BRIEF REPORT

Locking Plastic Tie—A Simple Technique for Securing a Chest Tube

Eitan Melamed, MD; Amir Blumenfeld, MD; Guy Lin, MD

Israel Defense Forces (IDF) Trauma Branch, Surgeon General Headquarters, IDF Medical Corps, Israel

Correspondence:
Dr. Eitan Melamed
IDF Trauma Branch
PO Box 02149 Israel
E-mail: eitanme2000@yahoo.com

Keywords: combat casualties; chest tube; fixation; locking plastic tie; military trauma; pneumothorax; prehospital care

Abbreviations:
None.

Received: 07 September 2006
Accepted: 09 October 2006
Revised: 10 October 2006

Web publication: 24 August 2007

Abstract

A quick and simple technique for securing a chest tube in the prehospital setting is described. The technique makes use of a plastic tie with a self-locking mechanism that is wrapped around the tube and sutured to the skin. The use of a plastic tie is recommended as a valuable component to chest tube kits for use in the prehospital setting.

Melamed E, Blumenfeld A, Lin G: Locking plastic tie—A simple technique for securing a chest tube. *Prehospital Disast Med* 2007;22(4):344–345.

Introduction

Chest tube insertion is the definitive procedure for treating tension pneumothorax and hemothorax, and can be a life-saving procedure. In the prehospital setting, insertion commonly is performed by relatively inexperienced doctors and paramedics who are trained in advanced life support, but rarely have any surgical training. Inserting a chest tube properly may be difficult for the inexperienced, and this underscores the importance of effective tube fixation in the prehospital setting.

Moreover, since trauma mortality is time-sensitive, emergency prehospital care requires rapid solutions that sometimes may lead to ineffective fixations. Agitated, hypoxemic patients or those experiencing brain trauma might try to pull the tube out.

In current practice, the tube is secured to the skin using a suture tied tightly around the tube. However, sometimes these tubes slip through the knot and are pulled out accidentally,[1] especially during loading and transport in the prehospital setting. Recently, there have been a few cases with spontaneous dislodgement of chest tubes during transport. Therefore, an effective and simple method of securing the tube to the chest wall is needed.

A modified technique of securing a chest tube with a self-locking plastic tie used for household purposes is proposed (Figure 1). The proposed technique is quicker and easier to perform, and has important advantages over the conventional technique.

Technique

After inserting the chest tube, a plastic tie is wrapped around the tube and one end is inserted into another, without securing it tightly. While the tube is held steady, a suture is passed between the tube and the tie (Figure 2), which is then fastened tightly through the self-locking mechanism, making a slight indentation in the tube. Then, the tube is sutured to the skin, preventing the tube from sliding in or out of the chest wall. The tie should be secured as close to the skin as possible (Figure 3), to prevent excessive motion at the skin-tube junction, thus decreasing the pain experienced by the patient. A petroleum gauze dressing is placed at the entrance site to provide an airtight seal.

Discussion

As the old surgical adage goes: "all tubes will be pulled out sooner or later". This is true, particularly in prehospital care, and may result from voluntary

https://doi.org/10.1017/S1049023X00004994 Published online by Cambridge University Press

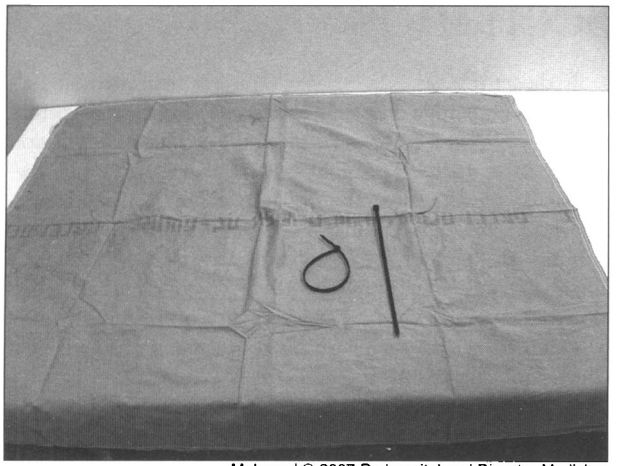

Melamed © 2007 Prehospital and Disaster Medicine

Figure 1—Self-locking plastic tie, folded (left) and unfolded (right)

