Roger Normando
Professor of Thoracic Surgery - Universidade Federal do Pará, Brazil

João Pedro Normando
Historian, Universidade do Porto, Portugal

FOUNDERS

Thoracic Surgery – Notes on Its History in Brazil (Part I)

"I now ask your permission to narrate, inspired by memories and personal experiences, the saga of Thoracic Surgery in Brazil

It will serve as a backdrop to help me construct a current interpretation of the specialty in our country [...] I trust that my fellow thoracic surgeons of the current generation may find some inspiration in this account."

— Jesse Pandolpho Teixeira, 1979

INTRODUCTION

Jesse Teixeira (1918-1993) was an academic surgeon. He trained dozens of young surgeons throughout Brazil and was a dreamer—a Quixote of tropical surgery who wrote about his windmills. In his private library, he collected a myriad of elements related to our specialty, from the earliest descriptions of surgical techniques to the strengthening of the specialty in Brazil.

He recounted these events in one of the most beautiful lectures in the history of our specialty. It took place in 1979 at Mandaqui Hospital in São Paulo during the First National Meeting of Thoracic Surgeons.

The account precedes the era of lung transplants and minimally invasive surgery, which will be addressed at another time (Part II). It describes the foundation for inspiration and strengthening, laying the groundwork for the present day when viewed through the lens of history. Above all, the testimony preserves an extraordinary historiography, interwoven with poetic nuances, permeating every passage with the literary essence of that surgeon who left us in 1993 after severe renal complications.

Only someone who lived the specialty as intensely as Jesse Teixeira could transcribe this daily experience so viscerally, without losing the romanticism and connection to his era—while still portraying the fundamental elements of the specialty, as if it were a scene from a play. We, mere admirers, can only applaud. We will present this lecture now.

FIRST ACT
– BRIEF INTRODUCTION

> "Excited by a youthful fantasy and believing in a mirage,
> I opted for a specialty that, in practice, did not exist."
>
> — Jesse Teixeira, 1979

The golden dream that animated the ambitious pioneers of Thoracic Surgery seemed like a chimera at the time. It was almost science fiction: they wondered whether the vital organs enclosed in the thoracic cavity would one day also merge with operative medicine, just as had happened with the abdomen and skull. After Lister and Pasteur, surgery, supported by aseptic techniques, had made victorious progress in all fields—except for the thorax. Indeed, until World War II (1939-1945), thoracotomy had remained stagnant for years, hindered by a widespread, almost superstitious fear of the fatal consequences of an open pneumothorax, which could trigger a lethal disruption of the cardiopulmonary mechanism.

Faced with prohibitive mortality rates, surgeons dared not go beyond the rib wall. The very first surgical act in human history—the rib resection described in the Book of Genesis, performed on our most remote ancestor and so rich in its enchanting consequence—symbolized, for millennia, the narrow anatomical limits permitted for thoracic operations.

The visionary concept of major surgery on the lungs, heart, and mediastinum germinated obsessively in the minds of surgeons but failed to materialize. A peculiar anatomical and functional characteristic of the thorax—the pleural cavity—was the cause of an insurmountable and demoralizing mechanical obstacle blocking the path of surgical progress.

For this reason, the history of Thoracic Surgery is, to a great extent, intertwined with the history of the technical innovations devised by human ingenuity to overcome the pleural obstacle, namely the risks of open pneumothorax.

It is worth recalling the most significant milestones of this remarkable technological evolution, in which the methods attempted only became effective when simplified. The first concrete attempts to solve the problem emerged during the Belle Époque, a period of intense intellectual activity in the West, between the death of Queen Victoria and the Great War of 1915.

Broadly speaking, three successive phases can be identified in the research and procedures aimed at eliminating the harmful effects of surgical pneumothorax:

1. The Differential Pressure Phase
2. The Baronarcotic Phase
3. The Controlled Respiration Anesthesia Phase

The first two phases resulted from the erroneous assumption that the adverse effects of the phenomenon lay solely in lung collapse and mediastinal shift. To counteract these issues, barometric methods of varying complexity were developed, such as Sauerbruch's hypopressure chambers or Brauer's hyperpressure chambers, built around 1904 under the concept of differential pressures.

