

Technical Report

A New Technique for Tying the Gea Extracorporeal Knot for Endoscopic Surgery

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ABSTRACT

The development of minimally invasive surgery has promoted new knot elaboration techniques. The Gea extracorporeal knot was described in our institution for use in laparoscopic surgery and has demonstrated to be excellent for endoscopic surgical procedures. Our experience has provided some changes in the technique to facilitate the elaboration of the Gea knot. Here we present an alternative tying technique for the Gea knot and slip loop.

INTRODUCTION

KNOTS ARE AN ESSENTIAL COMPONENT of surgical technique and surgical outcome can often depend on the correct elaboration of knots. Some traditional knot tying techniques have been adapted to minimally invasive surgical procedures (e.g., square, surgeon, and Roeder knots);^{1,2} however, few techniques in knot elaboration are specifically described for endoscopic surgical procedures. The Gea extracorporeal knot was created in our institution for laparoscopic surgery and has been used by our surgical team for several years. It has the following characteristics: easy, quick, and simple to perform; secure (does not slide back), reliable, and effective; the adjusting knot force is always controlled, limiting tissue damage; low cost; and it can also be used in endoluminal and general surgical procedures.³ Here we describe some changes in the technique to facilitate the elaboration of the Gea knot.

MATERIALS AND METHODS

We show a simple and quick technique for tying the Gea extracorporeal knot using a one-handed tying method. It is also useful to elaborate a secure slip loop.

In order to more clearly illustrate the knot elaboration technique, we substituted a shoe cord for suture in Figures 1 and 2.

The procedure begins with both ends of the suture placed outside the trocar. The two strands are grasped with the thumb and index fingers of both hands. The left end is slipped beneath the right hand and with the right thumb and index fingers, the ligature is maintained at an equidistant point from the ends (like a forceps), generating a rectangle delimited by the suture. The left middle finger is flexed to hook and pull the left ligature twice through the loop (Fig. 1A,B). Then the left end is crossed through the anterior surface of the rectangle and returned through the posterior surface. Two areas ("a" and "b")

