1. The desperate struggle with esophagectomy for cancer and the discovery of columnar-lined lower esophagus-adenocarcinoma

The esophagus has always taken third place in the minds and hearts of chest surgeons, whose primary interests were pulmonary and later on cardiac surgery. Indeed, the esophagus runs from the neck through the chest to below the diaphragm, and it was logical that ‘borderline’ pathologies such as diverticula, achalasia, and tracheo-esophageal fistulas were also taken on by ENT surgeons as well as those interested in pediatric or gastrointestinal surgery. A sort of ‘no man’s land’, the esophagus was rapidly taken over by general surgeons once the problems of anesthesia, thoracotomy and postoperative care had been solved. Aside from the fact that topographically the esophagus belonged to the chest, there was indeed very little difference in the technique for operations of the esophagus, the stomach, or the colon, all the more as the latter viscera were used to reestablish the continuity of the alimentary tract. Thus, I could have hesitated to include the esophagus; but any historical analysis reveals again that most breakthroughs in this field were the doings of thoracic surgeons (Torek, Cameron Haight, Sweet, Belsey, and others).

The dramatic story of the esophagus could be told in many ways and, having lived through all of it, I will tell it according to my somewhat personal experience. The spectacular advances are connected with three names:

- Richard Sweet
- Ivor Lewis
- Marc Orringer

As an approach to this often-disappointing chapter, I would like to recall a personal story of my first meeting with another towering personality in this field, Ronald Belsey.

In the summer of 1970 we had a big international meeting of the American College of Chest Physicians in Lausanne. Belsey gave a presentation on about 20 cases of achalasia with malignant degeneration. During the discussion I dared to ask if some of these malignancies might not have been prevented by early diagnosis and early treatment: the Heller operation with an antireflux fundoplication? It was meant to be a timid, purely theoretical question and Belsey did not consider it worth an elaborate discussion and just said: “Achalasia is a BAD disease”. In analogy I might also begin this chapter by declaring, with all the surgeons of our time “Cancer of the esophagus is a BAD disease”.

For us, the average thoracic surgeons in the 1950s and 1960s, cancer of the esophagus was one of the most disappointing experiences. There were only a handful of master surgeons, Belsey, Sweet, Garlock and a few others, who could claim doing worthwhile esophageal surgery, but even for them postoperative mortality was high, 15–40% reported, and late survival very poor. For tumors at or above the aortic arch results were so dismal that even Sweet, in his earlier publications, did not dare to report them.

The Sweet technique was an outgrowth of the old 1913 Torek operation, reason enough to briefly remember this earlier event.

Franz Torek (1861–1938) (Fig. 1), the son of a German immigrant, came to New York at the age of 11 years. He must have been a surgeon of exceptional skill, as the operative report under 1913 primitive conditions plainly shows: ‘The tumor was fairly fixed just below the transverse portion of the aortic arch, allowing only slight mobility. The dissection of the esophagus, which passed behind the aortic arch, offered great difficulties. Dislodging the aorta and lifting it forward after having ligated and divided a number of its intercostal branches finally overcame these difficulties. Getting the aorta out of the way where it crosses the esophagus is of considerable help. The tumor was attached to the left bronchus, which sustained a longitudinal cut during the separation of the tumor. The tear in the bronchus was repaired using silk sutures. The esophagus was brought out through an incision in the neck, resected and its proximal end joined to a gastrostomy by a prethoracic...
rubber tube’. The patient, a 67-year old lady, not only survived the operation, but also lived without recurrence for 13 years. It took another 20 years before two surgeons, Garlock and Sweet, were able to report another esophagectomy according to the Torek technique, this time, however, with restoration of the continuity by esophagogastronomy.

Maybe I should not have retold this surgical ‘fait divers’ once more, but taking into account the conditions of 1913 it was an exploit worthy to be remembered—all the more so because Torek’s technique was the basis of the famous ‘Sweet-Era’—actually the first revolution in esophageal surgery.

