Sequels 10 years after thoracoscopic procedures for benign disease

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Abstract

Objective: Video-assisted thoracic surgery (VATS) is recognized to be as effective as open thoracic surgery for a variety of diagnostic and therapeutic conditions, but with significantly less morbidity. Chronic postoperative pain (CPP) is defined as persisting more than 2 months after the procedure. CPP and other neurological sensations like dysesthesia or numbness are found frequently, but little is known about the outcome of those patients many years after the primary procedure. Methods: In 1999 we retrospectively investigated a group of 46 (31.9%) out of 144 patients who were identified with sequels at a mean of 32 months after a VATS procedure. Now at 123 months postoperation we reinvestigated those patients for ongoing sequels.

Results: Out of 46 patients, 36 were still alive and could be reached for an interview. Eighteen patients (50%) were now free from symptoms while 18 patients (50%) still suffered from sequels. From the group of 144 patients operated on, sequels were now present in 18 patients (12.5% at 123 months vs 31.4% at 32 months, p = 0.0002). Pain was present in 17 patients (11.8% vs 20.1%, p = 0.11), in 3 patients (2.1% vs 18.1%, p < 0.000001) even at rest, and in 4 patients (2.7% vs 12.5%, p = 0.0002) only at exercise. Ten patients (6.9% vs 28.5%, p = 0.096) suffered from pain occasionally, e.g. because of changing weather. Painkillers were taken only by one patient (0.7% vs 16.6%, p < 0.0001) occasionally, and the sequels impacted the life of one female patient (0.7% vs 13.2%, p < 0.0001) badly. Numbness was present in 16.9% versus 1.3% (p = 0.0013) of patients.

Conclusion: Early postoperative sequels are frequently found in VATS procedures, but patients with pain even after years have a nearly 50% chance to eliminate their problems. In addition, numbness and dysesthesia seem to disappear almost completely several years after the procedure.

Keywords: Chronic pain; VATS; Benign pulmonary disease

1. Introduction

Video-assisted thoracic surgery (VATS) is recognized to be as effective as open surgery for a variety of diagnostic and therapeutic conditions, but with significantly less morbidity [1]. Reports in the literature find a prevalence of chronic pain in 5—33% [2—8] of patients undergoing thoracoscopic procedures. Numbness and paresthesia are rarely reported in the literature but are present in up to 10% of patients 1 year after a thoracoscopic procedure [2,9]. It is known that numbness and dysesthesia may decrease by time, but long-term results are not known.

In 1999 we investigated a series of 144 patients undergoing various thoracoscopic procedures for benign disease [9]. In this series we found 46 patients (31.9%) suffering from chronic sequels at a mean of 32 months postoperatively. This group of patients was now reinvestigated to assess their sequels at a mean interval of 123 months.

2. Methods

Between 1993 and 1998 a series of 161 patients underwent a thoracoscopic procedure for benign disease and were not converted to an open thoracotomy procedure. Patients with malignant disease were excluded to avoid pain due to tumor recurrence. Out of 144 patients who were eligible for the final evaluation, at a mean of 32 months (mo) 46 patients (31.9%) suffered from chronic sequels.

To re-evaluate the sequels, all 46 patients were interviewed by either telephone or mail at a mean of 123 (89—159) mo postoperatively. Thirty patients were male and 16 were female, with a mean age of 53 (29—75) years. Thirty-six (78.3%) of the 46 patients suffering from sequels at 32 mo could be reached for an interview. Six patients were already deceased and four patients could not be reached by either telephone or mail.

Primary indications for the procedure in sequel patients were pneumothorax in 14, empyema in 11, interstitial lung disease in 1, tuberculoma in 1, pleural effusion in 2, hamartoma in 2, and others in 4 patients.

The following parameters were investigated using a questionnaire sent by mail or telephone: sequels (generally) and, if yes, then pain, dysesthesia, numbness; regular use of
painless; if bothered in the daily life activity by the
sequels; and ability to work. The following factors were
checked for significance for chronic sequel: 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
dysesthesia. The results were compared between 1999
and 2006 and checked for significance.

3. Statistical methods

Univariate analyses using the test of McNemar were used to
analyze the 2 × 2 cross tabulation tables. A p-value less than
5% was considered as statistically significant. All analyses were
done with StatXact (Cytel Software Corporation, Cambridge,
MA) and STATISTICA 6.1 (Hill T, Lewicki P. STATISTICS Methods

4. Results

After a mean of 123 mo 36 patients could be re-evaluated.
Eighteen patients (50%) were free from former symptoms,
while sequel were still present in 18 patients (50%).

From the originally investigated group of 144 patients
sequel were present in 18 patients (12.5% at 123 mo vs 31.9% at 32 mo)
undergoing a thoracoscopic procedure for benign
disease (Table 1).

Seventeen (12.5% vs 20.1%, p = 0.11) of the 144 patients
were suffering from pain, 10 patients (6.9% vs 28.5%,
 p = 0.096) only occasionally, e.g. with changing weather.
Pain was present during exercise in four patients (2.7% vs
12.5%, p = 0.0002) and at rest in three patients (2.1% vs
18.1%, p < 0.000001). Only one patient (0.7% vs 16.6%,
 p < 0.0001) needed pain medication occasionally and one
female patient was suffering from pain impacting her daily
life badly (0.7% vs 13.2%, p < 0.0001). All patients were able
to work despite their sequel (0% vs 6.3%).

