Surgery in Lebanon

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In the Middle East, Lebanon has traditionally been known for high standards of medical education and a high quality of medical care. Its health care system is characterized by an abundance of medical schools, hospitals, equipment, and manpower; multiple systems of medical education; prevalence of the private sector; and paradoxical proficiency of the system in the face of lack of regulation. The Lebanese value individualism and are firmly attached to their liberal system, which contributes to their creativity and inventiveness and, on the other hand, leads to a paucity of government policies and control, lack of statistics, excessive competition, and no clear effort at organization.

Lebanon is a small country located on the eastern shores of the Mediterranean. The surface area is 10,452 km², and it extends 217 km from north to south and 85 km from east to west at its widest point (Figure 1). Its population is estimated at 3.6 million, with a density of 347 persons/km². Another million or more non-Lebanese refugees, laborers, and house maids also reside in the country. Emigration to other countries in search of opportunities has always been a fundamental reality of the history of the Lebanese from the time of the early Phoenicians. It became steady in the mid-19th century and increased sharply since the beginning of the internal war in 1975. Close to 10 million people of Lebanese origin are estimated to live outside Lebanon, scattered all over the globe.

Lebanon is a mountainous country with a narrow coastline and a central fertile valley between 2 ranges of mountains. Its name is derived from the Semitic word labun, which means white, a reference to its snow-covered mountains. Its name first appeared in recorded history around 3000 BC as a group of coastal cities and heavily forested hinterland rich in fragrant cedars, which were much prized in the region. It was inhabited by the Canaanites, a Semitic people, whom the Greeks called Phoenicians because of the purple (phonokies) dye they discovered from a special snail. The color purple later became the color of royalty and “more precious than gold” during Roman rule.1

Lebanon is a historical melting pot of cultures. It witnessed all the important events of ancient world history and is neighbor to the birthplace of the 3 monotheistic religions. The successive civilizations that inhabited its shores and mountains, ie, Phoenician, Egyptian, Assyrian, Babylonian, Persian, Greek, and Roman, left their influences and imprints on its culture and geography. They were followed during the seventh century AD by the Arabs. Later came the Crusaders, then the Mamluks, and then the Ottoman Turks, who ruled the entire Middle East for 400 years. After the Turks were defeated in World War I, Lebanon came under the French mandate as Greater Lebanon. In 1943, it became an independent republic, and for 3 decades it prospered under a free-market economy. Regional interference and rivalry between different Lebanese groups erupted into a devastating war from 1975 to 1990. A major rebuilding effort is now under way, and much has been achieved during the past 10 years.

From Tyre came Didon, who founded Carthage. From Byblos, the oldest continuously inhabited city in the world, came the Phoenician alphabet, which linked the Semitic civilizations with the Western world. The ancient Greeks added mystery to history with the legend of Europa, princess of Tyre, who was ravished on the beach by Zeus and taken to the continent that now carries her name.1

Christianity was introduced during the Roman Empire and persisted after the coming of Islam. Both religions coexist to the present.
Lebanon is a parliamentary republic with a central multiparty government that is organized according to religious groups, a system known as confessional democracy. The president of the republic is a Maronite Christian, the speaker of Parliament is a Shiite Muslim, and the prime minister is a Sunni Muslim. Arabic is the official language, but French and English are commonly spoken because they are taught all through elementary and high school. The literacy rate is 92%.

ANCIENT MEDICAL HISTORY

In the sixth century BC, a Phoenician temple dedicated to a healing god, Eshmoun, was built near Sidon (Saïda), 2 centuries before an equivalent temple was built for Asclepios, the Greek god of medicine. The site of Eshmoun temple was, for centuries, a pilgrimage site for the sick and especially children, who were immersed in the basins inside the temple. Statuettes of children were found there as ex-votos. The discovery of a trepanated skull gives surgery an ancient dimension. A human jaw with its teeth wired with gold, dating back to the fifth century BC, was found in 1901 by George Ford, director of the American Presbyterian Mission School in Sidon (Figure 2). This find is probably one of the earliest skilled surgical works. In the Crusaders’ time, the local Arab medicine was more advanced than that of the West. A Lebanese physician and surgeon named Tabit is mentioned in the 11th century AD as a well-known trauma surgeon who was often consulted by the local and foreign soldiers to help in complicated trauma cases. During the same period, a famous Christian Arab physician and mathematician named Costa Ben Luca translated into Syriac and Arabic the Aphorisms of Hippocrates and the Commentaries of Galen.