John Garlock (1896–1965) (Fig. 2) of New York and Richard Sweet (1901–1961) were two master surgeons who opened the field of ‘esophago-gastrectomy’ by left thoracotomy only. As everybody is aware today, the concept of resecting tumors at or above the arch of the aorta by the Torek technique was a mistake—primarily because the radial incision of the diaphragm from hiatus to chest wall abolished the essential diaphragmatic respiratory function. Belsey was astute enough to understand this inconvenience early on and introduced his circumferential detachment of the diaphragm from the chest wall, thus preserving the phrenic nerve. Nevertheless patients died ‘en masse’ and the survivors had a rocky postoperative course. Many surgeons, however, were on the right track. Owen Wangensteen, the astute academic surgeon, teacher of many, notably Varco and Lillehei, during a 1953 discussion at the AATS quoted Julius Caesar ‘divide et impera’, meaning ‘dissect the problem’.

I too have suffered from the experience of losing patients for no obvious good reasons! “Sometimes the loss of the patient is very difficult to understand, there being at autopsy scarcely anything to account for the lethal outcome” (Journal of Thoracic Surgery 24/267/1952). I cannot resist quoting one of my model thoracic surgeons, Max Chamberlain, 2 years earlier at the AATS meeting in New Orleans (Journal of Thoracic Surgery 19/569/1950): “It takes a brave man to stand up at this time, especially after Dr Garlock’s and Dr Sweet’s opening discussions. I imagine that it is because of my small experience that I have the courage to do so… I should like to emphasize

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Fig. 1. Franz Torek (1861–1938). First esophagectomy for cancer in 1913.

Fig. 2. John H. Garlock (1896–1965) of New York City. Pioneer in esophageal surgery.
the importance of preserving the diaphragm... Many of these patients, as you all know, have a very low respiratory reserve, either because of emphysema or a postoperative complication, and a good technical result may be a clinical failure simply because of respiratory insufficiency—the cough mechanism is nature's protection against postoperative complications and the diaphragm is extremely important. If the diaphragm is crippled by Dr Sweet's operation it is conceivable that some of these patients simply are lost because of pulmonary complications as has happened to me in one case... My second point is in defense of the right-sided approach. For a long time I disliked to put the patient through a long abdominal operation only to discover in opening the chest, that the tumor was inoperable. Dr Pool got around this dilemma by establishing a palliative anastomosis with the stomach above an inoperable tumor anyway. So in our last several cases we have assumed that all cases are 'operable', not 33 out of 60 cases, or 70 out of 100, but all are operable in the sense that anastomosis can be accomplished above the lesion” (dixit Chamberlain more than 50 years ago!).

Thus I conclude my chapter on the Sweet–Torek technique and in the mid-1950s everybody—or almost—switched to the Ivor Lewis laparotomy right thoracotomy concept. For Europeans it might be interesting to remember that the famous French surgeon Paul Santy (Fig. 3), whom I visited several times in Lyon, had published what he called a ‘Torek operation’ through the right chest as early as 1914(!) and wondered why everybody had not recognized the right thoracic approach to be the better one. Paul Santy, with the d’Allaines-Dubost group in Paris, was the first continental surgeon to invite Blalock in 1947 to initiate the blue-baby operation and cardiac surgery in Lyon. Called ‘Le Père Santy’ he was a real ‘chef d’école’ of many pupils, first of all my friend and mentor Marcel Bérard (Fig. 4). I spent some days with Bérard in 1946 in preparation of my year in the USA and again on my return in 1949 or 1950. He always impressed me by his natural courtesy as a colleague, and his technique, speed and precision as a surgeon. It was also through his sponsorship that I became the first foreign member of the Société Française de Chirurgie Thoracique. Bérard was probably the most outstanding French chest surgeon of the 1950s. His premature tragic death at the age of 47 while driving his ‘Citroën car’ to a mountain sanatorium for early morning operations, was an enormous loss for thoracic surgery not only in Lyon and but also for us all. As I stated before, the Ivor Lewis right thoracotomy–laparotomy approach was for all of us the decisive advance of esophageal surgery in the late 50s and early 60s. It also was a decisive relief in our lives as surgeons as it succeeded in pulling patients through these difficult operations after we had had so many disappointing defeats.
2. Richard H. Sweet (1901–1961) (Fig. 5)