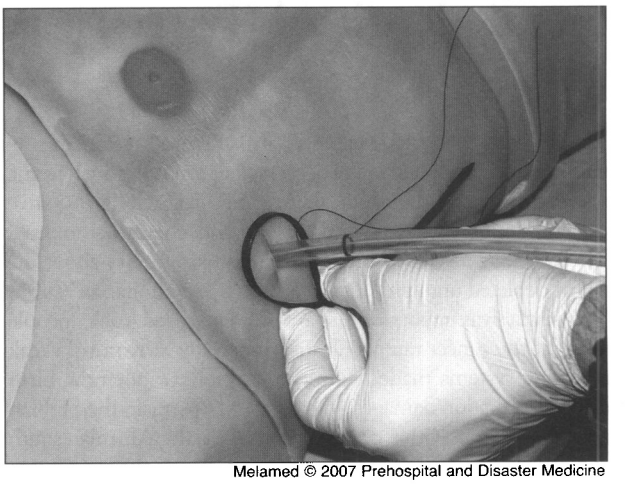

Melamed © 2007 Prehospital and Disaster Medicine

Figure 2—Passing a suture between the tube and the tie

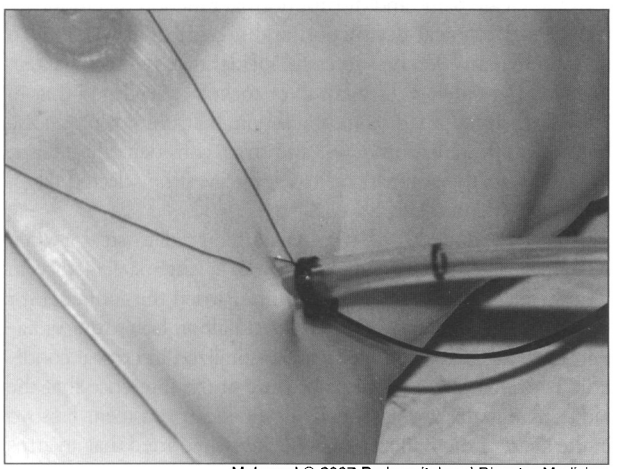

Melamed © 2007 Prehospital and Disaster Medicine

Figure 3—Securing the plastic tie on the suture and tube through the self-locking mechanism

movement by the patient, inadequate handling by doctors and paramedics during transport, and ineffective fixation.

In case of a chest tube removal, it may be necessary to reinsert the tube in order to prevent recurrent pneumothorax, thus prolonging scene time and possibly worsening the outcome.[2] In the sometimes hectic prehospital environment, it is easy to overlook post-procedural securement, only to find that the tube was dislodged and tension pneumothorax reoccurred during transport.

The proposed technique of securing a chest tube is a practical alternative to the conventional suturing method. It is quicker to perform, thus minimizing scene time, requires minimal skill, and may reduce the need for reinsertion. It requires the addition of a self-locking plastic tie, an unusual item for medical purposes, but inexpensive and easy to obtain. When wrapped around the tube, the plastic tie will not allow the tube to migrate, when sometimes occurs with suture-alone techniques, due to indentation of the tube. The use of indentation to secure tubes is not new and has been described elsewhere by Frank,[1] and earlier by Voitk.[3] In the previously described method, the indentation is created by a constricting plastic tie, which is relatively broad compared to standard sutures, and creates a larger indentation. Moreover, due to the self-locking mechanism of the tie, the tube cannot be pulled free from it.

The plastic tie should be an integral part of any chest tube kit in the prehospital setting, and should be included in chest tube drills and skill stations. Its true value lies in its simplicity.

Acknowledgments

The authors thank Mr. Dan Halleli for taking the photographs.

References

1. Frank M: A simple technique for securing tubes. *Ann Emerg Med* 1983;12(1):25–27.
2. Sampalis JS, Lavoie A, Williams JI, *et al*: Impact of on-site care, prehospital time, and level of in-hospital care on survival of severely injured patients. *J Trauma* 1993;34(2):252–261.
3. Voitk A: Technique for the secure suture of rubber tubes. *Surg Gynecol Obst* 1973;137(2):283–284.

https://doi.org/10.1017/S1049023X00004994 Published online by Cambridge University Press