Incidence of chest wall paresthesia after needlescopic video-assisted thoracic surgery for palmar hyperhidrosis


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Abstract

Objective: Chest wall paresthesia is a reported sequela of thoracotomy and Video-Assisted Thoracic Surgery (VATS) which is distinct from wound pain. Although needlescopic VATS confers less post-operative pain and better cosmesis, the incidence of paresthesia after needlescopic VATS has not been quantified.

Methods: For homogeneity of the patient cohort, we studied 50 patients who received bilateral needlescopic VATS sympathectomy (T2-T4 excision) for palmar hyperhidrosis using 2 or 3 mm instruments during a 36-month period at a single institute. A standard questionnaire was administered by telephone interview, with 34 patients responding (68.0%). The median post-operative observation time was 16.5 months (range: 10-40 months). Collected data were compared with a historical group who received conventional VATS using 10 mm ports.

Results: Paresthetic discomfort distinguishable from wound pain was described by 17 patients (50.0%). The most common descriptions were of 'bloating' (41.2%), 'pins and needles' (35.3%), or 'numbness' (23.5%) in the chest wall. The paresthesia resolved in less than two months in 12 patients (70.6%), but was still felt for over 12 months in three patients (17.6%). Post-operative paresthesia and pain did not impact on patient satisfaction with the surgery, whereas compensatory hyperhidrosis in 24 patients (70.6%) did (P = 0.001). The rates and characteristics of the paresthesia following needlescopic VATS are similar to those observed after conventional VATS.

Conclusions: Chest wall paresthesia affects a significant but previously overlooked proportion of patients following needlescopic VATS, but has minimal impact on post-operative satisfaction. Needlescopic VATS offers no apparent advantage over conventional VATS with regard to paresthesia.

Keywords: Chest wall; Complications of surgery; Hyperhidrosis; Sympathectomy; VATS (video-assisted thoracic surgery)

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]. The advantages of VATS include shorter hospital stays, reduced analgesics requirements, and probably reduced respiratory impairment post-operatively when compared to open surgery [2-4].

Nevertheless, chronic pain is reported to afflict up to 63% of patients after VATS procedures, and can persist for up to several years after surgery [4-8]. Although, the pain is usually mild and non-debilitating, it is often refractory to conventional analgesic strategies. Such strategies have included modifications to surgical technique (such as reducing torquing at the wounds), pre-emptive local analgesia, intercostal nerve blockade, or early aggressive post-operative pain control [8-11]. We have previously reported that the post-operative ‘pain’ reported may be a heterogeneous group of noxious sensations, possibly accounting for the difficulty in treating such pain with any one strategy [12]. It has been found that 52.9% of patients receiving VATS pleurodesis for spontaneous pneumothorax experience paresthetic chest wall discomforts which are distinct from classical localized wound pain, and may represent a discrete post-operative complication following VATS.

One recent strategy to improve on the results of VATS is needlescopic VATS (n-VATS) [13-17]. In this technique, the 10 mm sized ports and instruments of conventional VATS (c-VATS) are replaced by very fine 2 or 3 mm instruments. It is argued that using such small wounds, there is minimal trauma to the tissues, reduced wound torquing, and even better cosmesis than conventional VATS. The downsides of this technique include relatively poor image quality with the current generation of video-technology, and reduced tactile feedback and dexterity when using such fine cameras and instruments [14,18]. Hence, at present, n-VATS has largely
been reserved for simpler thoracic procedures, in particular for thoracodorsal sympathectomy for palmar and axillary hyperhidrosis.

Although, it has been suggested that n-VATS may reduce post-operative pain compared to c-VATS [18], there have been few reports specifically documenting the incidence of pain following n-VATS for sympathectomy. There are no reports looking at whether n-VATS can reduce the incidence of paresthesia compared to c-VATS.

We therefore conducted a survey to identify if chest wall paresthesia can be recognized as a post-operative complication following n-VATS that is distinguishable from classical wound pain. We aimed to quantify its incidence and effect on patients, and to determine if n-VATS offers any advantages over c-VATS in reducing the paresthesia.

2. Methods

2.1. Patients and data collection

For homogeneity of the patient cohort, we selectively studied only patients presenting with palmar hyperhidrosis and who underwent uncomplicated bilateral n-VATS thoracodorsal sympathectomy.