HEALTH CARE SYSTEM

The Lebanese health care system is a mixture of a market-oriented system and a national health service. Health care is largely a private enterprise delivered by private physicians and hospitals. Total health care expenditure represents 12.32% of the gross domestic product, the highest in the region and in Europe. Private insurance companies cover 10% to 15% of the population. A social security service provides health care coverage to workers and employees of the private sector, representing 17.8% of health consumers. It is a highly centralized organization that is funded by contributions from employees and employers. Employees of the public sector (4.5% of the population) and members of the armed forces and their families (8.1%) receive care from independent services funded by the government. About 46% of the Lebanese population does not have health coverage. The Ministry of Health pays for a certain percentage of their hospital care in private and public hospitals. Direct charges to patients are relatively high (Figure 3).

The sources of funds that pay for health care are 18% public (government), 70% private (out-of-pocket and insurance), 10% employers through the national social security system, and 2% from donors and nongovernmental organizations.

Lebanon has a free-market economy, which prevails in the health care system. No centralized health plan or government control over the private sector exists. An abundance
of hospitals, laboratories, health care professionals, and state-of-the-art expensive equipment characterize the Lebanese health care system. A country of less than 4 million people is served by 20 centers for open heart surgery, 24 cardiac catheterization laboratories, 60 computed tomographic scanners, 16 magnetic resonance imaging machines, 45 dialysis centers, 27 lithotripsy machines, and 12 in vitro fertilization programs. Several positron emission tomographic scanners are on order, and one has already been installed. This overabundance of highly technical services is the major cause of the high cost of health care. The government is aware of the situation and is working on plans to establish a basic universal insurance that would cover the cost of the ambulatory and inpatient health needs of all Lebanon, whether health care is delivered in governmental institutions or in private institutions under contractual agreement with the government. Individuals who wish to have more medical and surgical coverage and be treated in private clinics and hospitals will be able to buy supplemental insurance from private companies, over and above the basic government insurance. Such insurance will be managed by the national social security system or by contractual agreement with one or more private insurance companies.

There are 147 private hospitals with 10,387 beds and 14 government hospitals with 900 beds, reserved for the indigent. The occupancy rates vary from 50% to 75% in private hospitals and 20% to 30% in government hospitals. The government hospitals are old, and their ability to deliver varied and adequate care is limited because of lack of maintenance during 15 years of war and lack of equipment and personnel, the 2 main reasons for the low rates of occupancy. To offset that and make adequate health care available to the indigent, the government contracts with private hospitals to deliver care to the indigent, but at a high price. The government has been aware of the situation and, during the past 3 or 4 years, started renovating and re-equipping its major hospitals. The government also introduced a system of autonomy whereby appointed boards run these renovated and now well-equipped hospitals, which have become better than many of the private hospitals in their respective regions. These autonomous public hospitals function as private institutions that admit private patients and the indigent. The funds generated from the private patients cover the cost of health care for the indigent. The experiment is now being evaluated, and every indication suggests that it is a functional system.

One hundred ten primary health care centers and 734 dispensaries are run by the government or by nongovernmental organizations and deliver ambulatory care to the indigent.

MANPOWER

Of 9829 physicians in Lebanon, 3170 are surgeons distributed among the subspecialties of general surgery (n = 734); cardiothoracic surgery (n = 81); maxillofacial surgery (n = 9); neurosurgery (n = 93); orthopedics (n = 428); pediatric surgery (n = 49); peripheral vascular surgery (n = 31); plastic and reconstructive surgery (n = 70); urology (n = 276); ear, nose, and throat surgery (n = 297); ophthalmology (n = 245); and obstetrics and gynecology (n = 857) (Figure 4). About half of them are graduates of Lebanese medical schools with subspecialty training in France, England, Canada, or the United States. The other half are graduates of foreign medical schools.

To be able to practice medicine and surgery, a physician should be registered with the Ministry of Health and the Order of Physicians of Lebanon. The latter is an organization of peers created in 1946 to safeguard the interests of physicians, to ensure the highest levels of medical practice in the country, and to provide continuing medical education in cooperation with the medical societies that are under its governance. Of the 42 medical societies in Lebanon, 12 are surgical. The most active is the Lebanese Society for General Surgery, which is a member of the Arab Surgical Association and the International Federation of Surgical Colleges. The societies meet periodically and organize joint meetings with their foreign counterparts.

The Lebanese Society for General Surgery established the Lebanese Board of General Surgery in 2000. Other societies are now following suit.