Building on Brauer's method, which prevented lung collapse by increasing endobronchial pressure, Meltzer and Auer introduced, in 1909, a technique of respiration without respiratory movements through intubation and continuous tracheal insufflation of air and ether under a constant pressure of 20 mmHg. The excess gases escaped through the space between the inserted tube and the tracheal wall since the system was deliberately non-hermetic. This method of controlling pneumothorax during thoracotomy became known as baronarcotic anesthesia, a technique that would dominate early intrathoracic surgery until the end of World War II (1939-1945).

However, the baronarcotic phase was marked by a high operative mortality rate, especially in longer procedures. Lillienthal, known as the "father of lobectomy" and author of "Thoracic Surgery" (published in two volumes in 1925), recalled that he had never saved a single patient whose surgery lasted beyond 45 minutes. Today, the explanation is clear: "baronarcotic anesthesia under spontaneous respiration dangerously impaired the patient's pulmonary ventilation". The lungs remained in a constant inspiratory position due to continuous alveolar insufflation. While lung collapse and mediastinal shift were avoided, this came at the cost of progressive carbon dioxide retention". The "fatal 45 minutes" of Lillienthal signified that respiratory acidosis had disrupted the body's equilibrium, leading to low cardiac output, arterial hypotension, and cardiac arrest—the tragic finale.

The third and final phase began in 1916, marked by the critical research of Swedish surgeon Giertz, mentor and predecessor of Crafoord, who used experimental data to condemn continuous differential pressure methods. Instead, he proposed intermittent pressure anesthesia and rhythmic insufflation, a form of controlled artificial respiration that ensured adequate gas exchange during thoracotomy.

Unfortunately, Giertz's original work, written in

Swedish during wartime, did not receive the recognition it deserved and only became widely known when Crafoord published his classic monograph, "On the Technique of Pneumonectomy in Man", in English, in 1938. Thanks to a prototype respirator—the "Spiropulsator of Frenchner Crafo— mechanically controlled rhythmic lung insufflations" became possible after deep anesthesia and apnea through hyperventilation, with carbon dioxide absorbed by a soda lime filter.

The pros of this breakthrough were significant: it greatly reduced intraoperative mortality, allowed for longer procedures, and ultimately paved the way for safer thoracic surgeries. However, it was not without challenges—early respirators were still rudimentary, requiring continuous refinements to improve efficiency and patient safety.

The visit of the renowned Stockholm surgeon Crafoord and his team to Brazil in 1950, during which they conducted remarkable live surgical demonstrations at the Hospital dos Servidores do Estado in Rio de Janeiro, greatly accelerated the development of both Thoracic Surgery and Anesthesiology in Brazil. Before long, both disciplines had evolved into independent specialties.

Thanks to this and other multidisciplinary advances in anesthesia, surgical techniques, post-operative care, and infection control, intrathoracic surgery saw its dawn and full realization. As a result, a new specialized branch emerged from the broad tree of general surgery, attaining the unique identity it proudly holds today—a transformation magnificently demonstrated in this national gathering of its practitioners.

SECOND ACT
– PERIOD OF WALL OPERATIONS
(COLLAPSE AND DRAINAGE)

"Thanks to this and other multidisciplinary advancements in anesthesia, surgical techniques, postoperative recovery, and infection control, endothoracic surgery saw the dawn of its era."

— Jesse Teixeira, 1979

My testimony goes back to the uncertain days of 1940, when the Brazilian people were suffering from the harsh and tormenting living conditions imposed by the bloody armed conflict between the great world powers. A young doctor, 22 years old, newly graduated, I had reached the metaphysical moment of deciding on a path in my profession. Still raw and inexperienced, I immediately wanted, at the very threshold of my career, to define the meaning I would give my destiny as a surgeon. Driven by youthful fantasy and believing in a mirage, I chose a specialty that, in practice, did not exist. At that time, Thoracic Surgery, the subject of my intellectual contemplation, was limited to parietal interventions for the treatment of pulmonary tuberculosis (collapse operations), pleural empyema, or pulmonary abscess (drainage operations).

