of contrast media efficiently, the intensive training, the development of high-standard clinical research. Michel, the first French radiologist who chose a full-time academic carreer in 1963, was the foundator of the Club du Rein, a core group of active French uroradiologists, which provided the first book written by uroradiologists only. Ultrasonography was included in 1978.
A transient decline happened when the administration did not supply a total body CT scanner in the 80ies. Necker pionneered renal lithotripsy, taking benefit of a donation for the implementation of the first Dornier prototype in 1986
The only copy of the Palais du Rein and its radiology department is the Hôpital Edouard Herriot in Lyon, opened in 1972.

THE YEARS 1980 : A DISASTER FOR THE RADIOLOGY AT THE NECKER-ENFANTS MALADES INDUCED BY POLITICAL, ADMINISTRATIVE AND MEDICAL MISTAKES BUT CATALYZED BY LOCAL FAILURES

Under Giscard d'Estaing acting until May 1981, the administration of the Assistance Publique banned the implementation of modern technologies in the university hospitals of Paris. The deal between J. Sauvegrain and J-R Michel - US at Necker, the CGR TB-CT scanner prototype at Enfants Malades - did not work because of strategic failures. Whereas the B-Mode digital CGR sonograph prototype was installed in 1978, an already obsolete CGR ND 8000 brain CT scanner was installed, in late 1981 only, in the department of Pediatric Radiology, without any return to Necker .
Under Mitterrand, apart from 1981, an anarchic dispatching of CT scanners all over the country was promoted without any consideration for the university hospitals, aiming mainly to save the CGR Co close to bankrupcy, total body CT scanners lately were installed, respectively in 1986 in pediatric radiology (CGR CE 10000), in 1989 in the renewed Necker department (GE 9800 highlite). DSA were installed respectively in 1985 in pediatric radiology, in 1989 at Necker. An 0.5T Magniscan MR was installed in 1987 in pediatric radiology. All equipments had to be shared by several teams from half-a-dozen hospitals.
Such a catastrophic politics had prolonged disencouraging effects on both radiological staffs, deleterious impacts on radiological research and clinical cares inducing a fall in national and international competitivity, and, subsidiairily, pernicious effects on the CGR company which was purchased by General Electric in 1988. Nobody could argue against the enormous amount of

knowledge and expertise congregated in the whole radiological staff at the Necker-Enfants Malades but, it was demonstrated that the fight for new technologies relies on technocratic tactics and strategies superimposed by the introduction of the « budgetted envelops » in 1984. The lesson for the future generations was to have politically well-introduced and handsome leaders having the capacity to win aggressively versus the antogonists whether they are the hostile "dear colleagues but nevertheless friends", the avaricious administrators, the reluctant politicians etc...

1989-1999
THE RENEWAL OF THE NECKER RADIOLOGY BUT A MEDICAL MUTATION

ICR'89, the International Congress of Radiology held in 1989 in Paris, was conceived to help the adaptation of the still shy French radiology to a new universal age in convincing not only the radiologists themselves but also the politicians and the administrators to invest in new technologies quickly developing in computed medical imaging, a concept replacing the purely photographic "roentgenology".

Apart from 1985, an updated politics stimulated a new wave of administrators to re-appraise the value of the radiological services required by a modern medicine. They used ICR'89 as a target to demonstrate the know-how and the expertise of the Assistance Publique-Hôpitaux Paris. Both services of radiology totalizing 13 rooms were concentrated in one 8-room-ward located in the « Palais du rein ». Top equipments were installed including Color Doppler, CT and DSA but no MR because of architectural constraints. The management of the department has been fully computerized but conventional radiology and ultrasound equipments were analog. Preluding to telemedicine, a special CT-room was dedicated to the emergencies of Paris. Besides uroradiology but because of a decrease in urology, new activities started in women, hepatology and haematology imaging.

A new wave of technological progress has started in 1988. Three analog US have been replaced in 1998 by top digital sonographs. A new CT is planed to be installed in 1999. Despite many campaigns, MR has not been installed yet