Chronic sequels after thoracoscopic procedures for benign diseases

Jörg Hutter*, Karl Miller, Erich Moritz
Second Department of Surgery, Landeskliniken Salzburg, Müllnerhauptstraße 48, 5020 Salzburg, Austria

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Abstract

Objective: Chronic pains after lateral thoracotomy are present in up to 40% of cases. Chronic sequels after thoracoscopy are less common, but nevertheless, a cause for complaints by patients. Pain often reflects a recurrence of malignant disease. For this reason, we only investigated patients with benign disease. Methods: We retrospectively investigated the incidence of chronic sequels in a consecutive series of 161 patients who underwent thoracoscopy for benign disease and were not converted to an open procedure. The data from all 144 patients, contactable at the time of investigation, who were at least 2 months postsurgery, were analyzed. Results: Chronic sequels were present in an overall of 31.4% of patients. Patients complained of chronic pain (20.1%), numbness distal to the incision sites (16.9%) and disaesthesia (8.3%). Painkillers are taken on a regular basis by 82.8% of patients with chronic pain. The use of Staplers, as well as the number of drains (1 vs. 2) used, were statistically significant ($P < 0.05$) for chronic sequels. All other investigated factors, such as sex, age, and length of drainage, were not significantly different in the two groups. Conclusion: The thoracoscopic approach is not likely to impact on the prevalence of long-term postthoracotomy sequels, and therefore, further strengths are necessary to reduce this number. © 2000 Elsevier Science B.V. All rights reserved.

Keywords: Chronic sequels; Chronic pain; Thoracoscopy; Benign pulmonary disease

1. Introduction

A primary goal of minimally invasive surgery is the reduction in sequell-related morbidity associated with open thoracic surgical techniques. Video-assisted thoracic surgical (VATS) approaches have been touted as providing the patient with the benefit of reduced operative morbidity [1–4]. This is based on the tenet that thoracoscopic procedures with incisions as small as 1–2 cm are used to introduce the videoscope, and the instruments are less traumatic than open thoracotomy incisions.

Up to 40% of patients undergoing lateral thoracotomy may experience chronic postthoracotomy pain for up to several years after their thoracic surgical procedure [5].

In two studies [6,7] comparing the rate of acute and chronic pain after thoracotomy and VATS resections, no significant difference could be found in persistent long-term pain.

There have been a few reports regarding the prevalence of chronic sequels in the literature after thoracoscopic procedures for benign diseases. Worsening pain, following an interval of initial control, often reflects tumour recurrence in malignant disease [8].

The mechanism of pain after thoracoscopic procedures is explained by excessive torquing of the instruments (trocars) in the intercostal space, resulting in potential rib fracture or direct injury to the neurovascular bundle, as well as direct damage to the intercostal nerve by electrosurgical access or blunt dissection to access the pleural space [7].

We were not able to compare a series of patients treated for benign primary disease, either by open thoracotomy or thoracoscopy, due to the small number of patients operated through an open thoracotomy.

2. Material and methods

One hundred and eighty-four thoracoscopic procedures for benign primary disease were performed at the Second Department of Surgery between January 1993 and December 1998. All patients were placed for standard lateral thoracotomy on the operating table, and we used one-lung ventilation without carbon dioxide insufflation to establish pneumothorax. All patients received perioperative piretramide i.v. and non-steroidal anti-inflammatory drugs i.v. or orally; epidural catheters were not used.

In 23 cases, the procedure had to be converted to an open operation. The indication for conversion was empyema in
12 cases, when complete expansion of the lung could not be achieved, in three cases, the lesion could not be identified, and in another three, a lobectomy with thoracotomy was indicated. In one case, a postoperative bleeding indicated reoperation through a thoracotomy, two persistent pneumothoraces indicated thoracotomy, and in another two cases, single-lung ventilation could not be established.

In the remaining 161 patients, the procedure could be performed successfully by thoracoscopy without any auxiliary minithoracotomy.

In cases of diagnostic intervention of the pleural space or the mediastinum, one 10-mm and one or two 5-mm trocars were inserted, and in cases of parenchyma resection, an additional 12-mm trocar (for the Endo-GIA™ stapler, USCC) was inserted into the pleural space for thoracoscopy. Due to the narrow intercostal space, paravertebrally trocars larger than 5 mm were avoided in this area.

