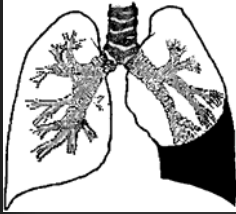


# International Pleural Newsletter



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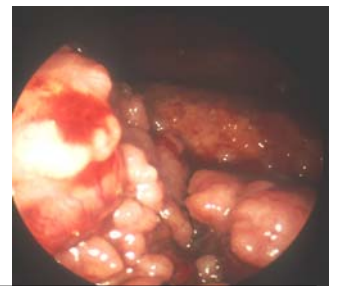
## Medical Thoracoscopy: Indications

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Medical thoracoscopy is a technique increasingly employed by pulmonologists around the world. It is less invasive and less expensive than surgical thoracoscopy (video-assisted or open) and can be performed with conscious sedation.

When investigating the underlying cause of pleural effusions the aim is to establish a diagnosis swiftly while minimizing unnecessary invasive investigation. This is particularly important as the diagnosis includes malignant mesothelioma in which 40% of needle incisions for investigation are invaded by tumor.<sup>1,2</sup> As the sensitivity of cytology for malignancy is only approximately 60% many malignant effusions remain undiagnosed after this simple initial investigation. In these cases direct visualization of the pleural space by medical thoracoscopy is a fast and accurate way of obtaining a definitive diagnosis without the need to



Thoracoscopic view showing metastatic malignant deposits in the parietal pleura.

undergo general anesthesia. In addition to suspected pleural malignancy, other indications for medical thoracoscopy include suspected TB pleuritis, pleural effusions of unknown origin and recurrent effusions requiring talc poudrage for symptomatic relief (Table 1).

**Table 1:** Indications for medical thoracoscopy

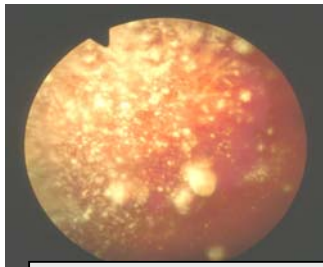
Pleural effusion of unknown origin
Suspected tuberculous pleuritis
Suspected malignancy – inconclusive cytology
Recurrent pleural effusions requiring talc poudrage

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Thoracoscopy can be performed as a one stage (diagnostic) or a two stage (diagnostic and therapeutic) procedure. It is undertaken with light sedation and local anesthesia.<sup>3</sup> It is little more invasive than chest tube insertion, allows visualization of the pleural space, drainage of all pleural fluid and numerous parietal pleural biopsies can be taken. Although medical thoracoscopy is primarily used for the diagnosis of pleural disease it also allows talc poudrage which is a highly effective way of controlling recurrent symptomatic malignant effusions. Thoracoscopy has an excellent diagnostic yield for malignancy and most



The pleural appearance after talc poudrage.

large series have shown the sensitivity to be approximately 95%.<sup>4</sup> This compares to 88% by CT guided biopsy (where pleural nodularity is amenable to biopsy) and 50% by Abrams' needle biopsy.<sup>5</sup> In addition to obtaining a tissue diagnosis, several liters of fluid can be removed during the procedure and the opportunity is also

provided for talc pleurodesis. Complications appear to be uncommon, but rare complications include hemorrhage, subcutaneous emphysema and infection.

There are few absolute or relative contraindications – most of which are related to the general fitness of the patient. The ability to lie flat for an hour is imperative. In patients with a large effusion, drainage of one liter of fluid the day before thoracoscopy can assist with this requirement (Table 2).

**Table 2:** Contraindications to medical thoracoscopy

<p><b>Absolute:</b></p> <ul style="list-style-type: none"> <li>Uncorrectable bleeding disorder</li> <li>Obliterated pleural space</li> <li>Superior vena cava obstruction</li> <li>Uncooperative patient</li> </ul> <p><b>Relative:</b></p> <ul style="list-style-type: none"> <li>Complicated parapneumonic effusions</li> <li>Uncontrolled cough</li> <li>Inability to lie flat for one hour</li> <li>Unstable cardiovascular status</li> </ul>
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Unfortunately, the incidence of mesothelioma will continue to rise over the next two decades in Europe. It has been calculated that it will account for 1% of deaths in the cohort of men born in the 1940's. As the sensitivity of cytology is low, medical thoracoscopy allows biopsying large pieces of pleural tissue to obtain a definitive diagnosis.

In summary, medical thoracoscopy is an important technique, which we believe should be available to every respiratory department. This would allow rapid and accurate

diagnosis of undiagnosed pleural effusions, facilitate prompt treatment and relief of symptoms.