A retrospective cohort study was performed. From review of our operation records, 56 patients were identified who received n-VATS sympathectomy at our institution between January 1, 2000 and December 31, 2002. Patients were excluded from this study if the hyperhidrosis was axillary only (n=1), if conversion to c-VATS for hemostasis was required (n=2), or if dense pleural symphysis was encountered requiring extensive adhesiolysis (n=3). Of the 50 remaining patients eligible for study, 16 patients could not be contacted by telephone or mail. The median age of these 16 unreachable patients was 29 years, representing an age at which many Hong Kong residents may have just moved away from home, changed mobile phone numbers frequently, or moved to work in mainland China since the time of their surgery.

The 34 patients contacted for this study included 17 males and 17 females. They had a median age of 30 years, and a mean age of 30.8 years (range: 13-45 years). None refused to participate in this study, giving an overall response rate of 68.0%.

A questionnaire-based survey was conducted for all 34 participating patients. They were asked if they could recall the wound pain after surgery, and if they experienced any paresthetic discomfort in addition to that pain. For the purposes of this study, 'paresthesia' has been defined as any numbness or disordered sensation causing chest wall discomfort which the patient can distinguish clearly from the wound pain.

Patients with such paresthesia were asked to describe the site and the characteristics of any paresthetic discomfort in their own words. Patients were also asked to subjectively grade the severity of any paresthesia on a 10-point analog scale (with one being minimal discomfort, and 10 being the worst discomfort imaginable). We regard paresthesia severity of 1-3 on the 10-point scale to be 'mild', 4-7 to be 'moderate' and 8-10 to be 'severe'. Affected patients were also questioned regarding the perceived effect of the discomfort of their daily lives, and how they responded to the discomfort if at all.

All patients were asked to grade their overall satisfaction with the surgery on a 10-point scale. We regard satisfaction scores of 8-10 to be 'very satisfied', 5-7 to be 'moderately satisfied', and any score below 5 to be 'dissatisfied'. Any adverse effects following surgery (such as compensatory and gustatory hyperhidrosis, Horner's syndrome, and pneumothorax) were also recorded. Spearman correlation analyses were performed to explore any association between satisfaction scores and the presence or absence of post-operative complications.

2.2. Operative protocol

Our technique for n-VATS sympathectomy has been reported [14,19]. Prior to August 2002, we employed conventional double-lumen tracheal intubation, placing the patient in a lateral decubitus position to operate on one side first, then repositioning the patient to operate on the other side. Subsequent to August 2002, we have used a novel technique of selective lobar collapse [19]. With this latter technique, we place the patient in a 20-30° semi-sitting position. The arms are abducted to 80-90° in a crucifix position. The operation is otherwise unchanged before and after August 2002.

Local infiltration with 0.5% bupivacaine is given preemptively prior to creating each port. The first camera port is placed in the mid-axillary line in the 5th or 6th intercostal space, with the ventilation temporarily stopped during insertion. The camera is inserted for initial inspection to confirm that the port has entered the pleural space, and low-pressure carbon dioxide insufflation is given if necessary to further enhance the collapse of the target lobe. Two instrument ports are then placed under guidance with the video-thoracoscope. We typically place these instrument ports in the mid-axillary line in the 3rd or 4th intercostal space, and at one rib space above this at the lateral border of the pectoralis major muscle.

We use 2 or 3 mm instruments, and emphasize minimal torquing during instrumentation via each port. Endoscopic forceps are inserted via the latter to grasp the sympathetic trunk while resection is performed with a diathermy hook inserted via the former port. Complete resection of the T2-T4 sympathetic ganglia is performed using a combination of gentle diathermy and blunt dissection.

At the end of the procedure, complete lung re-expansion is confirmed using a simple on-table water seal maneuver we have previously described [20]. A positive pressure inspiratory hold via the endotracheal tube is then sustained, together with suction applied via a catheter to the pleural space for 30-60 s to reduce residual pleural air and post-operative atelectasis. A chest tube is not routinely placed. The wounds are closed with either 5/0 nylon sutures or with Steri-strips (3M Health Care, St Paul, MN).