The Lebanon chapter of the American College of Surgery is the oldest in the region and has 77 members. It has organized international congresses every 2 years since 1960 except during the 15 years of the war. Departments of surgery in the medical schools and several private hospitals also organize seminars of continuing medical education certified by the Order of Physicians.

MEDICAL EDUCATION

Medical education in Lebanon maintains a very high standard and is an amalgamation of the European and the American systems. Medicine is taught in English or in French. Five medical schools graduate an average of 250 students a year.

American University of Beirut Faculty of Medicine

The American University of Beirut is the oldest in the region. It was established by the Presbyterian Mission and opened its first class of 16 students on December 3, 1866. It is chartered in the state of New York and is a member of the Association of American International Colleges and Universities. The medical school was established in 1867. The prerequisite for admission to the medical school is a bachelor of science degree from a recognized university. It of-
fers a 4-year program and graduates an average of 70 students per year. It also offers postgraduate education tailored according to the American system of residency training.

The Department of Surgery of the American University of Beirut was established in 1867 by George E. Post, MD, and has since been a regional pioneer in surgical care and education. The department includes all of the surgical subspecialties, organized in divisions, except otolaryngology, ophthalmology, and obstetrics and gynecology, which are separate departments. At present, the Department of Surgery has 42 active surgeons of different subspecialties who are directly involved in patient care, education of medical students, research, and training of residents. Research productivity suffered during the war but is now picking up momentum. In 2001, the surgical faculty and residents wrote and published 34 articles in peer-reviewed journals. The department offers residency training in general surgery, neurosurgery, orthopedics, plastic and reconstructive surgery, and urology. Prerequisites for training and the number of years of training are according to the American system of residency training. For example, in general surgery, 2 residents are accepted every year for a total of 5 years, including 1 year of straight surgical internship.

Training is given at the American University of Beirut Medical Center, a 400-bed fully equipped facility.

Saint Joseph University Faculty of Medicine

The Saint Joseph University Faculty of Medicine, Beirut, long known as the Faculté Française de Medicine, was established by the Jesuits in 1883. Until 1982, it was considered a French university and offered the French state doctor of medicine diploma. Since 1982, it has been recognized as a private Lebanese institution offering its own medical degree to 70 students every year. Medicine is taught in French, but English is a prerequisite for research and publications. Medical education is according to the French system, but major changes have been introduced since 1987, with emphasis on small-group teaching and interactive exchange in an integrated program.

The school offers a 7-year educational curriculum. Students are admitted after high school on the basis of a scientific and cultural examination. The seventh year is a rotating internship. Residency training is offered in more than 20 specialties and is structured similar to the American system. At the end of the training period, residents must pursue 1 or 2 years of fellowship in Europe or North America before receiving their specialty diploma.

The Saint Joseph Faculty of Medicine uses the medical facilities of Hôtel-Dieu de France hospital, a 399-bed fully equipped facility in Beirut, as its university hospital. Residents also rotate in other hospitals with clinical and teaching programs.

Faculty of Medicine at The Lebanese University

The Lebanese University, Beirut, is a public institution established in 1951, and its Faculty of Medicine was established in 1985. It offers a 7-year program. Students are considered for admission after the successful completion of the Lebanese baccalaureate. Selection of candidates occurs in a 2-step process. The first step requires a minimum grade of 12/20 in the baccalaureate examination. All of those who pass are admitted to the first year of medical school. At the end of the first year, another examination is given, and only the top 80 students are allowed to continue. At the end of the seventh year, students take an entrance examination for postgraduate training or continue for an eighth year, the completion of which will allow them to practice in Lebanon as general practitioners. Medicine is taught in English and in French.

The Department of Surgery of The Lebanese University was established in 1988 and offers residency training in general surgery; cardiothoracic surgery; ear, nose, and throat surgery; neurosurgery; ophthalmology; orthopedics; plastic and reconstructive surgery; and urology. Residency training continues for 5 years, after which the resident travels abroad for fellowship or practices in Lebanon for at least 1 year before sitting for the specialty examination. Admission into the residency training program requires the successful completion of an entrance examination.

The university uses several reputable hospitals in Beirut and the vicinity as university hospitals for undergraduate and postgraduate education.

Beirut Arab University Medical School

The Beirut Arab University, Beirut, was established in 1960 in affiliation with the Alexandria University of Egypt. Its medical school opened in 1966, and in 2001 graduated its first group of 37 physicians. The school accepts 40 to 45 students every year after an entrance examination. Most of the teaching staff is Egyptian, and the 2 universities give the doctor of medicine degree jointly. Students are taught in English. Clinical rotations take place in 2 private hospitals in Lebanon, and during the last 2 years, students spend 2 to 4 months in clinical rotations in hospitals in Alexandria, Egypt. The medical school has no residency training program.