The first step to moving forward with my plan was to work as a doctor in a tuberculosis sanatorium. I joined, with that goal, the São Sebastião Hospital in Rio de Janeiro as an inmate. Looking back today at the medical and surgical resources available at the time of my early training in Tisiology, I am astonished by the enormous load of utopian idealism that motivated all those who shared the same purpose. It is enough to mention that, at that time, three essential elements for the successful execution of a thoracotomy were not available:

1. Anesthesia with tracheal intubation and controlled ventilation: Note that anesthesiology had not yet become a medical specialty, and curare and its derivatives were only later used as muscle relaxants.

2. Stored blood transfusion: There were no blood banks, and transfusions were done directly, arm to arm, from donor to recipient.

3. Antibiotics: Fleming had not yet discovered penicillin as a bactericidal agent; only sulfanilamide was known.

Such was the state of the art when I began my internship at São Sebastião Hospital. Surgical collapse therapy for tuberculosis was practiced in the vast and traditional institution for contagious diseases by two eminent general surgeons working in independent pavilions: Dr. Azambuja Lacerda, already deceased, and Professor Ugo Pinheiro Guimarães. I am grateful to both for the kindness with which they welcomed me and the teachings I received from them.

At the same time, other Brazilian tisiosurgeons, in

different centers, also dedicated themselves with interest and pioneering spirit to this type of surgery, managing to gather a considerable amount of experience in the field. I will now cite, from memory, the most notable names, apologizing for any omissions: Azambuja Lacerda, Aresky Amorim, Fernando Paulino, J. M. Castelo Branco, Mario Pardal, Otávio Marques Lisboa, Rodolfo Figueira de Melo, Ugo Pinheiro Guimarães (Rio de Janeiro). Alberto Chap-Chap, Eduardo Etzel, E.J. Zerbini and his disciple, our companion Rubens Monteiro de Arruda, Gabriel M. Botelho, Radyr de Queiroz, Ruy Doria (São Paulo), Bayard Gontijo (Belo Horizonte), Augusto Maria Sisson (Porto Alegre), Joaquim Cavalcanti (Recife). The well-deserved tribute to these unforgettable pioneers is to recognize that almost all of us, if not all, the participants in this meeting, have directly or indirectly benefited from their significant influence and noble example.

The surgical procedures of this period were quite modest in terms of technical and human resources. Infiltrative locoregional anesthesia, performed by the surgeon themselves, was the norm. I also used high epidural anesthesia with good results. Alongside the smaller interventions, such as intra-pleural endoscopic pneumolysis (Jacobaeus operation), operations on the phrenic nerve, and pleural or pulmonary drainage procedures, there were also large-scale operations, such as extrapleural pneumolysis and thoracoplasty. Thoracoplasty was the largest, bloodiest operation, with the removal of the first rib generally considered a difficult technical feat. To reduce blood loss and the risks of paradoxical breathing caused by parietal instability and mediastinal imbalance, thoracoplasty had to be divided into several stages. Its late results proved to be more rewarding than those of other collapse methods, providing a high incidence of cavity closures. However, its main drawbacks could not be overlooked: the persistence of uncollapsed cavity fissures and the severe trunk deformity caused by thoracogenic scoliosis, which could have serious repercussions in both the functional and psychological spheres. For this reason, the old idea of surgically removing the focus of the disease, i.e., pulmonary resection in tuberculosis, was always present in the minds of tisiosurgeons. Let us see how, in our country, it became a reality in the post-war period.

Before proceeding, I must mention that in 1945 I was appointed to lead the Department of Surgery at the newly inaugurated Santa Maria Sanatorium Hospital in Jacarepaguá, Rio de Janeiro. I remained there for 25 years at the helm of a brilliant team of collaborators, including Haroldo Meyer, João de Paula Arruda, Arídio Ornelas, and Vital Imbassahy de Melo.

The contribution of Santa Maria Hospital to the development and teaching of Thoracic Surgery in our country was of inestimable value, replicating, by the way, the significant role played by the major Tuberculosis Sanatoriums. Among these, I justly include this renowned Hospital in Mandaqui.