Our standard post-operative analgesics regime for all patients consists of 650 mg of paracetamol with 65 mg of dextropropoxyphene given orally five times a day, starting as soon as the patient is fully awake. Intramuscular opiates are made available to the patient, but only given upon request.
On discharge, patients are prescribed paracetamol to take on an 'as required' basis.

2.3. Comparison with conventional VATS

To investigate whether the use of n-VATS produced different incidences of chest wall paresthesia compared with c-VATS, we surveyed patients who previously received c-VATS sympathectomies in our institute. Between April 1, 1993 and December 31, 1999, 29 patients were identified who received uncomplicated c-VATS sympathectomies with 5 or 10 mm instruments and ports for palmar hyperhidrosis. Of these, 8 were unreachable by telephone or mail at the time of survey. The 21 patients who were contacted for survey included 14 males and 7 females, with a mean age of 27.0 years at the time of surgery (range 18–41 years). All 21 patients were administered the same questionnaire-based survey as above for n-VATS patients. Results from the n-VATS and c-VATS groups were compared.

We have also previously reported the incidence and characteristics of chest wall paresthesia in patients who have received c-VATS pleurodesis using 10 mm ports and instruments for primary spontaneous pneumothorax [12]. The results from that earlier study were also compared to those of the current n-VATS patients.

3. Results

The median observation time was 30 months (range: 10–40 months). The results are summarized in Table 1. All 34 patients receiving n-VATS sympathectomy reported successful treatment of their palmar hyperhidrosis following surgery as defined by completely dry hands. There were no cases of recurrent palmar hyperhidrosis in any patient.

### 3.1. Post-operative complications

Some degree of sharp, localized wound pain was reported by 22 patients (64.7%) immediately after surgery. However, 17 patients (50.0%) reported experiencing paresthetic discomfort in the chest wall that was distinct from any localized sharp wound pain in terms of site and/or nature. In the 17 affected patients, the onset of paresthesia was noted within one week of surgery by 15 patients (88.2%).

The most common descriptions of the paresthetic discomfort were of ‘stretching or bloating’ (7 patients; 41.2%), ‘pins and needles’ (6 patients; 35.3%), and ‘numbness’ (4 patients; 23.5%) in the chest wall on the operation side.

The two most common sites of the paresthesia were diffusely in the lower, anterior chest wall on the operation side (6 patients; 35.3%), and in the lateral chest wall vaguely around the territory of the VATS wounds (6 patients; 35.3%).

Specific factors which exacerbated the paresthesia could be identified by 9 patients (52.9%). These included movement (6 patients; 35.3%), deep breathing (3 patients; 17.6%), and local pressure (2 patients; 11.8%). On a 10-point analog scale, only two affected patients (11.8%) described the paresthesia as being severe (grade 8–10). Overall, only these two patients (11.8%) described functional disturbances of their daily lives as a result of the paresthesia. One patient found that paresthesia exacerbated by local pressure made it difficult to sleep in a lateral position. The other reported that paresthesia exacerbated by deep breathing restricted his ability to partake in more strenuous activities. The routine analgesics prescribed were ineffective in relieving the paresthesia in 14 of the 17 affected patients (82.4%). Nevertheless, none of the 17 patients experiencing chest wall paresthesia actively sought any other means of relieving the discomfort.

The paresthesia spontaneously resolved in 10 of the 17 patients (58.8%) after one month, in 12 patients (70.6%) after 2 months, and in 13 patients (76.5%) after 3 months. In the 13 patients with paresthesia who were followed up for over 12 months, three (17.6%) reported that the paresthesia still persisted at 12 months after surgery. The percentage of total patients with residual paresthesia at various time-points after surgery is shown in Fig. 1.

Other than pain or paresthesia, the only noted postoperative complication was of compensatory hyperhidrosis. This occurred in 24 patients (70.6%). The most common

