Chest pain control with kinesiology taping after lobectomy for lung cancer: initial results of a randomized placebo-controlled study

Andrea Imperatori, Annamaria Grande, Massimo Castiglioni, Laura Gasperini, Agnese Faini, Sebastiano Spampatti, Elisa Nardecchia, Lorena Terzaghi, Lorenzo Dominioni, and Nicola Rotolo

Center for Thoracic Surgery, Department of Surgical and Morphological Sciences, University of Insubria, Ospedale di Circolo, Varese, Italy
Department of Physiatry and Rehabilitation, Ospedale di Circolo, Varese, Italy
Corresponding author: Center for Thoracic Surgery, University of Insubria, Via Guicciardini, 21100 Varese, Italy. Tel: +39-0332-278868; fax: +39-0332-260260; e-mail: andrea.imperatori@uninsubria.it (A. Imperatori).

Received 7 September 2015; received in revised form 31 January 2016; accepted 22 February 2016

Abstract

OBJECTIVES: Kinesiology taping (KT) is a rehabilitative technique performed by the cutaneous application of a special elastic tape. We tested the safety and efficacy of KT in reducing postoperative chest pain after lung lobectomy.

METHODS: One-hundred and seventeen consecutive patients, both genders, age 18–85, undergoing lobectomy for lung cancer between January 2013 and July 2015 were initially considered. Lobectomies were performed by the same surgical team, with thoracotomy or video-assisted thoracoscopic surgery (VATS) access. Exclusion criteria (n=25 patients) were: previous KT exposure, recent trauma, pre-existing chest pain, lack of informed consent, >24-h postoperative intensive care unit treatment. After surgery, the 92 eligible patients were randomized to KT experimental group (n=46) or placebo control group (n=46). Standard postoperative analgesia was administered in both groups (paracetamol/non-steroidal anti-inflammatory drugs, epidural analgesia including opioids), with supplemental analgesia boluses at patient request. On postoperative day 1 in addition, in experimental group patients a specialized physiotherapist applied KT, with standardized tape length, tension and shape, over three defined skin areas: at the chest access site pain trigger point; over the ipsilateral deltoid/trapezius; lower anterior chest. In control group, usual dressing tape mimicking KT was applied over the same areas, as placebo. Thoracic pain severity score [visual analogue scale (VAS) ranging 0–10] was self-assessed by all patients on postoperative days 1, 2, 3, 5, 8, 9 and 30.

RESULTS: The KT group and the control group had similar demographics, lung cancer clinicopathological features and thoracotomy/VATS ratio. Postoperatively, the two groups also resulted similar in supplemental analgesia, complication rate, mean duration of chest drainage and length of stay. There were no adverse events with KT application. After tape application, KT patients reported overall less thoracic pain than the control group, the difference being significant on postoperative day 5 [median VAS, 2 (interquartile range, 1–3) vs 3 (2–5), P<0.01] and day 8 [median VAS, 1 (0–2) vs 2 (1–3), P<0.05]. Moreover, on postoperative day 30 persistence of chest pain (VAS ≥3) was reported less frequently by the KT group than by the control group (7 vs 24%; P=0.03).

CONCLUSIONS: KT after lung lobectomy is a safe and effective auxiliary technique for chest pain control.

ISRCTN REGISTRY: ISRCTN37253470.

Keywords: Kinesiology taping · Postoperative chest pain · Lobectomy · Lung cancer