THIRD ACT – THE ERA OF ENDOTHORACIC OPERATIONS

The incidence of tuberculosis in 1950s in Rio de janeiro was huge and the affected, even when free of the bacillus, remained hospitalized for many years, which represented an elevated cost for the State. In this sense, the implementation of thoracic surgery as a treatment for tuberculosis was a true weapon for the public health to fight the disease.

— Haroldo Meyer, thoracic surgeon

Starting in 1946, the medical advancements made during the war period had a revolutionary impact on surgical practice in general. The advent of antibiotics brought considerable changes in the field of thoracic diseases, sometimes with ambivalent effects. Surgery, made safer by infection control, advanced in the use of new and bolder surgical techniques. On the other hand, the impact of antibiotics on the morbid physiognomy of certain bacterial diseases, such as bronchopulmonary suppurations, almost eliminated the need for the traditionally adopted surgical treatment. Acute pulmonary abscesses ceased to be a routine indication for pneumotomy, transitioning to treatment through non-invasive, conservative methods.

Over time, a notable reduction in the frequency of bronchiectasis was also observed, explained by the prophylactic effect resulting from the proper treatment of acute pulmonary infections, especially in childhood. The experience gained in collapse therapy, along with advancements in diagnostic

and treatment methods and in the structure of hospitals themselves, encouraged surgeons to pursue the long-awaited goal of pulmonary resection. Before specific chemotherapy, tuberculosis surgery was still focused on closing cavities through collapse or cavity drainage. Therefore, pulmonary resection in ulcerative-caseous tuberculosis was not yet a consideration.

However, other conditions, such as lung cancer, chronic bronchopulmonary suppurations, and certain incolapsable forms of tuberculosis (tuberculoma, bronchostenosis, destroyed lung), would have as their only therapeutic option the partial or total excision of the affected lung. During the period we are considering, a few sporadic pulmonary resections were recorded in Brazil, but the surgeons who performed them - Amorim in Rio, and Almeida and Ferreira in São Paulo - did not remain active in the field, and for this reason, their efforts, although commendable, were somewhat unfruitful.

Let us mention the national surgeons responsible for the first reported series of pulmonary resections for bronchial cancer, starting in 1946:

E. J. Zerbini, G. M. Botelho, from São Paulo, and F. Paulino and J. Teixeira, from Rio de Janeiro. The respective statistical data are presented in the following chart:

The data above are part of the official report I presented at the 1st Brazilian Congress on Thoracic Diseases, held in Curitiba (November 1953), titled "Lung Cancer (Including Aspects of the Problem in Brazil)." From the analysis of these first 93 pulmonary operations for cancer, three points of historical interest can be drawn, which faithfully reflect the early stages of the national experience in this field:

1º – Excessive number of exploratory thoracotomies (40%)

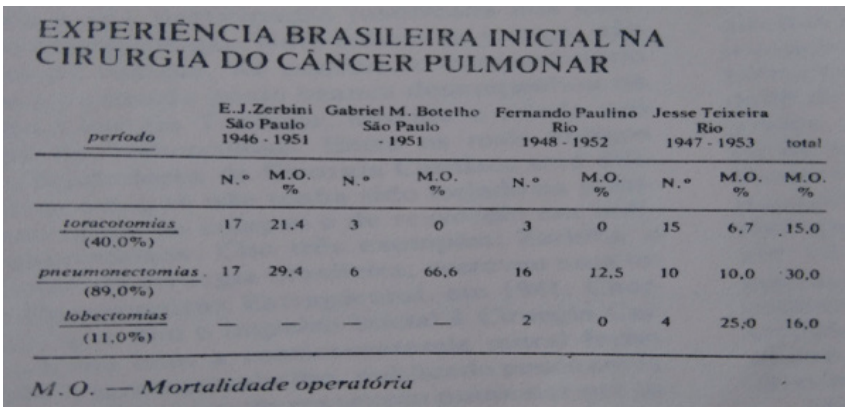
2º – Massive predominance of pneumonectomies (89%)

3º – High operative mortality, distributed as follows: exploratory thoracotomies (15%), pneumonectomies (30%), and lobectomies (16%).

These results attest to the remarkable work of Brazilian surgeons in the 1940s, during which the foundations of Brazilian Thoracic Surgery were solidly established, despite the known unfavorable factors in place at the time.