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### Table 1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>No. of patients</th>
<th>(%)</th>
</tr>
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<tbody>
<tr>
<td>Localized wound pain</td>
<td>22</td>
<td>64.7</td>
</tr>
<tr>
<td>Paresthesia distinct from wound pain</td>
<td>17</td>
<td>50.0</td>
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<tr>
<td>Onset of paresthesia</td>
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<td></td>
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<tr>
<td>Immediately post-op</td>
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<tr>
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<td>6</td>
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<td>17.6</td>
</tr>
<tr>
<td>2 weeks post-op</td>
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<td>5.9</td>
</tr>
<tr>
<td>1 month post-op</td>
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<td>5.9</td>
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<td>Stretching or bloating of chest wall</td>
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</tr>
<tr>
<td>Pins and needles</td>
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<td>35.3</td>
</tr>
<tr>
<td>Numbness or decreased sensation</td>
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<tr>
<td>Site of paresthesia</td>
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<td></td>
</tr>
<tr>
<td>Anterior chest wall</td>
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<td>Lateral chest wall (around wounds)</td>
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<tr>
<td>Arm/axilla</td>
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<td>23.5</td>
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<tr>
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<td>Movement</td>
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<td>Deep breathing</td>
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<tr>
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</tr>
<tr>
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</tr>
</tbody>
</table>

*Patient can describe more than one response (totals may exceed 100%).
sites affected were the back (16 patients; 66.7%), feet (10 patients; 41.7%), and chest (7 patients; 29.2%). None of the patients in this study experienced post-operative pneumothorax, Horner’s syndrome, gustatory sweating or any other notable complications besides the above.

### 3.2. Patient satisfaction

Overall, 24 of the 34 patients (70.6%) were very satisfied with the operation (score of 8-10 on a 10-point scale), nine were moderately satisfied (26.5%), and one was dissatisfied (2.9%). The correlation of patient satisfaction with the occurrence of the specific post-operative complications is shown in Table 2.

Spearman correlation analyses were performed to relate satisfaction scores with the presence or absence of post-operative localized wound pain, chest wall paresthesia and compensatory hyperhidrosis. The results were $-0.148 \quad (P=0.397)$, $-0.032 \quad (P=0.855)$, and $-0.543 \quad (P=0.001)$, respectively. There was thus a highly significant negative relationship between satisfaction score and compensatory hyperhidrosis. In contrast, both wound pain and paresthesia did not significantly impact on the patients’ satisfaction overall.

### 3.3. Comparison with conventional VATS

Of the 21 patients contacted who had received c-VATS sympathectomies prior to 2000, more than half expressed that the time between their surgery and this survey was so long that it was difficult to remember clearly any experiences of their immediate post-operative pain or paresthesia. Direct comparisons were therefore largely impossible with the patients receiving n-VATS. However, one patient still had residual paresthesia distinct from wound pain at the time of survey. Another two claimed that the paresthesia had only stopped at three months and three years prior to the survey, respectively. Therefore, at least three of the 21 patients receiving c-VATS (14.3%) reported paresthesia at over 12 months following surgery.

In the 21 patients receiving c-VATS sympathectomies, 16 (76.2%) had compensatory hyperhidrosis following surgery, and five (23.8%) claimed to have excessive dryness in the face. One patient developed unilateral cord palsy following the surgery.

Table 3 shows the comparison between the patients receiving n-VATS in this study with those receiving c-VATS pleurodesis for primary spontaneous pneumothorax from our earlier study [12]. The incidence, characteristics and sites of the paresthesia reported in both groups is very similar. However, none of the patients in the n-VATS group actively sought methods of relief compared to 40.7% of those in the c-VATS group who felt compelled to seek alternative palliative methods other than conventional analgesics.

### 4. Discussion

The technique of n-VATS was developed as a means to improve upon the proven good results of c-VATS. Undoubtedly, n-VATS offers improved cosmesis over c-VATS [16,17]. However, its use has been limited by the relatively poor

![Fig. 1. Percentage of patients with persisting chest wall paresthesia at various periods of time after needlescopic VATS sympathectomy.](https://example.com/fig1.png)
optical quality thus far provided by the smaller video-thoracoscope lenses, and the inferior dexterity, precision and ‘feel’ that may be experienced using the thin, mildly flexible instruments [14,18]. This has restricted the use of n-VATS thus far to relatively simple procedures, particularly sympathetic denervation. Yet even for this operation, some have argued that the ease and efficacy of performing a thoracoscopic sympathectomy using a single- or two-port 10 mm c-VATS technique may outweigh the cosmetic advantages of n-VATS [21].