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## Complications of Thoracoscopy

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Thoracoscopy is a safe and effective procedure in the diagnosis and treatment of several pleural diseases if certain standard criteria are fulfilled. In the most thorough review, only one death was reported in 8,000 cases - a mortality rate of 0.01%. In another series reviewing 4,300 cases, a mortality rate of 0.09% was reported. The reported mortality rate of thoracoscopy is thus roughly equivalent to, or below that of, transbronchial biopsies. In another study of 817 thoracoscopic procedures done under conscious sedation and local anesthesia, the reported complications were persistent air leak (>7 days) in 2%, subcutaneous emphysema in 2%, and postoperative fever in 16%. The major complication rate in a series of 102 patients was 1.9% and included ventricular tachycardia responding to resuscitation, subcutaneous emphysema, and persistent air leak. The minor complication rate was 7.5%, including air leak, fever, and bleeding at a biopsy site that responded to conservative measures within ten minutes. Another large series including 360 patients reported morbidities of fever in 9.8%, empyema in 2.5%, pulmonary infection in 0.8%, and malignant invasion of the scar in 0.3%. Major uncontrollable bleeding requiring thoracotomy was not reported in any of these large series and appears to be extremely rare. During the procedure, cardio-respiratory functions should be monitored. Complications, such as benign arrhythmias, low-grade hypotension or hypoxemia can be prevented by administration of oxygen. In case of smaller persistent bleeding, electro-coagulation may become necessary.

Several liters of pleural fluid can be removed completely during thoracoscopy with little risk of pulmonary edema, because immediate equilibration of pressure is provided by direct entrance of air through the cannula into the pleural space. Following lung biopsies, a bronchopleural fistula may result. This may require longer than the usual suction periods of 3-5 days, particularly when the lungs are stiff. Local site infection is uncommon, and empyema has been reported only very rarely.

In cases of mesothelioma, the late complication of tumor growth at the site of entry has been observed. Radiotherapy carried out 10-12 days after pleuroscopy has been shown to prevent this late complication, which may even occur after thoracentesis or closed needle biopsy. After talc poudrage, fever and pain may occur, which have to be treated symptomatically. Many side effects are attributed to talc rather than the thoracoscopy.

In conclusion, the overall mortality rate is low, as is the morbidity rate, which is due mainly to benign postprocedural fever. Thoracoscopy in the hands of the appropriately trained pulmonologists is a safe modality.

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## How to Setup Your Own Thoracoscopy Practice

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### *Why would one need a thoracoscopy practice?*

Pleural disorders are common. Every pulmonary clinician sees patients presenting with pleural effusions or pneumothoraces often. Non-invasive diagnostic tests in pleural effusions allow for a definitive or presumptive diagnosis in about 75% of cases, but what should we do with the undiagnosed effusions? Depending upon the probability of tuberculosis as the cause of the effusion, anti-TB drugs can be started, or a "wait and watch" period can be proposed. However, both alternatives are not ideal, and are intellectually unsatisfactory. If an answer is wanted, and if you don't perform thoracoscopy yourself, you will have to send the patient for video-assisted thoracoscopic surgery (VATS).

If no thoracoscopy is available, most pulmonologists would refer the patients with undiagnosed effusions and recurrent pneumothoraces to their surgical colleagues for VATS. Wouldn't it be more challenging and satisfactory if we, as pulmonologists, can diagnose and treat those patients ourselves? All of this is possible: there *is* a procedure out there, which is easy to perform by a pulmonologist, under local anesthesia and sedation or - if you have the facilities - under intravenous anesthesia, in an endoscopy suite or in an operating theatre - thoracoscopy.

### *What do you need to start your thoracoscopy practice?*

To start with, you will need the appropriate experience and qualification (this will also convince your surgical colleagues and your hospital administration that you know what you are doing!). The best way to learn thoracoscopy is to begin with a hands-on course that includes theoretical and practical teaching (these courses are organized in thoracoscopy centers in Europe and in USA), followed by a stay of a few weeks in a busy thoracoscopy center.

Back in your hospital, I would advise you to talk with your thoracic surgeons: *not* to ask them to be on standby when you perform your first intervention (this will hardly ever be necessary: the conversion rate to thoracotomy is around 1:1000), but to inform them *what* you plan to do in *whom* (eg start with diagnostic thoracoscopies under local anesthesia in patients with suspected malignant effusions), and to make clear 'deals' on what you will and will *not* do.

You then need logistics: ideally, a fully equipped and staffed operating theatre is optimal (but most often also unrealistic). You probably will have to start in your endoscopy suite. This should not pose any problem (most thoracoscopists do it). Do not do it alone - you *will* need at least one (and preferably more) assistant.

Thoracoscopy instruments are not expensive, and you can borrow material that is already present in the hospital (eg videotower and electrocautery units). You will also need patients. This should not be a problem, since they are the reason why you start thoracoscopy in the first place.