By the end of 1950, the difficult preparatory phase had been completed, paving the way for the acceptance of Thoracic Surgery as a medical specialty. All the anatomical structures involved in the thoracic framework were now ready for the surgeon's approach. Confidence in thoracotomy had been established through the coexistence of three essential conditions: anesthesia with controlled ventilation, transfusion of stored blood, and antibiotic coverage.

In January 1952, I applied for membership as a Full Member of the Brazilian College of Surgeons, becoming the first member of the newly created Thoracic Surgery section. The new discipline was thus officially recognized by the highest surgical body in the country. The monograph I wrote at that time was titled "Pulmonary Resections - Regarding a Series of 38 Consecutive Cases." Two groups of patients were analyzed based on the type of anesthesia used: 15 cases under baronarcose and spontaneous breathing, resulting in nine operative deaths, and 23 cases under anesthesia with controlled ventilation and no mortality. This fortunate turnaround in the results we achieved was due to the adoption of the new anesthetic technique recommended by J. J. Cabral de Almeida, a distinguished portuguese inventor of the first artificial respiration device conceived and manufactured in Brazil – the pulmoventilator. It is a chrono-volumetric ventilator of original design and excellent technical performance, built before its closest foreign counterpart, the Engstrom respirator. Another Brazilian type of ventilator that gained widespread popularity and was widely used in thoracic surgery was the Takaoka respirator, which cycles by pressure through a continuous flow of oxygen. Today, preference is given to volumetric ventilators, with gas mixtures containing atmospheric air rather than pure oxygen, especially for prolonged artificial respiration.



EXPERIÊNCIA BRASILEIRA INICIAL NA CIRURGIA DO CÂNCER PULMONAR

período	E.J.Zerbini São Paulo 1946 - 1951		Gabriel M. Botelho São Paulo - 1951		Fernando Paulino Rio 1948 - 1952		Jesse Teixeira Rio 1947 - 1953		total
	N.º	M.O. %	N.º	M.O. %	N.º	M.O. %	N.º	M.O. %	M.O. %
toracotomias (40,0%)	17	21,4	3	0	3	0	15	6,7	15,0
pneumonectomias (89,0%)	17	29,4	6	66,6	16	12,5	10	10,0	30,0
lobectomias (11,0%)	—	—	—	—	2	0	4	25,0	16,0

M.O. — Mortalidade operatória

Figure 1

FOURTH ACT – THE PERIOD OF INSTITUTIONALIZATION AND TECHNICAL IMPROVEMENT: THE GREAT SCHISM OF CARDIAC SURGERY AND ITS LESSONS

We were at the beginning of the 1980s, period that cardiac surgery flourished while tuberculosis surgery decreased. This shift led many of those who dedicated themselves to the surgical treatment of pleuropulmonary and mediastinal diseases to that new speciality.

— Ricardo Beyrute, thoracic surgeon, 2010

In the decade starting in 1950, two events of transcendent influence occurred in the destiny of the new specialty: the cure of tuberculosis through chemotherapy and the advent of Cardiac Surgery under direct vision, made possible by the fabulous discovery of extracorporeal circulation.

The medicamental control of Koch's bacillus activity now allowed the intensive performance of pulmonary resections for tuberculosis. Brazilian surgeons were thus able to widely train in the technique of pulmonary excision, as they had a continuous stream of patients referred for surgery. Alongside the growing experience in endothoracic operations, the rapid decline of collapse therapy marked the imminent end of the Forlanini era in tisiology, a field that had been established for half a century.

In November 1956, I had the opportunity to present, with a group of collaborators, at the IX National Tuberculosis Congress, held in Niterói, a paper titled "Surgical Treatment of Pulmonary Tuberculosis – Evaluation of Results Obtained in 11 Years of Experience at the Santa Maria Sanatorium Hospital." A total of 3,186 operations were performed from 1945 to 1956, with 353 of these being pulmonary resections. Chemotherapy not only put an end to collapse therapy but also to the very surgery of resection in tuberculosis. Acknowledging this fact, I attended the XV National Tuberculosis Congress in Curitiba (1970) to bid farewell, as a surgeon, to these meetings of tisiologists. From now on, would only participate in Pneumology Congresses in Pneumology Congresses.

