Medical thoracoscopy: past, present, and future

Amr Shoukri

Background Medical thoracoscopy is an old interventional technique that has evoluted over more than hundred years. The role of medical thoracoscopy in modern pulmonary medicine is well established, its application is accepted, and in particular for diagnosis of pleural effusion, and it also has other several diagnostic and therapeutic implications. The procedure is safe and simple, and can be done under local or general anesthesia. There are different forms of equipments that are available, but still the rigid thoracoscope is the most efficient. Medical thoracoscopy has to be strongly considered as a research tool, it provides large biopsies permitting molecular research.

Conclusion The procedure is expected to progress more in the future with the advances in technologies that can be applied it. *Egypt J Broncho* 2013 7:50–52

Egyptian Journal of Bronchology 2013 7:50–52

Keywords: History of thoracoscopy. Medical thoracoscopy, future of thoracoscopy.

Pulmonary Medicine Department, Ain Shams University, Cairo, Egypt

Correspondence to Amr Shoukri, MD, Ain Shams University, Faculty of Medicine, Pulmonary medicine department, 11566, Cairo, Egypt.
e-mail: amr_shoukri@hotmail.com

Received 12 August 2013 **Accepted** 10 September 2013

An old technique with a promising future

Medical thoracoscopy is the oldest invasive interventional technique in the recent history of respiratory medicine. More than a century ago, the Swedish physician Hans-Christian Jacobaeus (1879–1937) [1] had published the first article on thoracoscopy. The most common application of thoracoscopy during that period was to lyse pleural adhesions and create pneumothorax as a part of collapse therapy. The diagnostic applications of the technique were limited at that time, with only few isolated reports of occasional cases of metastatic or primary pleural tumors [2].

With the advent of the antituberculous chemotherapy in the 1950s, collapse therapy was abandoned. The use of thoracoscope markedly declined and it was almost forgotten in the 1960s and 1970s except in some centers in Europe [3].

Two meetings were of great and fundamental importance for the rebirth of thoracoscopy. The first one was in Marseille, 1980, in which Christian Boutin organized the first international symposium on medical thoracoscopy [4]. The second one was in Berlin, 1987, in which Robert Loddenkemper organized the second symposium on thoracoscopy [5].

Medical thoracoscopy is nowadays an important diagnostic and therapeutic tool for pulmonologists. Its role is established and defined in guidelines [6], reviews [7], manuals [8,9], and textbooks of pleural diseases [10,11] (Fig. 1).

The application of medical thoracoscopy is mainly for diagnosing pleural effusion and for performing talc poudrage pleurodesis in malignant pleural effusion and recurrent spontaneous pneumothorax [12]. It also plays a crucial role in staging non-small-cell lung cancer and guiding treatment and prognosis, as the documentation of pleural metastasis renders the patient inoperable (stage M1a) [13]. It can be useful as well to provide large biopsies required for the application of molecular techniques, such as the use of molecular markers, for example, epidermal growth factor receptor; these markers participate in the modern staging of malignant diseases and provide possibilities for potential therapies [14].

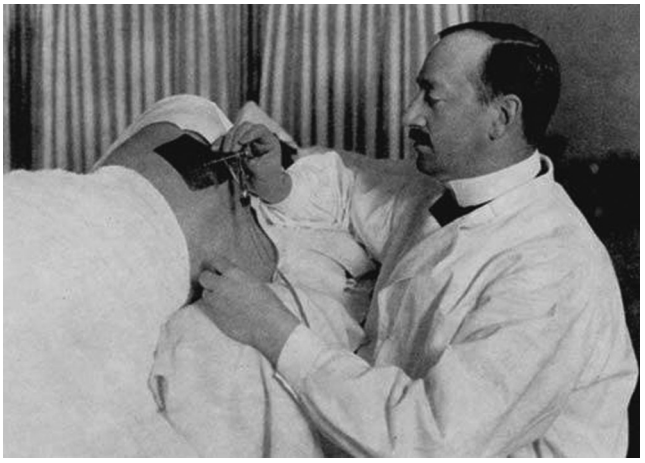
Other nonroutine and more complex applications of medical thoracoscopy are in the treatment of empyema, in lung biopsy with forceps, and in cervical sympathectomy; these procedures are considered advanced, need more experience, and should definitely be performed by experts and highly trained thoracoscopists [15].

