

Asian perspective in surgery: thoracic surgery in Turkey

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Abstract: Turkey with a population of 78 million is located between Asia and Europe geographically and culturally. There are 577 active pure thoracic surgeon and 37 thoracic surgery teaching units. Thoracic surgeons usually deal with lung cancer patients due to relatively higher rate of tobacco usage as well as inflammatory diseases such as pulmonary hydatid disease, bronchiectasis and empyema. Minimally invasive thoracic surgery has been a new approach which is being adapted by increasingly more surgeons. There are a number of reasons to predict that the number of thoracic surgical cases will be increased and new generation of thoracic surgeons will be operating more minimally invasive resectional surgeries for most lung cancer in future.

Keywords: Thoracic surgery; Turkey; videothoroscopic surgery; surgical heritage; profession

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Turkey is located between Asia and Europe being a bridge between these two continents culturally, demographically and scientifically. In 2015, the population of Turkey was estimated to be 78.2 million with a growth rate of 1.1% per annum (2016 figure) (1). The population is relatively young with 25.9% falling in the 0–14 age bracket (1). According to the OECD/World Bank population statistics in Turkey population from 1990 to 2008 was 16 million or 29%. The total fertility rate decreases in its natural flow and it will be reached to its lowest value 1.65 in 2050 (2). Persons at the age group of 15–64 constitute 67.2% of the total population. 25.6% of the population of Turkey is in the age group of 0–14, and 7.2% is in the age group of 65 and over. Since, the birth rate began to decrease 20 years ago, it is plausible to expect larger older population which will be prone to many thoracic diseases such as lung cancer and emphysema. The recent rate of cigarette smoking is 27% in 2013 despite the anti-tobacco campaigns (3). According to recent statistics, the incidence of lung cancer in men is 59.3/100,000/year in 2013 (2).

Turkey has a long history of religious education system started with the acquiring Istanbul in 1453. However, western education system initiated in 1933 (4). With the aid of the university reform by the Turkish government in

1933, many Jewish German scientists and physicians who arrived to Istanbul continued their career very passionately. All were enthusiastically welcomed and placed in important positions in Istanbul University, the sole higher educational school of that time in Turkey. They became core elements of Turkish scientific society and they did pioneering studies in almost all fields of science.

Among them, Rudolf Nissen was offered the head of the surgical clinic and a professorship in Istanbul University by 1933. Numan Menemencioglu, Minister of State, had undergone an operation in Berlin in Sauerbruch's clinic and had further accompanied Nissen in his visit to Istanbul. He stayed and performed many pioneering surgeries during his 5.5-year stay in Istanbul (5,6). The former head of the surgical clinic was Ahmet Burhaneddin Toker who wrote books in general thoracic surgery: *Surgical Treatment of Pulmonary Tuberculosis* [1927], *Lung Abscesses* [1938]. During his stay, Nissen accomplished and presented many leading thoracic operations including lumbar sympathectomies, Schede thoracoplasties and heart operations for injuries (6). Nissen performed his first Nissen fundoplication on a 28-year-old man with a distal esophageal ulcer in 1936 (6,7). Fahri Arel (1894 to 1976), another associate professor in had worked with Nissen and he has become the successor of Dr.

