Surgery in Sweden

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Sweden has 9 university and regional hospitals and about 75 county hospitals. These hospitals are funded by counties that directly tax their inhabitants. In addition, the university hospitals use state money for education and research. The private sector performing major surgical procedures is small but slowly increasing. Reorganizations and closings of smaller hospitals are continually occurring, and various organizational models are being tested. Surgical care for inpatients is free for Swedish citizens; however, there is a small fee for outpatient care (US $10-$20 per visit). Education in surgery is changing rapidly with the introduction of new methods. Clinical research closely connected to basic sciences will be of profound importance for future development. The present article is confined mainly to general surgery in Sweden, but it also covers some general aspects of medicine in Sweden.

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SWEDEN

Sweden has a large area of 450,000 km² and is 1570 km long and 500 km wide. The 6 medical faculties are situated as shown on the map (Figure). Most (80%) of the inhabitants of Sweden live in the southern part of the country, up to and including Uppsala. The northern inner part has a low population density demanding special attention to the organization of management of surgical emergencies. Following are some key statistics about Sweden:

- 8.8 million inhabitants
- Direct health care costs of 120 billion Swedish crowns (1 Swedish crown is equivalent to US $0.13)
- 6 medical faculties
- 9 university and regional hospitals
- 75 county hospitals
- 27,300 physicians
- 13,100 specialist certifications
- 1,650 certified specialists in (general) surgery

HISTORY

The father of Swedish surgery is Olof Acrel, MD (1717-1806). He was later knighted and called Olof af Acrel. In 1752 he was instrumental in founding the first “real” hospital in Sweden, the Royal Serafimerlasaretet in Stockholm. At that time, it contained 8 beds in 2 rooms. Acrel traveled throughout Europe to learn surgery, created a Swedish surgical school, and published a series of surgical procedures describing how to perform the operation and what instruments to use. In 1835, the first surgical clinic was established at Serafimerlasaretet, and Karl Gustaf Lennander, MD, performed the first appendectomy for perforated appendicitis in Scandinavia in 1889. The development of surgery in Sweden followed its development in Europe.

Subspecialization of and milestones in surgery in Sweden include the first embolectomy of the femoral artery in 1912 by Einar Key, MD, the development of neurosurgery by Herbert Olivecrona, MD, and the resection of coarctation of the aorta by Clarence Crafoord, MD. The first kidney transplantation was performed in 1964 by Curt Franksson, MD (these physicians were also professors).

The specialization of surgery continued with the formation of many new specialties, such as neurosurgery, thoracic surgery, gynecology, ear-nose-throat, urology, plastic surgery, hand surgery, and orthopedic surgery. General surgery today in Sweden includes upper abdominal, colorectal, vascular, breast, endocrine, and...
trauma surgery. There is less money available for medical care and surgery, which means that the pressure to perform less and cheaper surgery is high; hence, further subspecialization may not occur, and it may even diminish.

**HOSPITALS FOR SURGICAL CARE**

In Sweden, hospitals developed at the beginning of the 20th century were small, with surgery, medicine, and obstetrics in a single clinic. These small hospitals were usually headed by a surgeon, and their aim was mainly to treat surgical emergencies such as appendicitis, intestinal obstruction, fractures, and deliveries. These small, undivided hospitals slowly disappeared, and the last ones were closed in the 1970s.

During the 20th century, the number of hospitals in Sweden rose until the mid-1970s. At that time it was realized that the need for surgical beds was not so great; between 1973 and 1994, the number of beds for all surgical specialties was reduced by 50%, from 2.8 to 1.4 beds per 1000 inhabitants. The closing of beds and hospitals was most intensive during the past 10 years, with large reductions every year, and many of the small hospitals were restructured to provide only elective care or only nonsurgical activities. Surgical care for inpatients is free for Swedish citizens. However, there is a small fee for outpatient care (US $10-$20 per visit).

**SURGICAL EDUCATION**

The 6 medical faculties in Sweden are all state financed, and there are no tuition fees. For admission to medical school, a variety of application criteria exist, including grades from school and national academic tests and interviews. Every year, 860 students are admitted to the medical faculties. The eighth semester is dominated by surgery, and after 5½ years the students receive their medical degrees; after an additional 18 months of internship, including internal medicine, surgery, psychiatry, and primary care, they are fully licensed.

**SPECIALIST TRAINING**

Training to become a specialist in surgery in Sweden by tradition takes place in all hospitals, from small county hospitals to the major university hospitals. When training in a small hospital, it is requested that part of the training take place in a large hospital, but the responsibility still remains with the small hospital. A major problem in surgical education is the Swedish law for working hours. People are not allowed to work more than 40 hours per week, including work in the emergency room. Compensation for this emergency room work is meant to be taken as compensation time. With such a large emergency workload in Sweden, exposure to surgical procedures is not satisfactory. This problem is currently being discussed in Sweden.

In recent years, graduate education for general surgery and other specialties in Sweden has been changed from a time-based to a goal-oriented system. Specialty training in general surgery lasts 5 to 6 years. After certification by the main supervisors, the Swedish National Board of Health and Welfare licenses the student as a specialist in general surgery. The Swedish Surgical Society provides a written examination, but it is not yet mandatory for receiving specialist certification.

The European Union entitles all surgeons licensed in their own countries to practice in all other countries. Within the section of surgery of the European Medical Association, a board certification recently started to create a “European surgeon,” but its place within the various countries remains unclear. The first 2 certifications took place in 1996 and 1997.