Standard equipment for medical thoracoscopy is a rigid thoracoscope with its different models; it allows excellent vision and easy orientation inside the pleural cavity as well as big biopsies through a single port of entry [16].

The procedure is safe and simple; it can be performed under local anesthesia, with some conscious sedation, in the endoscopy suite for cardiorespiratory monitoring of spontaneous breathing or under general anesthesia in the operating room [16]. However, quality standards should be respected with careful consideration of the contraindications [17] (Fig. 2).

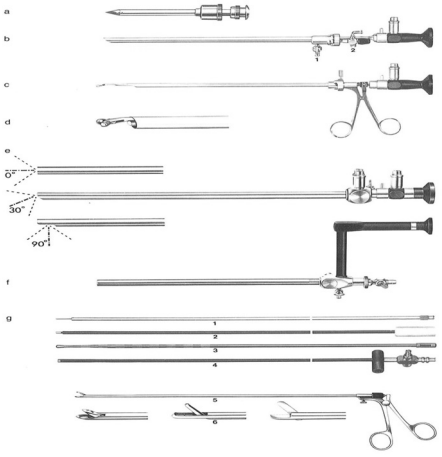
At the end of the 1990s, semirigid (or flex-rigid) thoracoscope was successfully introduced as a new instrument for thoracoscopy [18]. Pulmonologists who used to work with a flexible bronchoscope found it more familiar. It allows easy lateral vision or even retrovisualization of the point of entry, but its main limitations are small biopsies taken through the

Fig. 1



Jacobaeus demonstrating the thoracoscopic approach (c.1920).

Fig. 2

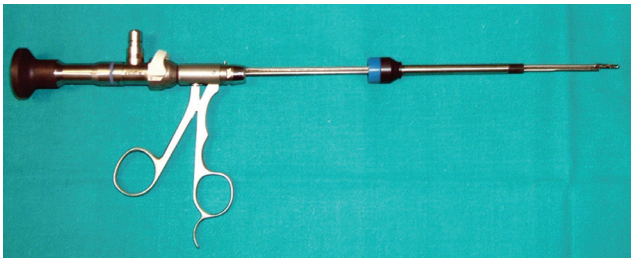


Basic instruments for medical thoracoscopy.

Fig. 3

Semirigid thoracoscope.

Fig. 4



Minithoracoscope of 4 mm diameter.

small working channel and the difficulty to lyse the adhesions [19]. However, there is no available study yet that directly compared flex-rigid with standard-rigid thoracoscope (Figs 3 and 4).

Minithoracoscopy using 3-mm instrumentation is also available; it is safe and effective for routine diagnostic applications. It is most useful for the assessment of small effusions, not accessible to conventional medical thoracoscopy. In this technique, pain is less, patient tolerance is better, and local anesthesia is safer compared with the conventional 7-mm thoracoscope, but the main concern is the smaller biopsies [20].

Besides its clinical utility, thoracoscopy is considered an important research tool for investigating different pleural diseases [21]. It markedly contributed in the field of molecular research of malignant pleural effusions, predominantly in mesothelioma and lung cancer [22].

More than a century ago, Jacobaeus predicted that medical thoracoscopy has great potential, and this is actually true now. Newer technologies such as autofluorescence thoracoscopy helped in the development of new theories about pleural permeability. Recent studies on the pathogenesis of primary spontaneous pneumothorax show evidence that it is a diffuse (pleural porosity) rather than a localized condition [23]. Recent diagnostic techniques such as narrow banding may be useful in the recognition of neoangiogenesis in patients with malignant pleuritis; it may also help to differentiate benign from malignant lesions [24].

Medical thoracoscopy is expected to progress and develop rapidly with future advances in the technology. With respect to its importance as a diagnostic, therapeutic, and research tool, it should be implemented as an essential part of all respiratory medicine training programs.

Acknowledgements

Conflicts of interest

None declared.