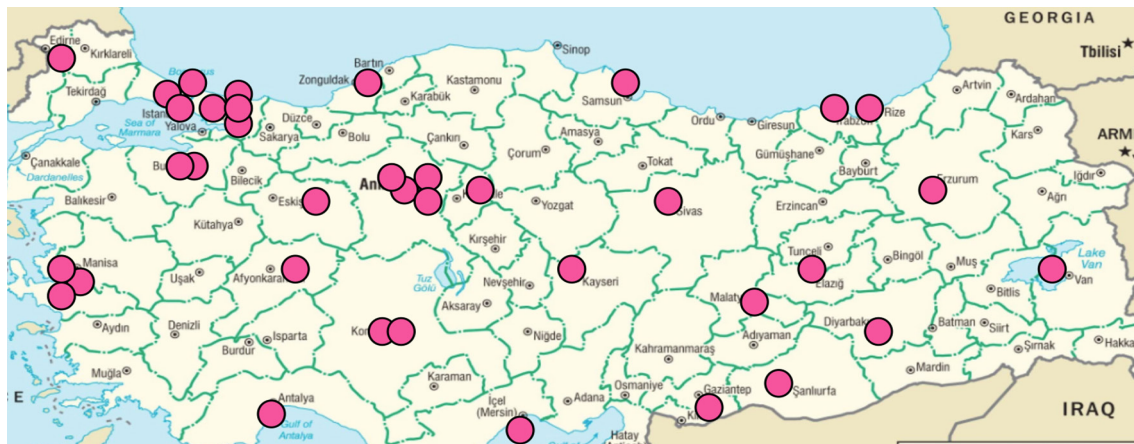


Figure 1 Teaching thoracic surgery units in Turkey (teaching state hospitals and university institutions) (red dots).

Nissen and a prominent leader of general thoracic surgery in Turkey (8). He wrote the first thoracic surgery textbook in Turkish language in 1950 and an expanded second edition in 1964 (8). He notes in the foreword that this book was the product of his experience in the First Surgical Clinic after 1933 and in the United States after 1939. Fahri Arel became a professor played a monumental role in the development of general thoracic surgery in Turkey. Galip Urak, as another leading thoracic surgeon established the thoracic surgery clinic in Ankara University. He was a general surgery resident in Istanbul University. He began thoracic surgery practice in Ankara with a lack of professional staff and instruments, but his institution developed after 1960, performing the first sleeve pulmonary resection in 1968 in Turkey (6). Dr. Urak introduced the 'modern dissection' concept to thoracic surgery in Turkey (9). His assistants Dr. Erdoğan Yalav was trained under the direction of Denton O. Cooley and Michael DeBakey. His other trainees Dr. Vedat Icoz and Dr. Erol Isin then became prominent professors in thoracic surgery in Turkey and made many contributions to thoracic surgery (9).

Thoracic surgery has been recognized as one of the separate primary surgical specialties in Turkey. Thoracic surgery and cardiovascular surgery have their different professional societies. There are a total of 37 thoracic surgery teaching units throughout the country (Figure 1). Thoracic surgeons deal with the pure thoracic diseases such as lung cancer, emphysema, tuberculosis, bronchiectasis, thoracic hydatid disease, empyema. Esophageal surgery is usually performed by general surgeons. However, esophageal surgery is done in a number of institutions including thoracic surgery departments of Ankara,

Ataturk and Marmara University Medical Schools. Lung transplantation program was initiated in 2004. Yet, it is performed in three units.

First video-assisted thoracoscopy surgery (VATS) lobectomy was performed in 2001 by Alper Toker in Istanbul. As of 2015, VATS lobectomy was performed in eight centers (Figure 2). Uniportal VATS lobectomy was first performed by Dr. İlhan Ocakcioğlu in 2013. First robotic resection was done in 2005, the first robotic lobectomy was performed in 2010 (10). VATS resections were performed in different rates in various centers ranging from 2% to 50% (Figure 3). Many young surgeons intend to initiate VATS resections and residents are being taught VATS lobectomy before open resections in many units.

Awake videothoracoscopic operations have been performed in three centers. However, many surgeons intend to initiate VATS resections. We conducted a multicenter VATS study recently which was contributed by seven main centers in Turkey. A total of 376 VATS lobectomy, segmentectomy and pneumonectomy performed for lung cancer were evaluated. Although, mostly small tumors were resected using VATS, 1 out of 20 patients had tumor larger than 5 cm (Figure 3). Performed operations were shown in Figure 4. The 90-day mortality rate was 1.4%. Mean duration of air leak and mean hospital stay were 3.7 and 5.6 days respectively. The mostly preferred length of utility thoracotomy was 4–6 cm in 286 patients (77.1%) followed by length of incision of 0–3 cm (n=51; 13.7%). During the study, it has been well established that, there is a trend toward videothoracoscopic resections especially for elder patients with limited cardiopulmonary functions.