INTRODUCTION

Pain relief is a major component of postoperative care in thoracic surgery. In addition to improving patients’ well-being after surgery, effective analgesia helps patients to actively perform respiratory rehabilitation and to prevent complications. A wide spectrum of pain control medications and techniques is available; however, the optimal strategy for pain management in thoracic surgery is still debated [1–3]. Kinesiology taping (KT) is a rehabilitative method developed in the 1970s, consisting in the application to the patient skin of an especially designed elastic tape, of which several brands are available on the market, to modify the underlying soft tissue spaces and achieve therapeutic effects [4]. The KT rehabilitative technique is designed to facilitate the body’s natural healing processes after trauma/inflammation while providing support and stability to muscles and joints. In addition, KT may alleviate pain with a mechanism of action that is hypothesized to...
result from targeting somatosensory receptors and from microscopical lifting of the skin. Importantly, when applying KT the skin must be manually stretched, so that the elastic tape forms cutaneous convolutions lifting up the skin; it is postulated that this skin-lifting effect increases interstitial space and facilitates lymphatic drainage \[4, 5\]. The adoption of KT as a method to treat various musculoskeletal, rheumatic, neurological, lymphatic and vascular disorders has extended in recent years \[6–9\].

This treatment method, combined with other pharmacological and physiotherapeutic interventions, has been extensively used primarily for the treatment of musculoskeletal trauma and pain in athletes. Considerable controversy surrounds the effect of KT on pain individuals with musculoskeletal injuries \[7, 10–14\]. A recent systematic review suggested that KT may be used in conjunction with more traditional analgesic therapies, but high-quality literature on this topic is scarce and further research with controlled studies is needed to evaluate efficacy \[10\].

It is unlikely that pain resulting from musculoskeletal trauma and postoperative pain are the same problem; nevertheless, KT has also been tested as a measure to alleviate postoperative pain. In a randomized, controlled trial in patients undergoing total knee replacement, KT proved to be beneficial to reduce oedema and pain during early postoperative rehabilitation \[15\]. KT was shown to improve pain control after laparoscopic cholecystectomy \[16\], and to decrease post-mastectomy lymphoedema \[17\]. Recently, a randomized trial in patients undergoing wisdom teeth removal indicated that the application of KT significantly reduced swelling, pain and trismus \[18\]. To our knowledge, no randomized trials evaluating KT for the treatment of chest pain after thoracic surgery have been published. In the present study, we aimed to test the safety and efficacy of the KT method in reducing postoperative thoracic pain after lung lobectomy.

**MATERIALS AND METHODS**

**Study design**

We performed a prospective, randomized, placebo-controlled trial of KT treatment for pain relief in patients undergoing lobectomy for lung cancer. The study design flow chart is illustrated in Fig. 1. This was a spontaneous, non-sponsored trial, registered in ISRCTN registry with ISRCTN37253470. The study protocol was approved by the Varese Province Ethics Committee. The written consent to participate was obtained from all patients.

**Participants**

All patients, both genders, 18–85 years old, with non-small-cell lung cancer stage I–IIIA \[19\], candidates to lobectomy between

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**Figure 1:** Study design flow chart.
January 2013 and July 2015 at the Center for thoracic surgery, Insubria University, Ospedale di Circolo di Varese, were initially candidates for this study. Exclusion criteria were: previous use of KT physiotherapy; lack of consent to participate; history of thoracic trauma 6 months or less prior to surgery; pre-existing chest pain; allergy to analgesic drugs; postoperative intensive care unit (ICU) treatment lasting >24 h after lobectomy.

Interventions

Throughout the study, lobectomies were performed by members of the same surgical team on rotation, with open thoracotomy or video-assisted thoracoscopic surgery (VATS) access, according to the surgeon’s preference. The routine open approach was lateral thoracotomy, through the fifth intercostal space, with minimal resection of latissimus dorsi and anterior serratus preservation; at the end of the procedure, two chest tubes were placed. Alternatively, we performed VATS lobectomy with three-port anterior approach (including a 4–6 cm minithoracotomy) and one chest tube anteriorly. Hilar-mediastinal lymphadenectomy was routinely performed.