After removal of the trocars, one or two drains (24 and 28 French Ø) were placed in the pleural space through trocar incisions.

Of the 161 patients who were not converted to an open procedure, 12 were already deceased and five could not be reached either by phone or mail.

Among the 144 patients who were eligible for final evaluation, 97 were male and 47 were female.

The mean age was 47 years (7–86 years), and the mean follow-up was 34 months (2–72 months).

A variety of thoracoscopic procedures for different indications were performed: pneumothorax, 42 (29.2%); empyema, 38 (26.4%); interstitial lung disease (lung biopsy), 16 (11.1%); unclear pleural effusion, ten (6.9%); emphysema, seven (4.8%); harmatoma, six (4.2%); tuberculosis, five (3.5%); others, 20 (13.9%). In all cases of pneumothorax, a parietal pleurodesis, but not pleurectomy, was performed.

The indication for the procedure was primarily diagnostic in 40 (27.7%) cases and therapeutic in 104 (72.3%) cases.

Chronic sequels were defined as either pain, numbness or disaesthesia, or a combination of the three, in the area of the trocar sites, persisting for longer than 2 months after the procedure.

The following factors were checked for significance for chronic sequels: age, sex, number of drains used, use of stapling devices and length of drainage. The use of stapling devices was additionally checked for significance for chronic pain, numbness and disaesthesia.

The following parameters were investigated using a questionnaire sent by mail or telephone: sequels (generally), and if yes, then pain, disaesthesia, numbness; regular use of painkillers; if bothered in the daily life activity by the sequels; and ability to work.

2.1. Statistical methods

All data were further analyzed with a ‘Targa Pentium’ personal computer with software programs from IDV–Versuchsplanung und Datenanalyse, Gauting, Munich, Germany. In each group, the median, standard deviation, standard error, upper and lower quartile, odds ratio and total mean values were calculated. Univariate analyses were performed using the Wilcoxon–Mann–Whitney U-test for continuous variables, and a chi-square test on a 2 × 2 table for binary variables (Fisher exact). The P values are those computed for each comparison, and statistically significant variables are those at the 0.05 level (two-tailed).

3. Results

From the 144 patients contacted, 46 (31.4%) complained about sequels. Chronic pain was present in 29 (20.1%), numbness in 23 (16.9%) and disaesthesia in 12 (8.3%) patients.

Eighteen (39.1% = 12.5% of all patients reached) patients suffer from their complaints only at exercise, and 26 (56.5% = 18.1% of all patients reached) suffer even while at rest. In 41 (89.1% = 28.5% of all patients reached) patients, the sequels are weather dependent. From the group of patients with chronic pain, 24 (82.8%) patients take painkillers on a regular basis, 19 (65.5%) are bothered by the pain in their daily life activity, and nine (31.0%) are unable to work.

Sequels were present in 23% of patients who were operated on for diagnostic reasons only, and in 31% with the therapeutic operation. Complications were present in 18 (12.5%) patients, with wound infection in eight (5.6%) patients, prolonged air leakage (>7 days) in four (2.8%), prolonged fever (>7 days) in three (2.1%), persistent pneumothorax in two (1.4%), and respiratory insufficiency in one (0.7%) patient.

Drain removal was at a mean of 2.4 days (0–16 days), and the patients were discharged from hospital at a mean of 7.3 days (1–32 days).

The use of Staplers (P > 0.05; odds ratio = 0.4641; C.I. = 0.206–1.023), as well as the number of drains (1 vs. 2; P > 0.05; C.I. = 0.0001–0.0001) used, were statistically significant for a combination of chronic sequels, but not for pain, numbness or disaesthesia alone. All other investigated factors did not reach statistical significance (Table 1).

4. Discussion

Chronic sequels are adverse side-effects in any operation, and very common in general thoracic surgery [5]. The most obvious advantages of the thoracoscopic approach to pulmonary surgery are the reduction of postoperative complications and an earlier improved pulmonary function. There are numerous studies demonstrating the advantages concerning pain in the early postoperative course [2–4,6,7,9], but only a few studies addressing the impact of VATS on chronic pain [6,7]. Most studies have the lack of inheriting a very heterogeneous group of indications for the procedure, and to our best knowledge, there is no study...
published concerning chronic sequels after thoracoscopic procedures (VATS) on patients with only benign pulmonary (thoracic) disease. Other sequels, like numbness or disaesthesia, are rarely mentioned in the literature.