Figure 2 Total performed videothoroscopic anatomical resections by thoracic surgical units in Turkey.



Figure 3 Percentage of thoracoscopic resections in centers performing videothoracoscopic surgery.

Thoracic surgery training in Turkey

In our country, among 37 teaching institutions 75% of them have a well established curriculum specifically followed for thoracic surgery residency. Residency lasts 5 years without any prerequisite such as general surgery. Thoracic surgery residents should have 6 months of general surgery rotation as well as 3 months of cardiac surgery, 1 month of anesthesiology and pulmonary medicine rotations each. In each rotation resident should complete a certain lists of procedures. Trainees should keep a logbook in 20 institutions (54.2%). Journal club hour was reported to be a part of the training in five centers (13.5%). Approximately half of the teaching units reported to apply

mini evaluation exercise during training which has a great importance in the evaluation of training.

Number of thoracic surgeons

As of June 2016, there are 577 active (pure) thoracic surgeons in Turkey. Turkish national society of thoracic surgery (which is unique for thoracic surgeons in all country) has 707 members. As a result of a questionnaire replied by most thoracic surgeons, 50 percent of surgeons think there are enough number of thoracic surgeons in Turkey. However, 71% of them think the number of residents is suboptimal which seems to be a paradox.

Size of tumor

Size (cm)	Number	%
≤2	126	34.1
2–3	118	31.9
3–5	106	28.6
>5	20	5.4
Total	370	100.0

Figure 4 Size of tumor resected by anatomical videothoracoscopic resections.

All thoracic surgeons should complete a compulsory service in a secondary-care hospital located in usually underdeveloped area for 18 months before starting any kind of academic or private practice following completion of training program. This rule has been criticized as an obstacle for rapid and proper academic performance which can be served by young enthusiastic thoracic surgeons.

Research activities and grants

In Turkey, academic appointment and promotion (for the associate professorship and professorship) are aligned to academic strategic goals namely publications. There are two main bodies which provide research grants: University and National Research Council (TUBITAK) grant. All thoracic residents and surgeons should apply one of them in order to obtain fund for their studies. The governmental Grant fund has been increased 14 times during last 10 years (1) to increase innovations and research.

There is one official journal for thoracic surgeons which is *Turkish Journal of Cardiothoracic Journal* (<http://tgkdc.dergisi.org>). The journal is funded by Turkish Society of Cardiovascular Surgery and the Turkish Society of Thoracic Surgery as partners and is published quarterly. The journal is indexed in various international indexes including Citation Index Expanded. The acceptance rate of thoracic surgery papers is 32% in 2015. A national congress is organized by the national society of thoracic surgery biannually.

Future prospectives

The thoracic surgery society has been progressing



Figure 5 Injection of diluted (2:1) ketchup into the main pulmonary artery of left sheep's lung mimicking blood containing lung. It is used in a videothoracoscopic training box for teaching lobectomy.

professionally and academically. Training programs for such as courses for videothoracoscopic surgery can be seen as a surrogate of pursuing new and better techniques. A number of different teaching techniques have been published in the literature (11,12). We developed an *ex vivo* model for VATS resections using sheep's lung injected with diluted ketchup for better and realistic dissection teaching experience (*Figure 5*) which can provide a safe environment for better and safe learning. However, no teaching methodology is included in the curriculum.

Considering the diminished fertility rate leading to aging population, higher rate of tobacco usage despite the effective anti-tobacco campaign, high expected incidence of lung cancer and expected long-term effect of lung cancer screening program (i.e., more patients with resectable lung cancer), it is plausible to expect that, next 5 to 10 years we will see increasing demand for thoracic surgeons in Turkey. Approximately 40 teaching units, concept of 'pure thoracic surgery specialty' and well established institutions will help to cope with the increasing demand. I believe that, enthusiastic young generation surgeons will be able to fulfill

all future expectations with performing more minimally invasive surgery for almost all surgical thoracic diseases.

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Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

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