As surgeons and patients grapple with the relative merits of n-VATS and c-VATS, one of the key elements to be considered is post-operative pain and discomfort. It has been demonstrated that c-VATS produces less pain than conventional thoracotomy for the same operation by virtue of its smaller wounds and avoidance of rib-spreading [1–4]. By the same token, with even smaller wounds and potentially less torquing pressure on the intercostal bundles, n-VATS should theoretically give less pain than c-VATS [18]. Nonetheless, there is as yet insufficient evidence to confirm any such superiority of n-VATS over c-VATS.

We have previously reported that even c-VATS does not completely eliminate post-operative pain, and that one significant component of post-VATS ‘pain’ may actually be a paresthesia of the chest wall [12]. It was found that 52.9% of patients receiving c-VATS with 10 mm instruments for treatment of primary spontaneous pneumothorax experienced a paresthetic discomfort of the operation-side chest wall that they could distinguish clearly from the sharp localized wound pain at the site of the incisions. This paresthesia is a specific post-VATS complication that causes morbidity in a sizeable proportion of patients following c-VATS, and may be related to intercostal nerve trauma by the torquing of the camera and instruments.

In this survey of patients receiving bilateral n-VATS sympathectomies for palmar hyperhidrosis, 50.0% of patients reported experiencing paresthetic chest wall discomfort which they could clearly distinguish from sharp wound pain localized at the incision sites. The characteristics of the paresthesia are notably different from those of classical sharp, localized wound pain, and appear more similar to descriptions of neuropathic pain [22,23].

The paresthesia is mostly short-lived, and resolves spontaneously in most of affected patients after three months. However, those patients with residual paresthesia at three months may experience a more chronic course. After the initial sharp drop in overall incidence of paresthesia from 50.0 to 11.8% in the first 3 months, residual paresthesia is still present in 10.3% of all patients at 12 months after n-VATS.

Only 11.8% of the affected patients graded the paresthesia as severe, and 88.2% claimed that the paresthesia did not noticeably impact their daily lives. Notably, none of the affected patients found it necessary to seek any form of palliative therapy other than the simple oral analgesia routinely prescribed for post-operative pain. This probably indicates that the morbidity attributable to the paresthesia is minimal.

Both pain and paresthesia appear to have less impact on patient satisfaction with the sympathectomy than the occurrence of compensatory hyperhidrosis post-operatively. In this survey of 34 patients, the correlation between patient satisfaction scores and compensatory hyperhidrosis reached statistical significance. The observed incidence of post-operative compensatory hyperhidrosis was 70.6%. Previous authors have suggested that the incidence of compensatory hyperhidrosis may be related to the degree of sympathetic denervation performed [13,24]. Our technique involves completely resecting the T2-T4 ganglia and certainly represents a more radical form of sympathectomy than in some other centers, yet our rate of 70.6% is comparable to or better than previously reported figures [24,25]. With this technique, we have achieved perfect rates of no primary failures and no recurrences, with no complications other than compensatory hyperhidrosis, pain and paresthesia. Despite the relatively greater impact of compensatory hyperhidrosis on patient satisfaction, we would maintain that the paresthesia affecting 50.0% of patients post-operatively nevertheless warrants attention.

It is noted that the incidence, described characteristics and sites of the paresthesia in the current n-VATS patients are remarkably similar to those from our previous study on patients receiving c-VATS pleurodesis for primary spontaneous pneumothorax [12]. On the other hand, the patients in the current n-VATS group report considerably less ill-effects on their daily lives than those in the C-VATS pleurodesis group (11.8 vs. 26.0%), and fewer resorted to seeking alternative palliative remedies (0 vs. 40.7%). There is also a trend for more affected patients in the n-VATS group to report the severity of paresthesia as mild. Although this appears to suggest that n-VATS produces less debilitating paresthesia than c-VATS, this interpretation should be mitigated by the fact that the surgery in both groups were not the same. In the current n-VATS group, a relatively simple sympathectomy was performed, whereas in the c-VATS group, a considerably more traumatic mechanical pleurodesis of the entire parietal pleura was done.

To obtain a more meaningful comparison, we surveyed those patients who received sympathectomies at our institute using c-VATS. However, as this technique had not been practiced in our unit for over four years at the time of survey, time has inevitably weakened the comparison. Firstly, most of the patients with c-VATS sympathectomies had lost clear recollections of their post-operative pains and morbidities. Secondly, those early sympathectomies using c-VATS may have represented the early part of our learning curve, as suggested by the relatively higher incidences of compensatory hyperhidrosis, facial dryness and even cord palsy. Nonetheless, it is noted that at least 14.3% of the c-VATS sympathectomy patients reported residual chest wall paresthesia at 12 months after surgery. The corresponding figure in the n-VATS group is 10.3%.