The key factor to chronic sequels seems to be the unconscious damage to the intercostal nerve. Landreneau [7] accuses excessive torqueing of the instruments (trocars) in the intercostal space, direct injury to the neurovascular bundle by electrosurgical access, or blunt dissection to cause chronic pain. Furthermore, the intercostal nerve is in danger when the trocars are placed to far posterior. Although there is no study proofing the direct injury by the mechanisms mentioned (e.g. by monitoring the nerve intra- and post-operatively) above, this explanation is conclusive and is supported by a study of Richardson et al. [10]. They recommend the resection of a rib eclipse with a ‘Sari’ Punch, and the alignment of the instruments along one intercostal space, to reduce the likelihood of peripheral nerve damage. By applying this technique, they did not find any complaints of chest wall pain or numbness in a series of 40 patients. These findings are also supported by our data, where the use of staplers and two drains (instead of one) were the only factors found to be significant for chronic sequels.

In light of the relatively young age of our patients, with a mean age of 46 years and a mean life expectancy of more than 30 years, we should consider a re-evaluation of the indication for the operation, especially in benign diseases or in cases of a diagnostic reason only. The VATS approach is not likely to impact on the prevalence of long-term post-thoracotomy sequels, and we still have to tell our patients that minimally invasive surgery does not mean no risk or no side-effects.

References

Appendix A. Conference discussion

Dr T. Rice (Cleveland, OH, USA): I would like to know how the questionnaire was constructed. Your patients all have benign disease, is that correct?

Dr Hutter: That is correct.

Dr Rice: The questionnaire was only done at one point?

Dr Hutter: That’s right. That was at a mean of 32 months after the operation.

Dr Rice: I think your paper is valid, one, because it is one group of patients with only benign disease, but then again, I think your analysis can only be carried out at one time. But I think it is very important, because people with benign disease truly deal with their pain differently than those patients with malignant, and also, people who undergo diagnostic procedures aren’t quite as happy as those who undergo therapeutic procedures with their pain. So I think these studies are important, but have flaws in their analysis.

Dr Hutter: First, we looked at the time difference since the operation if there was any difference, but we didn’t find any significant difference, and secondly, either diagnostic or therapeutic, there was no statistically significant difference in sequels.

Dr Rice: But you didn’t do it just for the one time period. The statistics, to go retrospectively and then divide them into groups, that is pretty complex.

Dr Hutter: That’s right.

Dr T. Molnar (Pecs, Hungary): Regarding the validity of these results, I would add that we cannot ignore that the patients have memory, so they can remember earlier pains, I’m afraid.

Dr K. Naunheim (St. Louis, MO, USA): I was wondering if you had analyzed this over time in terms of the chronological experience. I think we all know that as we have improved at VATS, we have improved at positioning the ports, so we have to torque a little less. In addition, the size of the instrumentation has decreased, and even our utilization of chest tubes...
has changed. We no longer use, for most patients, 32 French chest tubes. We will use 24 or 20 French chest tubes.

All those things can have a significant effect on the incidence and the severity of postoperative pain, and many of those things have changed, over a period of time. For that reason, I think that perhaps a direct comparison of the first half of your experience to the second half could be a significant predictor for the sequelae of pain. I wonder if you have looked at that?

**Dr Hutter:** Well, I think I mentioned before that we investigated this, and in the early period, there was no difference to the last period.

**Dr J.W. Rubin** (Augusta, GA, USA): My colleagues in the pain clinics tell me that a semi-quantitative scale for measuring pain is still valid. I would submit that your data would be strengthened by the use of a semi-quantitative pain scale at each period of observation with each patient, allowing each patient to be his or her own control.

**Dr Hutter:** We didn’t do any semi-quantitative evaluation of the pain, since there was no comparison between the two groups.

**Dr Molnar:** I would like to add a small question to Dr Hutter, whose presentation I enjoyed very much, regarding the numbness and disaesthesia, which is very frequent and can be as bad to the patient as pain, or maybe worse. What is your protocol, or how do you treat or cope with a problem like this, because it is more common than I think we think of it?

**Dr Hutter:** We don’t have any definite therapy for these patients.

**Dr Molnar:** No vitamins or TENS machines?

**Dr Hutter:** No. I know some people prescribe vitamins, vitamin B, but I don’t know whether those patients took those medications or not.