Standard postoperative analgesia was administered in the KT group and in the control group, as follows. On postoperative days 1, 2, 3: intravenous paracetamol (1 g three times a day: at 8 am, 4 pm and 12 pm); epidural naropin (0.2% at 4 ml per hour) and subcutaneous morphine (5 mg/day, at patient request). Since postoperative day 4 until discharge: oral paracetamol/codeine (500/30 mg twice/day: at 6 am and 6 pm) and oral ibuprofen (600 mg twice/day: at 12 am and 12 pm). Supplemental analgesics [non-steroidal anti-inflammatory drugs (NSAID) and opioids] were available at patient request in both groups. All patients in both groups underwent postoperative lung rehabilitation by using respiratory exercisers (Coach®, Smiths Medical ASD, Inc., Rockland MA, USA; PEP therapy). To facilitate early patient mobilization, posterior chest tube and bladder catheter were routinely removed on postoperative day 2.

For each patient, we recorded the basic demographic data, lung cancer symptoms at presentation, body mass index, smoking status, lung cancer histology and stage, surgical approach (open thoracotomy or VATS), postoperative complications, mean duration of chest drainage and length of stay.

Kinesiology taping and placebo taping. In addition to standard analgesia, in the morning of postoperative day 1, a specialized physiotherapist applied KT as indicated below to all patients of the experimental group.

The material we used for KT was Kinesio® Tex Gold™ (Kinesio Holding Corporation, Albuquerque, NM, USA), a 100% cotton, latex-free, elastic tape, 5-cm wide. KT was applied to the chest skin in defined areas (Fig. 2), with the following modalities.

For tape placement, we chose the sites according to the principles and techniques described by Kase et al. [4] that were empirically found to be effective for decreasing pain in soft tissue trauma and in various musculoskeletal conditions: space correction of pain trigger point; functional correction of muscles; lymphatic correction of oedema.

Accordingly, we routinely applied KT to the following anatomic sites after thoracotomy: (i) to the main trigger point of chest pain (Figs 2 and 3) that was localized by careful palpation of the chest wall; (ii) to the skin overlying the deltoid/trapezius (Figs 2 and 4) after chest muscles’ manual testing and shoulder range of motion testing, in order to obtain a sensory stimulus that inhibited pain and assisted muscle function; to the skin across the lower anterior chest (Figs 2 and 3), providing a stimulus that facilitates diaphragmatic function; (iii) on the skin above the oedematous area at the base of the chest wall (Fig. 5). Details of KT application are as follows:

Space correction of chest pain trigger point. We applied KT to the chest skin in a star shape, aiming to decongest the main painful area by lifting up the underlying tissues [4]. The tape was cut in 4 strips (each 2.5 cm × 10 cm) and applied with 25–50% tension in the centre of each strip, and no tension at the extremities (Figs 2 and 3). The star-shaped KT application was directly above the main pain trigger point (target area) identified by chest palpation. The target area was usually located at some distance from the (mini)thoracotomy access, frequently over the pectoralis muscle (Fig. 3).

Functional correction of the deltoid/trapezius and diaphragm. Muscular inhibition of the deltoid was routinely effected, by applying KT as shown in Fig. 2: over stretched skin, the anchor of the tape was positioned with no tension above the distal deltoid attachment; the rest of the tape was divided into two strips that were applied with light (~15%) tension above the muscle, and without tension at the ends (Fig. 4A). In patients with trapezius...
contracture, a similar technique was used for painful trapezius muscle functional inhibition (Fig. 4B).

Moreover, to facilitate diaphragmatic function, we routinely used diaphragmatic muscular assistance with KT, as described by Kase et al. [4, 5]. To this effect, the 5-cm wide tape was applied horizontally on the lower anterior chest, with maximally stretched skin (at the end of a deep inhalation). The tape extended across the xyphoid process and laterally joined the anterior axillary lines, as shown in Figs 2 and 3 (tape tension: ~15% in the centre; no tension at the ends).

Lymphatic correction of oedema. To facilitate lymphatic drainage from soft tissues of the area of surgical trauma, the tape was applied with no tension on stretched skin, fashioned as follows. Starting from one end, the tape was longitudinally divided into four equal tails (Fig. 5), leaving the last 3–4 cm of tape (anchor) uncut. The anchor was applied above an area of regional lymph drainage, whereas the tails were spread and placed on stretched skin above the oedematosus area [20].