At present, therefore, both the above comparisons are sub-optimal. It can be argued that n-VATS appears to give similar rates of post-operative chest wall paresthesia as c-VATS, but that there is as yet no strong evidence that n-VATS is superior to c-VATS in reducing this element of post-VATS morbidity. A prospective randomized controlled study would be required to further define this.

As is the case for c-VATS, the mechanism for the chest wall paresthesia after n-VATS is not yet ascertained, but it is possible that inadvertent torquing of the camera or instruments in the ports can compress on the intercostal nerves,
causing damage [9,22]. The diffuse distribution of the paresthesia compared to localized wound pain possibly reflects the wide area of chest wall supplied by the damaged intercostal nerve ‘downstream’ from the VATS port. The descriptions of the paresthesia are similar to some of those of neuropathic pain [23], further suggesting that the paresthesia can result from intercostal neural dysfunction. The use of metal or plastic instrument ports with the n-VATS technique may counter-balance the benefits of the smaller wounds compared to c-VATS, perhaps partially explaining the similar incidences of post-operative paresthesia in the two groups of patients. We acknowledge that it was not possible to accurately map out the distribution of the paresthesia for each patient as this study was performed by telephone interview. Demonstrating a correlation between the intercostal space of an n-VATS port, the chest wall area supplied by the corresponding intercostal nerve, and the site of the paresthesia would favor a neural trauma mechanism. Further studies will be required to confirm this hypothesis.

If the intercostal nerve trauma hypothesis is correct, suitable measures to counter this may include avoiding excessive levering of the camera and instruments against the wounds during surgery, and the use of intercostal neural blockade, Transcutaneous Electrical Nerve Stimulation (TENS) or Vitamin B therapy. Another option may be to use newer pharmacological agents specifically targeting neuropathic pains, such as gabapentin [23]. Given the preliminary evidence suggesting that pain and discomfort after thoracic surgery may result from neuropathic mechanisms [22], we are currently exploring the use of gabapentin for these patients.

We acknowledge that there are limitations to our study. Firstly, a generally accepted definition of paresthesia itself is not available. It is possible that the paresthesia described in this study may itself be a heterogeneous cocktail of pathologies and injuries. Secondly, experiences of paresthesia are very difficult to quantify. There are currently no well-established scoring systems for documenting paresthesia. This is in contrast to pain, where systems such as the McGill Pain Questionnaire are widely available. Thirdly, it is recognizably difficult to control for the influence of the socio-economic and educational backgrounds of individual patients on their sensation of paresthesia. We have attempted to reduce the influence of external variables by studying only patients with palmar hyperhidrosis who have undergone uncomplicated bilateral n-VATS thoracodorsal sympathectomies during a 36 month time window. Nevertheless, we recognize that this operation may not be the most ideal procedure for study as a component of the post-operative pain and paresthesia reported may arise from the electro-cauty of the parietal pleura and perioestum in our technique of sympathetic trunk resection. We also acknowledge that our study shares the common limitations of all retrospective studies. In particular, the time intervals between the date of surgery and the date of survey can greatly influence patient recollection of early post-operative events and sensations. We expect that a prospective study regularly checking for chest wall paresthesia following VATS procedures henceforth may more accurately define the scale of this problem.

We appreciate that our study leaves several pertinent questions unanswered. For example, would more limited extents of sympathetic resection or division of the rami communicantes alone result in reduced paresthesia? Would application of intercostal neural blockades reduce the paresthesia, or paradoxically exacerbate it by enhancing the numbness noted by some patients? It is anticipated that future studies, based on the appreciation that paresthesia may be a specific complication to be targeted for improvement, may help to answer these and other questions.

We would emphasize that n-VATS remains a very important technique that leaves wound scars that are usually barely detectable: a major consideration for many patients. However, this study has found no evidence that n-VATS is superior to c-VATS in reducing post-operative chest wall paresthesia. Future prospective studies will be required to identify any quantifiable advantage of n-VATS over c-VATS or vice-versa.