Two patients complained about numbness (1.3% vs 16.9%,
p = 0.0013) including one patient suffering from numbness
and pain. No patient suffered from dysesthesia (0% vs 8.3%,
significance not tested). Between 1999 and 2006 there was
also a significant decrease of chronic sequel in patients
where two drains instead of one were used and where
staplers were used for resection.

Table 1

Comparison of sequel of 144 patients between 1999 and 2006 (numbers
percentage)

<table>
<thead>
<tr>
<th></th>
<th>1999</th>
<th>2006</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic sequel overall</td>
<td>31.9</td>
<td>12.5</td>
<td>p = 0.0002</td>
</tr>
<tr>
<td>Pain (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At exercise</td>
<td>20.1</td>
<td>11.8</td>
<td>p = 0.11</td>
</tr>
<tr>
<td>At rest</td>
<td>12.5</td>
<td>2.7</td>
<td>p = 0.0002</td>
</tr>
<tr>
<td>At changing weather</td>
<td>18.1</td>
<td>2.1</td>
<td>p &lt; 0.000001</td>
</tr>
<tr>
<td>Painkillers</td>
<td>16.6</td>
<td>0.7</td>
<td>p &lt; 0.0001</td>
</tr>
<tr>
<td>Unable to work</td>
<td>6.3</td>
<td>0.0</td>
<td>Not tested</td>
</tr>
<tr>
<td>Impact on daily life</td>
<td>13.2</td>
<td>0.7</td>
<td>p &lt; 0.0001</td>
</tr>
<tr>
<td>Numbness</td>
<td>16.9</td>
<td>1.3</td>
<td>p = 0.0013</td>
</tr>
<tr>
<td>Dysesthesia</td>
<td>8.3</td>
<td>0.0</td>
<td>Not tested</td>
</tr>
</tbody>
</table>

5. Discussion

Chronic sequel are adverse side effects in any operation
and very common in general thoracic surgery [11,12]. The
most obvious advantages of the thoroscopogenous 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 [2,3,5,6]
but only a few studies addressing the impact of VATS on
chronic pain and other sequel [8,9].

A primary goal of minimally invasive surgery is the
reduction in pain-related operative morbidity associated
with classic open thoracic surgical techniques [13]. VATS is
accepted as reducing acute postoperative pain and analgesic
requirements compared to both muscle-sparing and standard
thoracotomy [13].

However, comparative studies have shown that there is no
difference in chronic postoperative pain (CPP) occurrence
between VATS and open thoracotomy [14,3]. In one large
study, there was less pain in the VATS group up to 1 year
postoperation, but the incidence of pain after 1 year was
identical [3]. An incidence of CPP of 31.7% was present in 60
patients undergoing VATS pleurectomy for spontaneous
pneumothorax [7].

The mechanism of chronic sequel after thoracic pro-
dure are not fully understood because of numerous causal
factors like nerve damage, rib fracture, overextension of
the costovertebral joint or recurrence of a primary cancer [14].
In VATS procedures the mechanisms for chronic pain were
described early by Landreneau et al. [13] as direct damage to
the nerves by ports or rib fracture due to forced maneuvers in
the intercostal space, but no study ever proved this to be
ture. Jutlay et al. [15] found a lower prevalence of
postoperative pain and residual paresthesia using a uniporal
versus a standard three-port technique in patients under-
ging VATS for pneumothorax, anticipating a uniporal access
will predispose to a lower incidence of neurological
symptoms. Recently Maguire et al. [16] published a paper
presenting data on the prevalence of the nerve damage
during open thoracic surgery and its association with chronic
pain and explored the intraoperative factors that may
influence nerve damage and chronic pain.

They showed in an open thoracotomy group of patients
that intraoperative nerve damage demonstrated by recorded
muscle-evoked potentials did not correlate with chronic
postoperative pain and/or cutaneous sensations at 3 months
postoperatively. This suggests that either the amount of
intraoperative nerve damage is not indicative of long-term
nerve damage or there is a more significant cause for chronic
pain than intercostal nerve injury. Owing to the lack of similar
studies in VATS patients we cannot draw final conclusions for
patients undergoing a VATS procedure.

Why symptoms in patients disappear could be explained by
the recovery of a damaged nerve. Different patterns of nerve
lesions are described in the Seddon’s classification [17]. The
damage of a nerve can be either incomplete (neurapraxia and
axonotmesis) or complete (neurotmesis). Neurapraxia is a
segmental demyelination caused by pressure on the nerve
and a recovery is expected from days to weeks. Axonotmesis
is a segmental demyelination with a disruption of the axon.
In this situation a recovery is likely in months with defect healing. In a neurotmesis with a complete discontinuation of the nerve a recovery is unlikely. In cases of neuropathic pain a recovery is unlikely [18], and therefore, early recognition and aggressive management is critical to successful outcome.

The key message of this study is that in patients with chronic sequels there is a chance of 50% with a significant difference that their problem will be eliminated in the long term. A significant reduction of pain at rest and at exercise as well as the need of painkillers and the impact of sequels on the daily life could be found. There was no significant change of pain in situations like changing weather. There was not a single patient in which a switch from one sequel to another was noted (e.g. pain to numbness or vice versa). A major drawback of our study is the loss of 10 patients to follow up. Six patients were already deceased and the remaining four were suffering from numbness in the previous study [9]. Assuming that pain is more debilitating and has more impact on daily life the message of our study is not shortened by this drawback.

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References