We should, however, not close this, in a way, unspectacular chapter without honoring Sweet, the man who, among others, has always remained a role model for us young mid-century surgeons. His reasoning was razor-sharp and his technical skill unmatched. His impeccably performed esophago-gastrectomies took him half the time—less than 2 h—that other excellent surgeons needed to do it. Watching him at the MGH I also remember his outstanding assistant, Rudi Herrera, later a thoracic surgeon in Guatemala City, who tied the knots of Sweet’s sutures faster than I have ever seen anybody else do it. There were two other sides to Richard Sweet, also called ‘Sir Richard’ for his reserved typically Bostonian distinction. First, according to Scanell the MGH historian, Sweet’s side interest was French literature, which he translated for relaxation. An unfulfilled project, spared for his retirement, was a translation of the work of François Rabelais, one of the major literary figures of the French Renaissance and a physician in Montpellier as well. Professionally Sweet was a general surgeon at heart, totally opposed to the already appearing specialization. In his excellent 1950 textbook ‘Thoracic Surgery’, of which I cherish an autographed copy, he wrote, “The present volume is based on the concept that any properly qualified surgeon can acquire with relative ease a satisfactory proficiency in thoracic surgery employing the techniques herein described.” Other times, other philosophies! Nevertheless, Sweet still was one of the last of his kind, an accomplished outstanding general surgeon, a race disappearing during the mid-century surgical revolution. In 1961 he was elected President of the AATS. Unfortunately, this ‘Master among Masters’ as Churchill had called him, never came to that meeting, having died suddenly on January 11 of that year.

The third and most spectacular change in esophageal surgery happened in 1978 when Marc Orringer (Fig. 6) presented his ‘Esophagectomy without thoracotomy’. As so often is the case, it was a revival of an incidental technique carried out by Gray Turner in 1933, but it took young Marc Orringer to systematically develop and publicize what had just been another early ‘fait divers’. Actually the mid-century revolution was practically over in 1978—30 years after Bailey, and more than 20 years after the heart–lung machine. Nevertheless, for the small group of esophageal surgeons Orringer’s ‘reckless’ presentation at the 1978 AATS meeting in New Orleans had every ingredient of a blazing revolution. The 45-min discussion following Orringer’s talk will always remain a vivid memory of, maybe, the greatest ‘show’ in thoracic surgical history. Most of us were shocked by the concept of this unconventional procedure and it was no surprise when the great Ronald Belsey started the discussion, in his often ironic style, by saying that he was very interested in Orringer’s ‘essay on BLIND surgery and his expedition into the DARK AGES’. He fustigated the technique as prone to cause fatal hemorrhage, being not radical and impossible to teach. “It is bad teaching and we are not justified in teaching residents to embark on blind surgery”. Although Belsey’s strong words reflected our general mood of reprobation, some prudently encouraging remarks by farseeing surgeons, such as David Skinner and Griff Pearson, followed. Pearson, in his striking style, concluded: “If you have not tried this operation, don’t knock it.”. Actually, quite unemotionally
he hit the nail on the head. “It was all a question of indication”. Whatever was said that morning in 1978, it was an emotional and historical moment, and in a way the end of a long line of great surgeons from Torek to Sweet and Orringer. The young man of the year 2000, resecting an esophagus by thoracotomy, video-assisted endoscopy or any combination of techniques, may be unable to really imagine our long and painful journey during this half-century. Ronald Belsey (1910–) (Fig. 7) in retrospect was not altogether mistaken. He had, in his own series, eliminated high mortality and morbidity due to the dreaded intra-thoracic leakage and anastomotic fistula, by bringing the gastric stoma up into the neck. He could see no reason to improve, or rather compromise results by blind, in his view uncontrolled maneuvers. Belsey, who had trained at the Brompton Hospital with Price Thomas and in Boston with Churchill, has made many important contributions not only to esophageal but also to pulmonary and tracheal surgery. I am proud to have known him well since my visit to the Frenchay Hospital in the late 60s when, incidentally, the master had put me up in a miserable small boarding house near to the hospital rather than at one of the decent hotels in downtown Bristol—a typically Belsey style of doing things. When he came to Geneva to re-operate with me one of my very complicated cases, he stayed of course at the Hotel Richmond, the best place in town. Aside from these unimportant anecdotes, Belsey was certainly the most colorful personality in our profession, gifted with a far above average intellect and technical skill. Furthermore he had an absolute self-control that I have never seen in any other of the many surgeons I have observed in operating rooms. Oswald Tubbs, the cardiac surgeon, in a letter to me about Belsey wrote: “He was absolutely imperturbable even when St Thomas’s Hospital, where Belsey operated during the war, received a direct hit during an air raid”. Closing his letter Tubbs wrote, “He spent his professional life in Bristol where they only mentioned his name in a whisper”. As the Orringer episode shows, Belsey quite rightly thought that in esophageal surgery nobody could teach him whatsoever. Besides, at the University of Chicago, under Dave Skinner, he was a permanent Guest Professor after his retirement from Bristol. In private—often at our reunions with Griff Pearson and his team—Belsey was a marvelous companion with his typically British, very dry sense of humor. To complete the picture he was not only the uncontested best esophageal surgeon of his time but also, according to Tubbs, a cattle breeder, watercolor painter, gun collector and ‘the best salmon fisherman on the Dart in Devon’.