Acknowledgements

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References


Appendix A. Conference discussion

Dr T. Treasure (London, UK): Chest wall parasthesia is an important troublesome complication, but usually we are dealing with intercostal neuralgia. Because your group of patients had surgery to the sympathetic nerves you have another site of neurological injury to consider. Do you think that you are going to have to start all over again with more representative VATS surgery for lung biopsies or pneumothorax surgery?

Dr Sihoе: I would agree that one of the main limitations of the study is that we do use electrocautery when doing our sympathetic resections, and resecting the sympathetic trunk, as you might have some bearing itself on the postoperative sensations. We chose sympathectomy mainly because it’s the most representative type of surgery for needlescopic VATS, it’s one we do most often, and because this is a retrospective survey, this provided the largest number of patients. Ideally in the future we would want a prospective study, as you say, perhaps on lung biopsies or any other procedures which don’t specifically affect the nerves, and hopefully that won’t affect the pleura, which is also sensitive.

Dr Treasure: Yes, but the pain from the pleura and the pain from the intercostal nerves are rather different things, aren’t they?

Dr Sihoе: Yes. One of the points of this survey is that in the past most studies looking at post-VATS pain and post-thoracotomy pain tended to lump all the sensations together as just ‘pain’. What we’re trying to show with this study is that the postoperative discomforts may actually be more various than just ‘pain’ or ‘no pain’.

Mr R. Berrisford (Exeter, UK): I just wanted to pick up your last point, that the postoperative discomfort may be caused by something else other than direct trauma to the intercostal nerve. One would expect that in your study with needlescopic VATS there would be less pain because of less direct trauma to the intercostal nerve. Do you have a theory as to what that might be, and would you consider central sensitization as being important in causing neuralgia?

Dr Sihoе: The most likely culprit may well be intercostal neuralgia from intercostal trauma during surgery. Obviously this study doesn’t go anywhere near confirming that. Previous studies by Dr Benedetti’s group from Italy a few years ago have shown that thoracotomy and perhaps VATS do cause physiologically measurable trauma to the intercostal nerves. With regards to how to treat such intercostal neuralgia, if that is the case, central treatment, as you say, is one possibility. Other possibilities that we are studying in our unit is the use of more novel agents, such as gabapentin, which acts specifically for neuropathic pain.

Dr Berrisford: So if you gave an intercostal block before you performed needlescopic VATS, could you abolish central sensitization and see whether that was a factor or not?

Dr Sihoе: We have given thought to this. However, as you’ll note from our results, some of these patients complained about just numbness in the chest wall, if we’re actually giving intercostal blocks, does it actually make the problem better or worse? That’s something we’ll have to find out in the future.

Dr J.A. Thorpe (Leeds, UK): Most of my patients don’t complain about their neuralgia. Really compensatory hyperhidrosis is going to be the end of this operation as far as I’m concerned. It is a devastating problem. There has been some interesting work from Seoul on what is the correct operation here. Should we be just dividing the rami communicantes and not dividing the main trunk? I think if you look at some of the research that has been out recently, the actual incidence of compensatory hyperhidrosis is much less with division of rami communicantes and not the actual trunk itself. So I think this is an area that we should really look into, you’re doing so many sympathectomies in Hong Kong, I think you would be a good group to really look at that anatomical variation and problems, particularly with the nerve of Kuntz, etc. So I think we have got to do something about compensatory hyperhidrosis. You may have an answer.

Dr Sihoе: Our results do agree with you. The only factor that really affected patient satisfaction in our own study was indeed compensatory hyperhidrosis. We brought up parasthesia as one aspect that we can hope to improve in the future. I think our study is too limited to really talk about the relative pros and cons of complete sympathetic trunk resection versus more limited surgery, such as clipping or dividing the Kuntz fibers. Yesterday there was a talk from Dr Cho from South Korea in which he quite elegantly described the anatomical variations in the rami communicantes and the Kuntz fibers around the sympathetic trunk, and I think these are the sort of factors we need to take into account in future surgery.

Dr J. Hutter (Salzburg, Austria): Those patients suffering from numbness or pain, did they suffer on both sides or just on one side? Was there any trend to those having problems having those problems on both sides?

Dr Sihoе: In our experience, most patients described the parasthesia bilaterally. I cannot recall offhand any patient who had just significantly unilateral problems.