References

1 Jacobaeus HC. About the possibility to apply the cystoscopy in the investigation of serous cavities. *Mu¨nch Med Woch* 1910; **57:**2090–2092.

2 Fourestier M, Duret M. Need for pleural biopsy to diagnose pleural endothelioma. *Presse Med* 1943; **32:**467–468.

3 Marchetti GP, Pinelli V, Tassi GF. 100 years of thoracoscopy: historical notes. *Respiration* 2011; **82**):187–192.

4 Symposium on thoracoscopy in pleuro-pulmonary diseases. *Poumon Coeur* 1981; **37:**3–320.

5 Thoracoscopy Symposium 1987. *Pneumologie* 1989; **43**:45–125.

6 Ernst A, Silvestri GA, Johnstone D American College of Chest Physicians. Interventional pulmonary procedures: guidelines from the American College of Chest Physicians. *Chest* 2003; **123:**1693–1717.

7 Rodriguez-Panadero F, Janssen JP, Astoul P. Thoracoscopy: general overview and place in the diagnosis and management of pleural effusion. *Eur Respir J* 2006; **28:**409–422.

8 Buchanan DR, Neville E. *Thoracoscopy for physicians: a practical guide* 2004; London: Arnold.

9 Loddenkemper R, Mathur PN, Noppen M, Lee P. *Medical thoracoscopy/ pleuroscopy. Manual and atlas* 2010; Stuttgart: Thieme.

10 Light RW, Gary Lee YC (editors). *Textbook of pleural diseases* 2nd ed. 2008; London: Arnold.

11 Bouros D (editor). *Diseases of the pleura* 2nd ed. 2009; New York: Informa.

12 Tschopp JM, Rami-Porta R, Noppen M, Astoul P. Management of spontaneous pneumothorax: state of the art. *Eur Respir J* 2006; **28:**637–650.

13 Froudarakis ME In: Bouros D, (editor). Diagnosis and management of pleural effusion in lung cancer. *Pleural diseases* 2nd ed. 2009; New York: Informa New York; 427–447.

14 Marios E. Froudarakis. Thoracoscopy one century later: The oldest interventional technique of modern pneumonology, with great future prospects. *PNEUMON* 2010; 1:23.

15 Tassi GF, Davies RJO, Noppen M. Advanced techniques in medical thoracoscopy. *Eur Respir J* 2006; **28:**1–9.

16 Rodriguez-Panadero F. Medical thoracoscopy. *Respiration* 2008; **76**):363–372.

17 Medford ARL, Awan YM, Marchbank A, Rahamim J, Unsworth-White J, Pearson PJK. diagnostic and therapeutic performance of video-assisted thoracoscopic surgery (VATS) in investigation and management of pleural exudates. *Ann R Coll Surg Engl* 2008; **90:**597–600.

18 McLean AN, Bicknell SR, McAlpine LG, Peacock AJ. Investigation of pleural effusion: an evaluation of the new Olympus LTF semiflexible thoracofiberscope and comparison with Abram's needle biopsy. *Chest* 1998; **114**:150–153.

19 Lee P, Colt HG. Rigid and semirigid pleuroscopy: the future is bright. *Respirology* 2005; **10**):418–425.

20 Tassi GF, Marchetti GP. Minithoracoscopy: a less invasive approach to thoracoscopy. *Chest* 2003; **124**:1975–1977.

21 Froudarakis ME. *Thoracoscopy as a research tool: personal communication* 2010; Sierre: ??.

22 Froudarakis ME, Noppen M. Medical thoracoscopy: new tricks for an old trade. *Respiration* 2009; **78**:373–374.

23 Noppen M, Dekeukeleire T, Hanon S, Stratakos G, Amjadi K, Madsen P, *et al*. Fluorescein-enhanced autofluorescence thoracoscopy in patients with primary spontaneous pneumothorax and normal subjects. *Am J Respir Crit Care Med* 2006; **174**:26–30.

24 Ishida A, Ishikawa F, Nakamura M, Miyazu Y, Mineshita M, Kurimoto N, *et al*. Narrow band imaging applied to pleuroscopy for the assessment of vascular patterns of the pleura. *Respiration* 2009; 78:432–439.