How-to-do-it

Is adhesive paper-tape closure of video assisted thoracoscopic port-sites safe?

Heyman Luckraz *, Kandadai S. Rammohan, Mabel Phillips, Peter A. O’Keefe

Cardiothoracic Unit University Hospital of Wales, Cardiff CF14 4KW, United Kingdom

Received 20 January 2007; received in revised form 8 March 2007; accepted 13 March 2007; Available online 17 April 2007

Abstract

Video assisted thoracoscopic surgery (VATS) is used in lung surgery for diagnostic, staging, curative and palliative purposes. The port-sites are usually sutured with dissolvable sutures. The use of adhesive paper-tape for port-site closure was assessed by a prospective randomised double-blind control trial comparing sutured to adhesive paper-tape closure. The following outcomes were assessed: incidence of clinically significant pneumothorax, wound healing using the ASEPSIS score, patient’s comfort (pain score using a visual analog score), the time difference between the two techniques of wound closure and cost savings. Thirty patients were recruited in each group. No clinically significant pneumothoraces occurred in either group. There were no significant differences between the two groups in terms of immediate post-operative pain scores, wound cosmesis and wound complications. It was quicker to close the wound with adhesive paper-tape with a mean time of closure per unit length of wound of 9.3 and 2.2 s/mm for the groups, respectively. The cost for wound closure (per patient) was $0.8 for the adhesive paper-tape group and $4.00 for the sutures.

# 2007 European Association for Cardio-Thoracic Surgery. Published by Elsevier B.V. All rights reserved.

Keywords: VATS; Port-site closure; Adhesive paper-tapes

1. Introduction

Video assisted thoracoscopic surgery (VATS) forms part of a well-established armamentarium in thoracic surgery [1]. Traditionally, the port-sites are closed using dissolvable sutures.

In laparoscopic surgery, a variety of techniques for port-site closure have proven to be effective and safe [2]. These include absorbable sutures, staples, tissue glues (octylcyanoacrylate) and adhesive paper-tape. The use of adhesive paper-tape for the closure of VATS port-sites has as yet to be reported in the literature.

2. Methods

Closure technique of VATS port-sites with either absorbable sutures — Group A (monocryl 3/0) or adhesive paper-tape — Group B (6 mm × 75 mm, steri-strip, 3M HealthCare, St Paul, MN, USA) was compared by a randomised control trial.

This study was approved by both the Institutional Research and Development Unit and the Local Ethics Research Committee. Patients undergoing VATS were recruited preoperatively and gave written consent to be part of the study. The study was powered using an alpha = 0.01, power = 0.9 and n = 30 for each group.

Outcomes compared between the two groups included (a) pneumothorax (incidence and size prior to hospital discharge, at 6 weeks follow-up and incidence of clinically significant pneumothorax requiring intercostal chest drain insertion), (b) wound healing, (c) patient’s comfort, (d) time difference for wound closure and (e) cost savings.

Analgesia included alfentanil (10 mcg/kg) at induction, intra-operative morphine, intercostal nerve blocks at the end of surgery and post-operative paracetamol (1000 mg qds) and intravenous morphine PCA. Break-through pain was controlled with either voltarol, tramadol and/or sevredol orally, unless contraindicated.

At the end of the procedure, an intercostal chest drain was positioned through the most anterior of the VATS port-sites and secured using a mattress suture. The latter was used to close that port-site when the drain was removed on the ward post-operatively. The remaining VATS port-sites (two for pneumothorax surgery or biopsy and one for talc pleurodesis) were closed using either adhesive paper-tape or 3/0 monocryl sub-cuticular suture. In either technique, no other deeper sutures were used, i.e. no layered closure.

Wounds were assessed prior to hospital discharge and at outpatient follow-up using the ASEPSIS score [3,4] (ASEPSIS: 

---

* Corresponding author. Address: Cardiothoracic Unit, Block C5, University Hospital of Wales, Cardiff CF14 4KW, United Kingdom. Tel.: +44 2920 743578; fax: +44 2920 745439.
E-mail address: HeymanLuckraz@aol.com (H. Luckraz).

1010-7940/$ — see front matter © 2007 European Association for Cardio-Thoracic Surgery. Published by Elsevier B.V. All rights reserved.
doi:10.1016/j.ejcts.2007.03.021
Additional treatment, Serous discharge, Erythema, Purulent exudates, Separation of deep tissues, Isolation of bacteria, Stay as inpatient prolonged over 14 days).

The discomfort experienced by the patient was assessed using a 10 cm visual analog scale and via the need for analgesics post-operatively. Patients were provided with a pain documentation sheet to record their level of pain and post-operative analgesia requirement.

3. Results

Each group had 30 patients. The indications for VATS included pneumothorax surgery (n = 32), biopsy (pleura, lung, mediastinal mass) (n = 19) and talc pleurodesis (n = 9). All patients had an intercostal chest drain inserted post-procedure. The pre-operative demographics are shown in Table 1.

After chest drain removal, no clinically significant pneumothoraces occurred in either group. However prior to hospital discharge, 20% and 34% of patients in groups A and B respectively, had a small, clinically non-significant pneumothorax (size < 10%) on their chest radiograph (p = 0.21). Pneumothorax was reported by the radiologists as part of their daily workload and were unaware of patient being in the trial or not.

There was no wound dehiscence or infection in either group. It was quicker to close the wound with adhesive paper-tape with a mean time of closure per unit length of wound of 9.3 and 2.2 s/mm for the groups, respectively (p < 0.001). The cost for wound closure (per patient) was $0.8 for the adhesive paper-tape group and $4.00 for the sutures.

At 6-week follow-up, all patients had fully expanded lungs bilaterally. Table 2 illustrates post-operative data for the two groups.

4. Discussion

The main objectives of any technique of skin wound closure include an air-tight wound closure especially in VATS (so as to prevent significant pneumothorax), good cosmetic result, acceptable wound complication rate (infection, dehiscence) and bearable wound pain. Additionally, a non-suture wound closure technique confers the added advantage of reducing the risk of needle-stick injury to the surgeon.

Surgical skin wound closure has evolved from the use of non-absorbable to absorbable sutures, staples, tissue glues such as octylcyanoacrylate and more recently adhesive paper-tape. Comparative usage of these various techniques has been evaluated in laparoscopic surgery but not yet reported in the thoracoscopic literature.

In 2002, Maartense et al. reported on their study comparing adhesive paper-tape, octylcyanoacrylate and suture with monocryl 4/0 for closure of laparoscopic ports. They concluded that adhesive paper-tape was the fastest and most cost-effective way to close laparoscopic wounds. In the same year, a meta-analysis by Coulthard et al. showed that adhesive paper-tape was cost effective and safe.

This current study compared the use of adhesive paper-tape to suturing for skin wound closure in VATS. It confirmed that this is a safe and cost-effective technique even in thoracoscopic surgery. Moreover, it provided an air-tight closure preventing the development of clinically significant pneumothoraces in the post-operative period. There was satisfactory wound healing with a cosmetically good end-result as judged by both the surgeon and the patient. Moreover, it avoids the risk of needle-stick injuries.

It is now routine practice in our VATS approach, to use solely adhesive paper-tape for VATS port-site wound closure.

Acknowledgement

We would like to acknowledge the contribution of Mr ENP Kulatilake during this study.

References