University of Balamand Medical School

The University of Balamand, Balamand, North Lebanon, was established in 1988 by the Orthodox Church. Its medical school is the youngest in the region. It opened in the year 2000 and admitted its first class of 27 students in October 2001. It offers a 4-year program tailored according to the American system of medical education in its prerequisites for admission and curriculum. The clinical rotations will take place in the St George Hospital, Beirut, which was also established by the Orthodox Church in 1878.

PATTERNS OF DISEASE

Until the beginning of the war in 1975, Lebanon was referred to as the “hospital of the middle east.” Lebanon received referrals from the region and cared for patients with all kinds of diseases and, specifically, endemic diseases of the region such as hydatid disease, lymphomas of the gastrointestinal tract, cancer of the stomach and esophagus, and schistosomiasis. Zoonotic diseases are also endemic to the region. The rare form of human intestinal anthrax
was discovered in Lebanon by one of us (A.G.), who reported 71 cases and provided a precise description of the disease, its epidemiology, and the role of surgery in its treatment.9 Lebanon also sees, with increasing frequency, diseases common in western societies, such as diverticulitis, colorectal cancer, Crohn disease, ulcerative colitis, and breast, lung, and prostate cancer. The lack of cancer and disease registries prevents us from presenting prevalence figures for different diseases; however, preliminary results obtained from a recently launched tumor registry show that the bladder, prostate, colon, lung, and breast are the leading sites of cancer.

The war in Lebanon gave surgeons tremendous experience in treating trauma and war injuries. For example, surgeons were able to confirm the safety of primary repair of colon injuries, probably because most such injuries occurred in urban areas, where tertiary care was available within a short distance and a short period of time.

Expertise is available in all types of surgery. Advanced laparoscopy, including donor nephrectomy, is routinely performed. Kidney, liver, pancreas, bone marrow, and heart transplantations are performed in more than 1 center; however, as is the case internationally, the lack of donors keeps the numbers down. A Lebanese surgeon was the first to perform laparoscopic fundoplication.8 Kidney transplantation was started in 1985 in Rizk Hospital, Beirut, and so far more than 600 operations were performed in 3 centers. Liver transplantation was started in 1989, and so far 9 have been performed. University and major private hospitals are equipped with laparoscopy units, peripheral vascular laboratories, lithotripsy machines, and facilities for stereotactic surgery and epilepsy care.

To give the reader an idea of the number of operations performed yearly by different specialties, the Table lists the operations performed in 2 university hospitals.

**CONCLUSIONS**

The concomitant presence of the American and French systems of medical education and postgraduate training and the continuous exchange of ideas between graduates of both systems in joint conferences and society meetings is a unique situation that can only advance the standards of education and medical care in the country.

The standards of surgical care in Lebanon are excellent throughout the country. Before the Lebanese war, specialty medical and surgical care was concentrated in the capital, Beirut. Patients had to travel to seek care. During the war, travel within the country became restricted and dangerous, which led to the building of new, well-equipped, and well-staffed hospitals in rural Lebanon. With the presence in Lebanon of an abundance of well-trained physicians and surgeons, excellent health care became available within short distances from anywhere in the country.

The cost of health care in Lebanon is the highest in the region, which is believed to result from the lack of adequate control over manpower and advanced technology.

Certificates of need do not exist. _Numerus clausus_ with respect to the number of admissions to medical schools is not practiced. Although the number of available positions in Lebanese schools of medicine is limited, the yearly influx into the country of graduates of foreign medical schools floods the market. Whether this situation can be controlled in a free-market economy where the individual has the freedom of choice is debatable.

Most medical educators in Lebanon believe that a National Health Council with representatives from the medical schools, Order of Physicians, and Ministries of Health and Higher Education should be created and charged to address and establish policies to govern medical education, manpower, and the health care system in general. This council should also direct the establishment of centers of excellence and eliminate the fragmentation that exists in the health care system.

We thank Walid Ammar, MD, director general of the Lebanese Ministry of Public Health, Robert Khouri, MD, founder and president of the Lebanese Society of the History of Medicine, and Nuhad Hemayd, MD, chairman of the Department of Surgery of The Lebanese University, for their contributions to this article.

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**REFERENCES**


**Table**

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