According to the Swedish goal-oriented program, residents shall:

- receive training to improve their ability to make independent and well-founded decisions concerning issues involving medical ethics
- acquire knowledge about general health care, policy goals, and priorities
- be given opportunities to participate in departmental activities related to organizational planning, financial management, production control, and quality improvement

Locations of the 6 medical faculties in Sweden.
acquire knowledge of and insight into the leadership role of the physician, be encouraged to participate in research and development, and refine their capabilities for critically appraising the results from various methods and technologies
• increase their knowledge about the potential for preventing disease and injury and participate in individual and general prevention activities
• develop their teaching skills by participating in the education and training of various categories of staff

Specific objectives applicable to all surgical specialties are that residents shall acquire the following knowledge and skills:
• fundamental surgical techniques, including minimally invasive techniques
• initial management of acute surgical diseases
• prevention and treatment of general complications, eg, infection and thrombosis
• different types of anesthesia and pain control
• establishing a free airway, including tracheotomy
• intensive care, including shock and fluid therapy

In addition, specialists in surgery should have specific knowledge about several diseases and procedures, as specified in the Table. These specifications are graded in 3 groups: (1) the specialist shall be able to independently manage/perform; (2) the specialist shall be well versed and have some experience in managing/performing; and (3) the specialist shall have attended at or have theoretic knowledge of.

THE PRACTICE OF SURGERY

Characteristic of surgery in Sweden is teamwork, and few surgeons work alone. Conferences with radiologists occur daily in most hospitals. Few open biopsies are performed; the combination of fine-needle aspiration and cytology was developed in Sweden and has replaced open biopsies. Preoperative diagnosis is usually obtained, which has hampered the development of surgical pathology as it is practiced in most large US hospitals. More than 50% of surgical patients are admitted through the emergency rooms. The workload for selection of surgical patients and treatment of many patients with minor problems in the emergency room, together with the 40-hour workweek, has become a threat to manual surgical training and must be addressed in the years to come.

MALPRACTICE IN SWEDEN

There is no reason to believe that malpractice is more or less frequent in Sweden than in other Western countries. All reports of malpractice are handled in 2 principally separate ways. The question of whether the physician committed a fault is addressed through disciplinary committees. The National Board of Health and Welfare receives many reports from patients, relatives, hospitals, and physicians. Cases in which the physicians are suspected of having performed unsatisfactorily are reported to an independent institution chaired by an experienced lawyer with political members of the committee in majority. This committee can find the physician not guilty, can administer an admonition, or, more seriously, can issue a warning. In severe cases, physicians may lose their license to practice medicine, their case may be brought to court, or both, although this is rare.

The other system for handling malpractice concerns compensation to the patient and is not related to whether the physician is convicted of having performed malpractice. These questions are handled by an insurance company to which all counties pay fees, and from...
this insurance company the patient also can receive com-
pensation if an unlikely complication of medical treat-
ment occurs. With this system, the liability insurance fee
for physicians can be kept below the US equivalent of $100
yearly.

CLINICAL RESEARCH

In Sweden, general surgery has a long tradition of re-
search activity covering several fields of general surgery,
including gastrointestinal malignancy (particularly rec-
tal carcinoma), breast cancer, endocrine surgery, and
surgical metabolic problems. The Swedish academic sys-
tem allows and stimulates research training parallel to the
surgical residency, which, thus, often is prolonged, al-
though on an individual basis. The PhD at the medical fac-
ulties requires 4 years of research, and about a quarter of
the Swedish physicians obtain a PhD. Although the num-
ber of academic positions is limited, a lot of clinical re-
search is performed in association with the university and
affiliated hospitals because many of the consultants in these
hospitals are doing research. These consultants form an
important group for clinical research and for supervision
of younger physicians. It is common to perform research
parallel to the specialist training, and all residents in uni-
versity and affiliated hospitals are expected to work with
education, research, and development. It is not possible
to be employed in a Swedish public hospital and run a pri-
vate surgery practice part-time, which may be a produc-
tive factor for research.

FUTURE DEVELOPMENT

Changes in methods and indications for surgical proce-
dures are occurring at increasing speed. Mini-invasive op-
erations, such as laparoscopic and endovascular proce-
dures, are replacing open surgery, which will continue
to reduce the number of beds needed for surgical pa-
ients. Ambulatory surgery has increased in the past 5
years, and more than three fourths of all inguinal hernias
are now done as ambulatory surgery. On the other
hand, the rising age of the population increases the oc-
currence of malignant neoplasms and vascular diseases,
and successful treatments can also be accomplished in
patients with advanced age.

The economic pressure of health care will stimulate
a continued concentration of expensive procedures. Par-
ticularly, investment costs in new technology will grow,
demanding concentration and rapid evaluation.

There is strong development of new forms of coop-
eration around complicated patient groups. For almost
all cancer groups there are specialist teams. Surgeons
evaluate (1) patients with vascular diseases together with
internists, physiologists, radiologists, dermatologists, and
endocrinologists; (2) patients with benign abdominal dis-
eases together with internists and radiologists; and
(3) patients with endocrine diseases together with en-
docrinologists and oncologists.

For areas with small populations, telemedicine and
effective helicopter transports are now being developed.
Small, remote hospitals will need special attention, and sur-
geons in these areas will need broader surgical educa-
tion; small hospitals in urban areas will undergo struc-
tural changes, subspecialization, mergers, or closure.

Research and development will be of still more im-
portance in the future. The rapid transformation of new
experimental data to diagnosis and treatment of pa-
ients will further increase the demand of the surgeon to
be updated on medical progress to avoid a future role as
surgical technician, soon to be replaced by a robot.

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