Importantly, all tapes were placed after stretching the skin, a fundamental manoeuvre to let the elastic KT raise skin convolutions and provide space correction in the underlying soft tissues. The modalities and the choice of sites of KT application we used in our study are based on about 3-year empirical experiences by physiotherapists of our group, who preliminary evaluated several possible modalities and sites of KT application for postoperative chest pain control. We found it is important to follow the specifications indicated above for the amount of tension (0, 15, 25 or 50%) applied to the different parts of the KT strips, respectively to achieve space correction of the chest pain trigger point, functional correction of the deltoid/trapezius and diaphragm and lymphatic correction of oedema. The specified tensions for the tape brand used in this study were obtained using the following simple rules: (i) when the paperback is removed, the tape has an intrinsic stretch (15% tension) that is retained if application to the skin is immediate, and lost (0% tension) a few seconds after peeling off the paper; (ii) maximum stretching (100% tension) corresponds to 40% increased length of the tape, whereas 50% and 25% tensions

Figure 3: Kinesiology taping (KT) applied horizontally on the lower anterior chest to facilitate diaphragmatic activity; another KT was placed in star shape over the pectoralis major muscle to provide space correction at the pain trigger point. The patient underwent VATS left lower lobectomy while on antiplatelet drug therapy and developed subcutaneous haematoma near the wound.

Figure 4: Kinesiology taping for: (A) deltoid muscle inhibition; (B) trapezius muscle inhibition. Percent values indicate the different tensions of tape application.
respectively correspond to 20 and 10% increase in length. Of note, tapes were applied without overlapping wound dressings. When wound discharge occurred (usually pleural fluid spillage around drains), spoiled tapes were substituted.

In all patients randomized to control group, placebo tape (usual adhesive dressing tape without stretch, mimicking KT in colour, size and stripe-shape) was applied by the physiotherapist on postoperative day 1, at the same sites as in KT group patients.

The KT and the placebo tapes were removed at the time of hospital discharge, or on postoperative day 10, whichever came first.

We prevented communication among patients enrolled in this trial in the same period, so that they would not recognize the different elasticity of KT and placebo usual tape.

Primary end-point

The primary end-point was to evaluate whether KT reduced the postoperative pain score. The measurement of chest pain after surgery was performed by patient self-assessment, using visual analogue scale (VAS) score (assuming that 0 represents no pain, and 10 denotes maximum pain intensity) at about 8 am, sequentially on the following postoperative days: 1 (before tape application), 2, 3, 5, 8 and 9. On postoperative day 30, the intensity of residual chest pain was evaluated by a telephonic interview with the patient.

Secondary end-points

Secondary end-points were to compare patient request of supplemental analgesia, chest tube duration, infectious complications and postoperative length of stay between KT group and control group.

Sample size

A total sample size of at least 80 patients (40 per group) was calculated as being required, on the basis of a Type 1 error of 0.05, a power of 80% and considering, on postoperative day 5, a difference between VAS score means of 1.5 to be clinically important (assuming a standard deviation (SD) in the control group of 2.7 and in the KT group of 2).

Randomization

On the morning of postoperative day 1, patients meeting the study criteria were prospectively randomized to KT experimental group or control group, using a random-number generator (Fig. 1). Allocation was made by contacting the holder of the allocation schedule who was off-site; patients were blinded to the results of randomization. All patients received KT treatment or placebo as allocated. Randomization was performed on postoperative day 1 for three reasons. Firstly, to avert the bias of the health team taking care of randomized patients before, during and immediately after lobectomy; secondly, ‘> 24 h postoperative ICU treatment’ was an exclusion criterion; thirdly, the physiotherapist needed active cooperation of the awake patient to correctly apply the tape.

Statistical analysis

Results are expressed as mean value ± SD, or median value and interquartile range (IQR). Data were compared between groups using the chi-squared test for categorical variables and Student’s t-test or Mann-Whitney U-test for continuous variables. A P-value of < 0.05 was considered significant. Statistical analysis was performed with MedCalc Statistical Software version 14.12.0 (MedCalc Software bvba, Ostend, Belgium). The method of analysis of results was intention-to-treat analysis.