Finally, thoracoscopy is a safe procedure, with a better safety record than flexible bronchoscopy. Do not be scared: Just do it!

### *What can you offer?*

To your patients, you can offer to diagnose and treat their pleural problems all by yourself. Never underestimate this: patients love it.

To your hospital, you can offer a 'new' activity, and an inflow of referred patients (by colleagues who have not read this article and start their own thoracoscopy).

To yourself, the intellectual satisfaction of solving your patient's problems by yourself. Never underestimate this: pulmonologists love it!

### **Suggested reading**

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If you have any interesting case of pleural disease to share, or any comment on the Newsletter, contact:  
**Mrs Emma Hedley**     [emma.hedley@orh.nhs.uk](mailto:emma.hedley@orh.nhs.uk)

## The Father of Thoracoscopy: Hans Christian Jacobaeus

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Hans Christian Jacobaeus is universally recognized as the father of thoracoscopy. He was born on May 20, 1879 in Skarhulte, Malmö, Sweden, and died in Stockholm on October 29, 1937 at the age of 58.

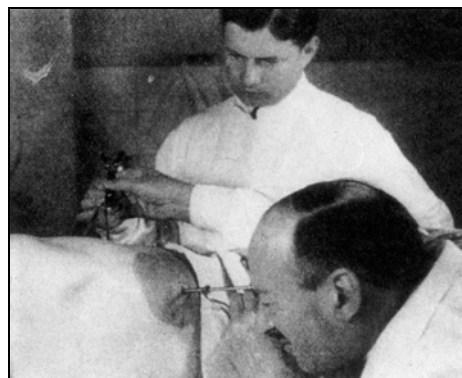
The first article in which he discussed this method entitled "On the possibility of using a cystoscope to examine the serous cavities" was published in October 1910 in Muenchener Medizinische Wochenschrift. It was divided into three parts: an introduction describing materials and methods, a second part dedicated to laparoscopy and a brief third part on thoracoscopy performed on two patients. For both techniques he used a purpose-made 17 Ch trocar with an automatic uni-directional valve which prevented the exit of insufflated air from both the abdominal and thoracic cavities. A rigid Nitze n. 14 (4.6 mm) cystoscope was introduced through the trocar. It was a lateral view (90°) optic, 22 cm long, with an electric lamp at the end.

He wrote about thoracoscopy: *'In exudative pleurisy it is possible to reach the pleura without injuring the lung. Recently a treatment has been developed.. in which the exudate is replaced by insufflated air. The quantity of air, apparently small (half a litre), is certainly sufficient to perform a thoracoscopy. In two cases of exudative pleurisy I carried out an insufflation and afterwards I examined the pleura. Although it was not possible to obtain a precise impression of alterations of the pleura, the two cases demonstrate that the method has vast potential.'*

This potential was realized in subsequent years when Jacobaeus, together with Unverricht, improved the technical characteristics of the thoracoscope making it more reliable and efficient. He used it for diagnostic purposes, but also for resection of adhesions to obtain a pneumothorax for the treatment of tuberculosis (*Jacobaeus' operation*).

His interest in lung disease was not limited to endoscopy. He studied bronchography, examining the ability of the bronchi to eliminate a contrast medium. He

observed that in healthy bronchi the contrast medium (lipiodol) was eliminated in 4-8 hours whereas in chronic bronchitis the time was longer and in bronchiectasis even greater. For many years, he also studied "acute atelectasis" due to massive hemoptysis or endobronchial injection of contrast medium and hypothesized that this material induced an intense bronchospasm. In the last years of his life he devoted his studies to bronchspirometry to evaluate the differential lung function before extensive surgical interventions.



*Jacobaeus performing a thoracoscopy*

Adapted from: G.P. Marchetti, G.F. Tassi: Storia della toracoscopia [History of thoracoscopy].



### For upcoming thoracoscopy training courses contact:

Nabeel Ali (Nabeel.Ali@sfh-tr.nhs.uk)  
Thoracoscopy training courses in Nottingham, U.K.

Philippe Astoul (pastoul@ap-hm.fr)  
Thoracoscopy training courses in Marseille, France

John Beamis (john.f.beamis@lahey.org)  
Interventional pulmonology courses in Lahey Clinic, USA

Wolfgang Frank (frank@johanniter-treuenbrietzen.de)  
Thoracoscopy training course in Germany

Marios Froudarakis (mfroud@med.uoc.gr)  
Thoracoscopy training courses in Crete, Greece

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European Respiratory Soc Interventional Pulmonology Group

Praveen Mathur (pmathur@iupui.edu)  
Pleuroscopy workshop by Indiana University, USA

Deborah Motooka (iep.eventos@hsl.org.br)  
Brazilian Thoracic Society Advanced Video-Assisted  
Thoracoscopic Surgery Course in Sao Paulo, Brazil