3. Adenocarcinoma in the columnar-lined lower esophagus

With this picture of Belsey we could conclude the chapter on esophageal surgery unless we briefly recall the pathology of adenocarcinoma in the neo-mucosa of a columnar-lined lower esophagus which is still of interest today. Before describing our personal contribution we must clarify that Norman Barret (Fig. 8) in his 1950 publication did not describe an ‘endobrachyesophagus’ (Lortat-Jacob 1951) (Fig. 9), nor a lower esophagus lined with a neo-mucosa of the columnar type (Allison, 1953), but simply ulcers in an intrathoracic portion of the stomach pulled up by a short- or brachyesophagus. Now, coming back to that 1969 congress of the American College of Chest Physicians in Lausanne, where I heard Belsey speaking for the first time, I also presented a paper on the anti-reflux Nissen fundoplication, a result of my then intense and productive cooperation with Savary at the Yverdon Hospital. One should remember—and it is often forgotten—that Marcel Savary was the first surgeon worldwide to systematically explore, describe and photograph what today is the well-known pathology of progressively ascending columnar reparation of erosions due to gastroesophageal reflux. Our case material presented at that meeting was apparently convincing, for I was approached by a thoracic surgeon from Tampa, Florida, H.S. Seiler—later to become one of my best friends—with the request to present our material at an honored guest lecture in his town.
Hawley Seiler was President of the Southern Association for Thoracic Surgery, whose next meeting in Tampa he was organizing and presiding. It was a wonderful meeting in a still small town, Tampa, with a small old-fashioned airport you would not recognize today. My lecture resulted in a classic paper on ‘Conservative operations for peptic esophagitis with stenosis in columnar-lined lower esophagus’ by Savary and myself, published in the *Annals of Thoracic Surgery* in 1972. In our next publication, ‘Columnar-lined lower esophagus: an acquired disease with malignant predisposition’, presented at the New York meeting of the AATS in 1975 (*Journal of Thoracic and Cardiovascular Surgery* 70/826-835/1975), we reported among others the landmark case of a patient operated for reflux in 1970 with microscopically confirmed benign columnar epithelium (Fig. 10). The patient came back two and a half years later to be operated for atypical adenocarcinoma of columnar epithelium. Before our...
publication there was only a single paper on this rare pathology published earlier by Adler in the 1963 *Journal of Thoracic Surgery*, but nobody apparently paid attention to it at the time. Although adenocarcinoma of the lower esophagus due to reflux metaplasia is today fairly frequent, and should be looked for by every resident, 30 years ago, when Savary alerted the world, it was a rare, little known disease. Adenocarcinoma of the Barrett-esophagus remains, though important, a fairly rare pathology, initially a ‘violon d’Ingres’ for a few of us. Nevertheless it can be stated here that the development of modern, eventually fiberoptic endoscopy has been a key factor in the spectacular progress of both bronchial and esophageal surgery. Technical factors have often played that role. Therefore, before leaving the esophagus for the heart, it might be the moment to remember the story of the introduction of stapling techniques and devices in cardio-thoracic as well as general surgery by the thoracic surgeon Marc Ravitch.