RESULTS

Of the 117 consecutive patients undergoing lobectomy who were initially considered, 25 did not meet the study entry criteria (2 patients refused; 23 did not meet one or more inclusion criteria). The 92 patients qualifying for this trial signed informed consent and were randomized. Forty-six were allocated to the KT group and 46 to the placebo control group (Fig. 1). At baseline, the demographic data and lung cancer clinico-pathological characteristics were found to be similar in the two patient groups (Table 1), confirming the efficacy of randomization. The majority of subjects underwent lobectomy with open approach, and the ratio of thoracotomy/VATS access was similar in the two groups (P = 0.58; Table 1).

Secondary end-points

Postoperatively, in the KT group a slightly smaller proportion of patients requested supplemental analgesia (P = 0.14), and chest tube duration was slightly shorter (P = 0.35) (Table 2) than in the control group.

The proportion of patients’ postoperative infections was similar in the two groups (17 and 22%; P = 0.60). There was no difference in the incidence of pneumonia (9 and 9%; Table 2). In both groups, there were no cutaneous alterations nor adverse events related to tape application, and no patient died postoperatively. The median length of stay was slightly shorter in the KT group.
relative to control group, but the difference was not statistically significant [10 (IQR, 9–12) days vs 11 (9–15), P = 0.14].

### Primary end-point

The comparison of VAS score between the KT and the control group is shown in Table 3. Subjective pain perception in the morning of postoperative day 1, just before tape application, was strong and not significantly different in the two groups (P = 0.92). There was no effect of KT on pain intensity assessed on postoperative day 2. However, significant reduction of chest pain in the KT group compared with that in the control group was evident on Day 5 (P < 0.01), continued on Day 8 (P < 0.05) and subsided on Day 9, when VAS score was very low in both groups (Table 3). Postoperative pain reduction from Day 1 to Day 5 was greater in the KT group than in controls [VAS, −3 (IQR, −5; −2) vs −2 (−3; −1); P = 0.04, Table 3]. At 30 days after lobectomy, in patients who underwent KT treatment the median VAS score was lower (P = 0.03, Table 3) and persistence of moderate-to-severe intensity chest pain (VAS ≥3) was recorded less frequently than in placebo controls (7 vs 24%; P = 0.03).
DISCUSSION

The main finding of this randomized study is a significant reduction of thoracic pain intensity in the KT group compared with the placebo-controlled group. Chest pain perception assessed by VAS score was significantly lower by one point in the KT group on postoperative day 5, and continued to be so on Day 8; subsequently the VAS score fell to low levels in both groups, and KT made no difference. Of note, on postoperative day 2, the chest pain VAS score was unaffected by the application of KT in adjunct to routine intensive administration of analgesics. Our interpretation is that KT improved pain control only a few days after lobectomy, when patients discontinued intravenous epidural analgesia and switched to oral medications, at a time when chest pain intensity decreased to about VAS score 3 with usual care. Because oral medications are frequently insufficient for continuous pain control, we hypothesize that KT provided auxiliary antalgic support which translated to a significantly lower pain perception by VAS: visual analogue score; KT: kinesiology taping; IQR: interquartile range.

Study limitations

The physiotherapists applying the KT were not blinded. Owing to the nature of the intervention, this problem was inevitable, as was indicated also in a systematic review of KT effectiveness [6]. Another inevitable problem in our study was the placebo-controlled tape that necessarily had to be non-elastic, because tape elasticity is key to KT efficacy. Correctly, it may be argued that patients could realize the difference in texture and elasticity between KT and usual dressing tape, thus technically they were not blind to the treatment. While this is a key limitation in this study, our patients did not have the information necessary to discern if any antalgic effect derived from tape texture, or from the modality of its application, or from both. Moreover, subjects with a history of use of KT physiotherapy were excluded from study, to avert bias from previous exposure, and in the postoperative period we separated KT-treated and control patients, to prevent exchange of information on postoperative pain. Another limitation is the relatively small number of randomized patients who underwent VATS lobectomy. It appears necessary to extend our trial to include a larger number of patients with the minimally invasive surgical approach, before firm conclusions can be drawn about chest pain reduction with KT application after VATS lobectomy.