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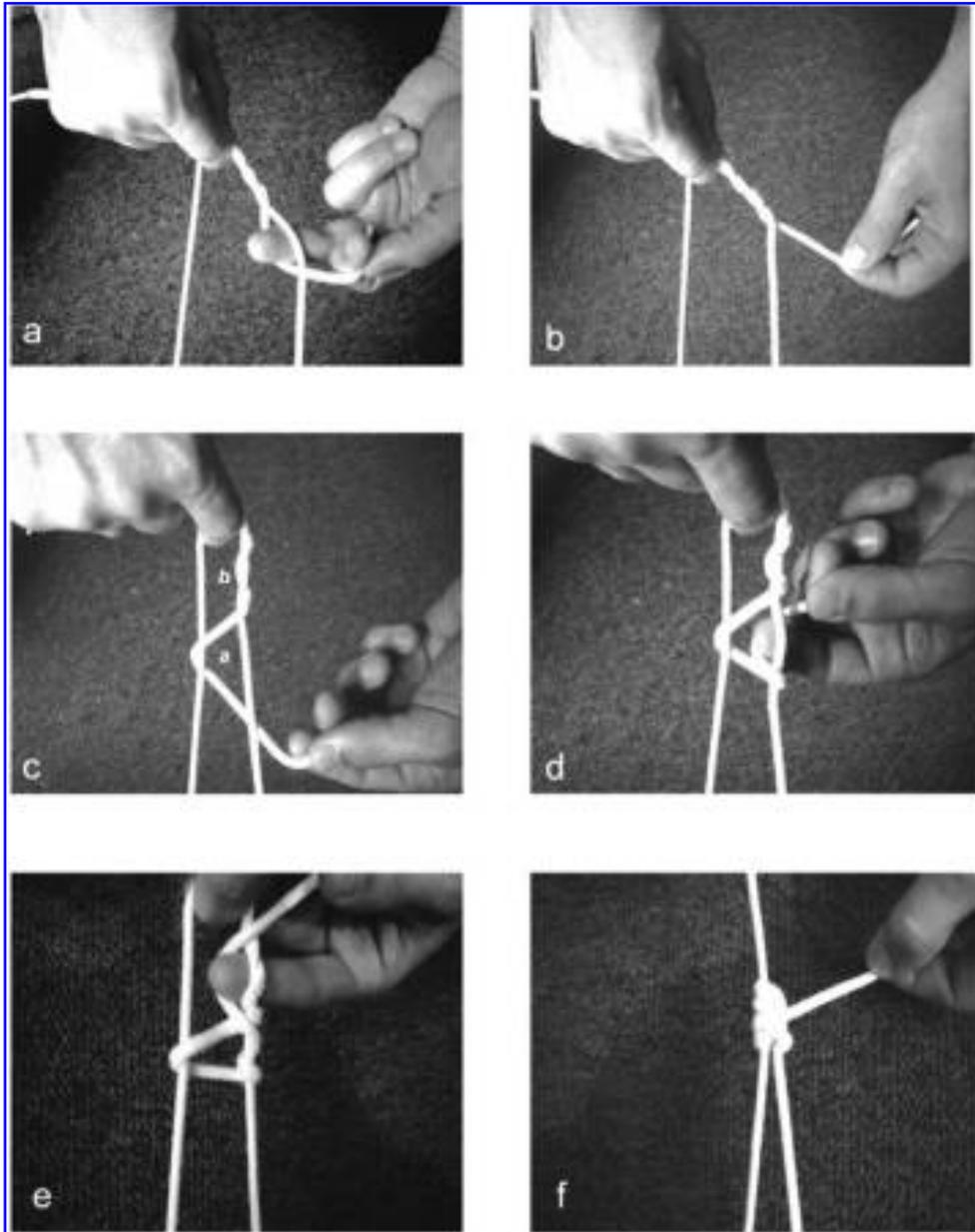


FIG. 1. The alternative tying technique for the Gea knot. **A:** the left ligature is pulled twice into the loop; **B:** a rectangle is formed by the suture; **C:** two areas are delimited when the suture crosses through the anterior and posterior surfaces of the rectangle; **D:** the left end is pulled into area “a”; **E:** the maneuver is repeated for area “b”; and **F:** finally the knot is gently adjusted and slipped.

may be delineated within the rectangle (Fig. 1C). The free end of the ligature is grasped with the distal phalanx of the left index finger, and then pulled through the loop (area “a”), followed by the same maneuver through area “b” (Fig. 1D,E). The knot is completed with a gentle knot adjustment, the free leftover end is cut at a distance of 1 to 2 cm, and the knot is slid into the trocar with a knot pusher (Fig. 1F).

Loop elaboration technique

In the loop elaboration technique, the left hand performs all the movements to tie the knot and the right hand acts as a supporting hand.

The technique is essentially the same as described above for tying the Gea knot. The suture is placed around the right middle and index fingers. Then, with the left

middle finger, the left ligature is pulled twice through the loop (Fig. 2A,B). The left end is crossed through the anterior surface of the rectangle and returned through the posterior surface. Two areas ("a" and "b") are delineated within the rectangle (Fig. 2C). The free end of the ligature is pulled through area "a", and the same maneuver is repeated through area "b" (Fig. 2D,E). The knot is completed with a gentle knot adjustment (Fig. 2F).

DISCUSSION

The advantages of the alternative tying technique for the Gea knot and slip loop described in this paper include the fact that the knot can be easily performed by a left-handed surgeon, only one hand is used for tying, and the elaboration of the loop eliminates the need for a surgeon assistant's finger.