In a tribute of justice, I did not fail to emphasize, at the time, the extraordinary role that the so-called white plague played in the history of Thoracic Surgery, which was born and developed in Tuberculosis Sanatoriums. Among the oldest masters and founders of Cardiac Surgery, it would be difficult to find one who was not forged in the practice of collapse and resection operations on individuals with tuberculosis. I cite three examples: Zerbini, the great name of Brazilian surgery, wrote a thesis on Extrapleural Pneumothorax in 1941; Charles Bailey, who gave the initial impulse to modern Cardiac Surgery with the closed mitral commissurotomy in 1947, had published a paper just before, comparing 100 cases of pulmonary resection for tuberculosis, without coverage, and another set with streptomycin coverage; Brock, the first to perform pulmonary valvotomy, had previously contributed with articles on the Jacobaeus operation and thoracoplasty.

The extraordinary success of operations in the thoracic cavity sparked surgeons ambition and thirst for progress toward conquering the heart. The ascent began with extracardiac operations (arterial duct, coarctation of the aorta) and soon moved on to intracardiac procedures, but with the heart still closed (finger mitral commissurotomy). Surface hypothermia, introduced in 1953, marked the pioneering phase of open-heart surgery, which, however, could only be applied to very short-duration interventions (pulmonary valvotomy, atrial septal defect). The discovery, followed by clinical application in the United States around 1955, of extracorporeal circulation finally provided surgeons with the great tool to overcome the hemodynamic barrier that previously hindered exsanguinated cardiotomy, free from the tyranny of time. This development was akin to the earlier use of anesthesia with controlled ventilation, which made thoracotomy and transpleural operations possible by overcoming the ventilatory barrier of open pneumothorax.

In Brazil, the use of the heart-lung machine was first introduced at that time by Hugo Felipozzi, in São Paulo. The succession of two large autonomous disciplines came about with an inevitable inevitability, taking shape from 1960. On one side, General Thoracic Surgery maintained its intimate connections with Pulmonology, while on the other, the new field of Cardiac Surgery rapidly developed to better serve Cardiology. Our brave colleagues, the cardiovascular surgeons, powerfully organized themselves within the Department of Cardiovascular Surgery of the Brazilian Society of Cardiology, which each year organizes its National Congress on Cardiac Surgery, demonstrating the unity, strength, prestige, and social-medical status of the specialty.

Their leaders were able to successfully lobby health care bodies for professional rights and advantages for their class. If we examine the booklet from INAMPS, which establishes the medical-surgical fees, the disparity in criteria adopted between the two branches is glaring. Thoracic Surgery becomes a sort of "poor cousin," with the Medical Fees Table of INPS (1977 edition) listing a disgraceful and outdated system of surgical

interventions, offering inadequate compensation that could be described as humiliating. In contrast, the section for cardiovascular operations is relatively better organized, with a compact and rational list of possibilities that covers the field of the discipline, encouraging teamwork and compensating everyone with service units at a much more dignified level.

Even without the cardiovascular component, Thoracic Surgery still covers a very broad nosological territory. Indeed, it encompasses a rich and varied surgical pathology: the thoracic wall, including frontier regions such as the superior opening, which borders the neck, and the diaphragm, which separates the thorax from the abdomen; the pleura; the lungs; the tracheobronchial tree; the mediastinum, containing the lymphatic network, thymus, pericardium, esophagus, and vascular and nerve elements. The surgery of these structures has anatomical, pathophysiological, clinical, and technical foundations, requiring a long and arduous theoretical and practical learning process.

FINAL ACT

I trust that the current generation of thoracic surgeons may find some inspiration in this testimony.

Jesse Pandolpho Teixeira (1918-1993) was born in Vila Velha (Espírito Santo), Brazil. At the age of he 16 migrated to Rio de Janeiro and in the same year was approved for a Medical course. Right after his graduation, he dedicated himself to thoracic surgery, which was practically nonexistent at the time, and created one of the most important thoracic surgery residency programs in Brazil. He wrote chapters for a great number of national and international books, and gave conferences in Brazil and around the world. He was an active doctor not only within his profession, but also with the history of Brazilian and international thoracic surgery. Throughout his life, he collected important points to build this memory in which the authors (a thoracic surgeon and former student, and a historian) decided to compile his writings to build a brief note about this topic in Brazil until the first lung transplantation and minimally invasive thoracic surgery.