Strengths of our study are: eligibility criteria specified, randomization with a placebo-controlled group, concealed allocation, baseline comparability of groups, adequate follow-up, intention-to-treat analysis, between-group comparison, point estimates and variability. Notably, the baseline comparability of groups was ascertained in our study, as shown in Table 1, confirming the adequacy of the randomization procedure. Moreover, all lobectomies were performed in a single institution by members of the same surgical team, and randomization was done on postoperative day 1. This provided homogeneous and unbiased surgical management, a factor known to affect chest pain intensity and postoperative length of stay. Thoracic pain intensity was self-assessed with VAS by the patients, who were blinded to the intervention and were not previously treated by KT. Another point of strength is the minimal missing of data in the results. Altogether our trial scored 8/11 according to the PEDro scale of methodological quality [23], suggesting that our findings are likely to be internally valid.

CONCLUSIONS

The results of our study indicate that KT after lobectomy for lung cancer is a safe and effective auxiliary technique for chest pain control, providing support to oral analgesics, as documented by scored median VAS 3 (on postoperative day 5), the KT provided a significant pain reduction. On the basis of these considerations, we hypothesize that VAS score 3 is the threshold of postoperative pain above which KT is ineffective as an auxiliary antalgic measure.

Another potentially interesting result of the present study is the possible long-term effect of KT on the occurrence of late postoperative chest pain; although the KT was removed at hospital discharge, on Day 30 after lobectomy in the KT group, the persistence of VAS ≥3 chest pain was reported significantly less frequently. The mechanism of action of this favourable late effect of KT remains to be elucidated. It has been hypothesized that the effective treatment of acute pain after thoracotomy may prevent persistent postoperative pain [22].

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Table 3: Patients’ self-assessment of postoperative chest pain by VAS

<table>
<thead>
<tr>
<th></th>
<th>KT group (n = 46)</th>
<th>Control group (n = 46)</th>
<th>P-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postoperative day</td>
<td>VAS, median (IQR)</td>
<td>VAS, median (IQR)</td>
<td></td>
</tr>
<tr>
<td>1^b</td>
<td>6 (4–7)</td>
<td>5 (4–8)</td>
<td>0.92</td>
</tr>
<tr>
<td>2</td>
<td>5 (3–6)</td>
<td>5 (3–7)</td>
<td>0.63</td>
</tr>
<tr>
<td>5</td>
<td>2 (1–3)</td>
<td>3 (2–5)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>8</td>
<td>1 (0–2)</td>
<td>2 (1–3)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>9</td>
<td>1 (0–2)</td>
<td>1 (0–3)</td>
<td>0.17</td>
</tr>
<tr>
<td>30</td>
<td>0 (0–3)</td>
<td>1 (0–6)</td>
<td>0.03</td>
</tr>
<tr>
<td>Chest pain reduction</td>
<td></td>
<td></td>
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<tr>
<td>Day 5-Day 1</td>
<td>−3 (−5; −2)</td>
<td>−2 (−3; −1)</td>
<td>0.04</td>
</tr>
<tr>
<td>Day 8-Day 1</td>
<td>−4 (−6; −2)</td>
<td>−4 (−5; −2)</td>
<td>0.24</td>
</tr>
</tbody>
</table>

VAS: visual analogue score; KT: kinesiology taping; IQR: interquartile range.

* = Mann-Whitney U-test.
^b = Before applying KT or placebo tape.
\( \text{c} \) = Data not available: 1 patient.
\( \text{d} \) = Data not available: 4 patients.
the significant reduction of one point in the VAS level of pain on postoperative days 5 and 8.