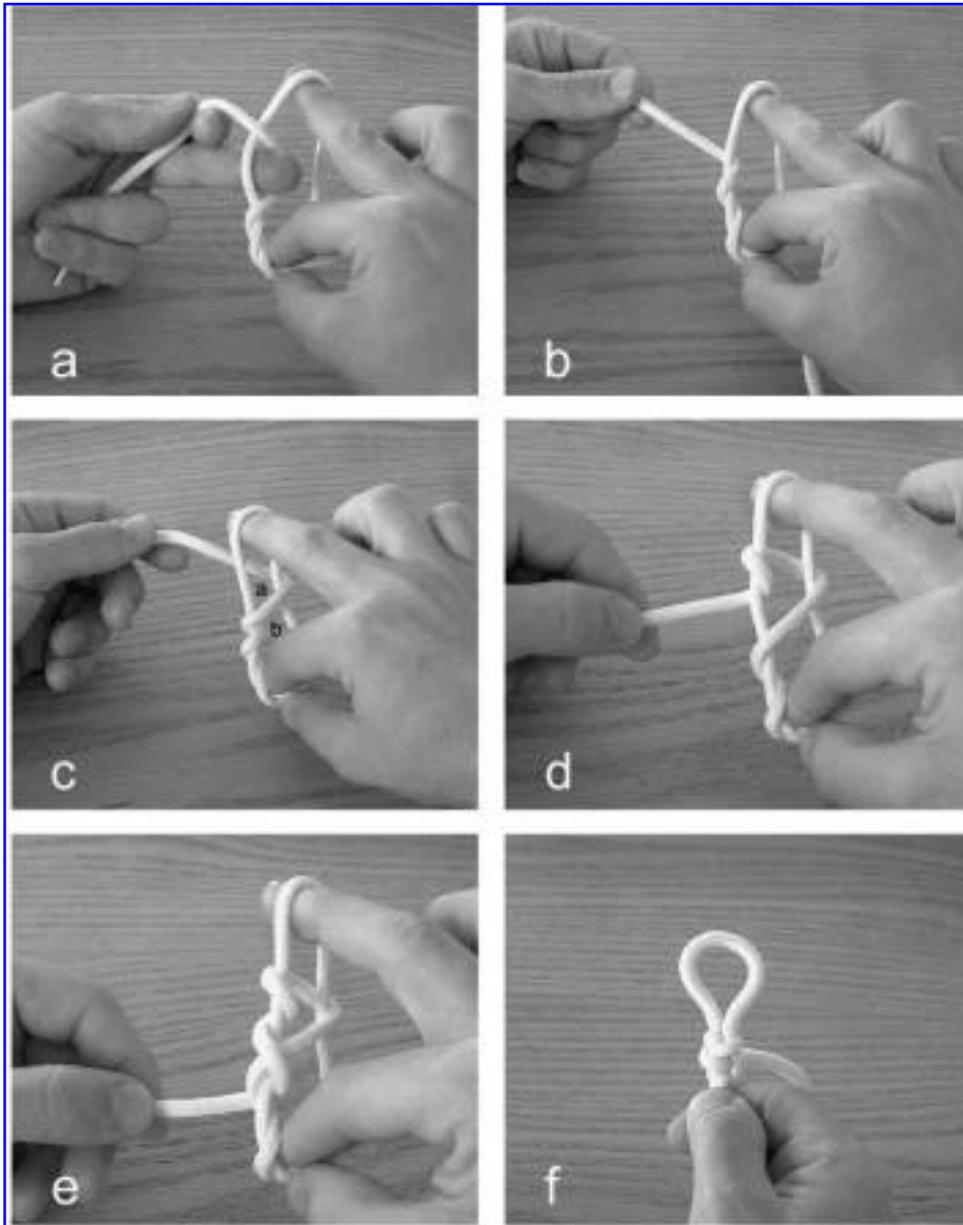


FIG. 2. In the method to elaborate a slip loop with the Gea knot, the suture is placed around the right middle and index fingers and the rest of the steps are the same as those described in Fig. 1 to tie the Gea knot.

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