Figure 2 *Jesse Pandolpho Teixeira (1918-1993)*

EDITORIAL

Concerning the Pancoast Tumor: What Is the Superior Pulmonary Sulcus?

Jesse P. Teixeira, M.D.

Carcinoma of the bronchus at the lung apex can invade, by contiguity, the dorsal aspect of the thoracic inlet, thus producing characteristic neurological manifestations. The resulting clinical pattern and the involved neoplasm were named with an eponym widely used in medical literature: the Pancoast syndrome and the Pancoast tumor. Two of Pancoast's articles on this type of cancer are considered classics [1, 2]. The tumor was defined as being located at the thoracic inlet and producing painful and dystrophic phenomena due to invasion of the brachial plexus (eighth cervical trunk) and the first two thoracic nerves. Horner's syndrome for injury of the cervicothoracic sympathetic chain was known to develop also. On radiographs, there was a homogeneous shadow at the extreme apex, a shadow associated with rib destruction and often with vertebral infiltration. In both papers, Pancoast made the mistake of denying the bronchopulmonary origin of the tumor and considered it possibly to derive from embryonic epithelial remainders of the fifth branchial pouch. He insisted on a primarily parietal and extrapulmonary localization of the growth, referring to an apical chest tumor in 1924 [1] and to a tumor of the superior pulmonary sulcus in 1932 [2].

After the term *superior pulmonary sulcus* became better known, it was generalized and simplified to *superior sulcus*. Its anatomical definition, however, remains dubious and inexact, and most texts on human anatomy ignore the existence of a formation with such a name.

In the osteology chapter of the 1968 edition of *Nomina Anatomica* [3], prepared by the International Committee of Anatomical Nomenclature under the auspices of the Convention of Bern, the sulcus pulmonalis is described as part of the cavum thoracis. It concerns an anatomical disposition of the thoracic wall defined by Kubik [4] as follows: "The backward curve of the ribs produces a deep groove internally on either side of the vertebral column, the 'pulmonary sulcus.' Because of this curvature the thoracic cavity is kidney-shaped in cross section." Thus, the pulmonary sulcus is nothing but the costovertebral gutter whose superior limit is the first rib arch and whose inferior limit is the insertion of the diaphragm in the thoracic cage.

This topographical misunderstanding is furthered by some authorities in pulmonary medicine who place the superior sulcus in the lung itself. For example, in connection with tumors in the apex of the lung, Fraser and Paré [5] wrote: "The superior pulmonary sulcus is a groove in the lung formed by the subclavian artery as it crosses the lung apex in the cupola of the pleura. . . . Most apical lung neoplasms arise in relationship to this sulcus; hence their name." In his later writings Paulson [6, 7], a surgeon with great expertise in this subject, also began to adopt the concept that the superior pulmonary sulcus is the depression caused in the lung apex by the subclavian artery passage. However, in a pioneer article written with Shaw and Kee [8] in 1961, he correctly identified the sulcus as a parietal structure with the phrase superior sulcus of the chest. Actually, Pancoast [2] was clear on this point: "Seven cases are reported of a peculiar neoplastic entity found in the upper portion of the pulmonary sulcus of the thorax." At no time did he refer to the impression left in the lung by the subclavian artery. Yet another view was expressed by Seydel and colleagues [9] who wrote that the superior sulcus is modeled in the lung by the azygos vein. "The tumors are often described as superior pulmonary sulcus because they arise in a vestigial fissure formed during the embryologic development of the right upper lobe because of migration of the azygos vein." If true, this interpretation would eliminate the possibility of Pancoast tumors in the left side.

From the Department of Cardiothoracic Surgery, Pontifícia Universidade Católica, Caixa Postal 370, 20.000 Rio de Janeiro, Brazil.

Figure 3 *Editorial from Ann Thorac Surg. 1983 Jun;35(6):577-8. doi: 10.1016/s0003-4975(10)61065-x.*