The lower rate of late postoperative (Day 30) chest pain reported by the KT group is also a potentially relevant clinical finding. These initial results need to be confirmed by further studies, which should also evaluate whether enhanced pain control by KT is associated with better performance of postoperative physiotherapy exercises and with improved lung function.

Funding
This work was supported by University of Insubria research funds (Fondi di Ateneo per la Ricerca 2013–2015).

Conflicts of interest: none declared.

REFERENCES

APPENDIX. CONFERENCE DISCUSSION
Dr T. Lacin (Istanbul, Turkey): I would like to ask you two questions. The first one is, you said, “For placebo patients, also I placed tapes.” So what kind of tape is it? How is it different from this taping system? My second would be more on the pathway of the pain production, because for the athletes, the pain is something related to lactic acid. So that’s why they feel pain, lactic acid. Echymosis in the muscle, as far as I know, and the pain fibers, C fibers get activated and you feel pain, aching pain. But for surgery it is totally different. You cut the muscle. You cut the nerves. So how can it be correlated, the orthopedics, the exercise and the thoracoabdominal pain?

Dr Imperatori: The second question is tough. For the first question we used a placebo tape. It is an elastic tape of the same colour with the same shape, but no Kinesio-tape and applied without tension by the physiotherapist. The patient was blind and unaware of which tape was used, assessing VAS score. You’re right about the second question. Thoracotomy pain is not just a skin problem or a subcutaneous problem. Actually, this tape does work, stimulating subcutaneous proprioceptors. Actually, also lymphatic drainage is involved.

To my knowledge, there are no studies correlating systemic inflammatory response to Kinesio Taping® technique; so we think that Kinesio Taping® does not have a systemic impact, but it acts locally reducing irritation of chemoceptors.

In our study we observed that in the first postoperative days when the pain is directly correlated to muscle and nerves trauma the most important part of the surgical trauma, the Kinesio taping technique has not a relevant impact.

Conversely, when the pain becomes less severe this technique may be effective. However, we need other randomized trials to confirm our results.

Dr G. Friedel (Gerlingen, Germany): You showed that there are different forms of taping after these procedures. Who and how do the physiotherapists decide which form of taping he performs?

Dr Imperatori: Yes. There is a standard one that is the so-called stripes anchored application. Moreover, if the patient localizes the pain in one point of the chest wall (the trigger point) the physiotherapist performs the “focal star”. This is the first report on this field after thoracic surgical major procedures; so you are right, it is not well standardized. However, as described in the manuscript, Kinesio taping was applied using various modalities according to the experience that the physiotherapist developed previously and on these patients.

Dr A Ciccione (Rome, Italy): Just a short question. What is the cost of this device, because when we ask for something new, the only thing we are asked is how much it costs and not if it works or it doesn’t?

Dr Imperatori: It’s very cheap. I mean, 30 meters cost about 70 Euro, 2 Euro/meter of tape, and you need less than one meter per patient. Moreover, you have to add the costs of training and time of a dedicated physiotherapist, but if we include all, it’s less than 10 Euro per patient, less than a daily 3-dose I.V. administration of paracetamol.

Dr Ciccione: Yeah, it’s very expensive, I.V. paracetamol.

Dr P. Van Schil (Antwerp, Belgium): I have two questions regarding the design of your study. The observed differences are small as you’ve been showing. So did you calculate the sample size beforehand because you only have I think 92 patients until now?

Dr Imperatori: Yes, we planned to have at least 100 patients. This is an interim analysis and the study is still ongoing.

Dr Van Schil: Secondly, because it’s critical in a randomized study, how was the process of randomization done?

Dr Imperatori: I’m sorry, I didn’t show this aspect.

Dr Van Schil: How did you randomize the patient?

Dr Imperatori: Through the PC, on the morning after surgery, the staff doctor randomize the patients in control group or in Kinesio taping group using a random-number generator.

Dr Van Schil: So it was done by at random figures?

Dr Imperatori: Yes.