4. Mark Ravitch and the story of surgical stapling

Although stapling has been one of the major advances in surgery and has played a key role in the recent revolution of minimally invasive surgery, its history is probably ignored by most of today’s surgeons. Without going all the way back to the early 20th century and stapling instruments for gastrointestinal surgery by von Petz and Friedrich (Fig. 11), we honor the surgeon who introduced modern stapling techniques to the USA, namely Mark Ravitch (1910–1989) (Fig. 12). He was a master surgeon and a wonderful human being, whom I knew quite well. Ravitch tells the story in great detail in a historical presentation given at the ‘Second Symposium and First European Congress on Stapling’ organized in 1988 in Luxembourg by himself and Felicien M. Steichen. The picturesque story of Ravitch meeting the prominent Russian surgeon N.M. Amosov and discovering the stapler is worthwhile reading in the 1991 edition of Steichen’s book on that 1988 congress.

In 1958 Ravitch was on a mission to the USSR for the National Research Council and visited Professor Amosov at the Ukrainian Research Institute for Tuberculosis. Amosov demonstrated his ‘UKL-60’ stapling device and had already published large series of papers on pulmonary operations, especially segmental resections for TBC, using his stapling device. Mark Ravitch tried to procure an instrument through official channels, but was not successful. During a coffee shop conversation in Leningrad a student told him that these instruments were manufactured at the Red Guard Factory, just outside Leningrad. To his surprise Ravitch found a store for ‘Surgical Instruments and Apparatus’ on Nevsky Prospect where they would sell him a bronchial stapler to take back to the USA.

Back in Baltimore he and Steichen launched a program of laboratory and clinical investigations, the results of which were a series of stapling instruments for general thoracic as well as for abdominal surgery. Although extended clinical use and potential industrial production were far from obvious, the ‘US Surgical Corporation’ became interested and manufactured a number of stapling instruments for both abdominal and thoracic surgery, which by the mid-1970s were widely accepted and used. Their distinguishing feature was the creation of sterile cartridges loaded with staples so as to avoid hand loading.
Ravitch, although not a ‘pioneer’ in the proper sense of the word in cardiac surgery, was an absolutely exceptional ‘renaissance’ surgeon, teacher and personality. I was invited to that 1988 Stapling Congress in Luxembourg because I had known Ravitch quite well for many years. My first, very superficial meeting with him took place during my 1946 visit with Alfred Blalock of Johns Hopkins Hospital. Much later our relationship developed further through our mutual interest in the History of Surgery and my admiration of his incredibly vast culture. As Steichen writes, he was the sage of a yeshiva, the scholar of a medieval library and the philosopher of a Greek city-state, a ‘man for all seasons’!

Ravitch and I met again by coincidence—two early risers—at 7 a.m. exercising in the swimming pool of the Greenbrier Hotel in White Sulfur Springs during the 1970 meeting of the American Surgical Association. As a visiting professor at the George Washington University I had been invited to this exclusive meeting by my friend Paul Adkins, who was Professor of Thoracic Surgery at the University. Tragically, some years later, looking at his own annual chest X-ray Paul Adkins, a heavy smoker, diagnosed a small-cell carcinoma and in spite of chemotherapy died rapidly at the young age of 57.

Mark Ravitch and I, during that meeting and many others discovered our mutual interest in history, and he was good enough to write a foreword to my short ‘Histoire de la Chirurgie Thoracique’ (1988). Compared to mine the accomplishments of Ravitch as a historian are enormous. His two-volume history of the American Surgical Association from 1880 to 1980, ‘A Century of Surgery’, is a tremendous work, a unique source of about everything that happened in surgery during our century!