

Endokomvos: A Simple and Secure Intracorporeal Laparoscopic Knot

Evangelos Menenakos, MD, PhD, Konstantinos Nassiopoulos, MD,
Theodoros Pavlidis, MD, Panayotis Petropoulos, MD

ABSTRACT

Accurate placing of securely tied knots in laparoscopic surgery is technically demanding and time consuming. Surgeons must face difficulties arising from 2-dimensional vision, spatial limitations, and restricted movement. Issues to be taken into account include security, virtuosity, and cost effectiveness. The authors believe that in spite of advances in instrumentation and optics, training should aim at manual skill development and application of the basic principles of general surgery.

Key Words: Endoscopy, Knots, Laparoscopic suturing.

INTRODUCTION

A new intracorporeally constructed knot is presented herein. The technique described provides extracorporeal control of one limb of the suture and has the advantage of continuous tension application on both ends of the thread during knot formation. It is easy to learn, fast to perform, and no new equipment is used.

METHODS

The needle end is advanced through the trocar, and the free end is firmly grasped extracorporeally by the assistant. The needle is passed through the tissues to be sutured and held with the right needle holder. The left-hand instrument holds the filament about 5 cm proximal to the needle, thus resulting in a triangle formation, the apex of it being presented by the tissues to be sutured and the base by the segment of the filament between the left instrument and the needle holder (**Figure 1**).

The needle is rotated around the free end of the filament, which is aligned and held in place by external traction (**Figures 2 and 3**). As many turns as desired are thrown choosing the appropriate direction: for clockwise throws, the needle is grasped proximally and for opposite throws distally.

The knot is tied intracorporeally under continuous tension (**Figure 4**).

DISCUSSION

Accurate and safe tissue suturing is essential for advanced laparoscopic surgery. During the last decade, suturing devices such as clip applicators, staplers, and endo-loops have been developed.^{1,2}

Extracorporeal knots are easy to perform and are usually created by multiple throws that are advanced intracorporeally with a knot pusher. These techniques however have several disadvantages. Most important, tension cannot be maintained while throwing turns, and the tying instruments before the next throw release the ends of the filament. On the other hand, sequential throw formation in opposite directions is technically demanding, resulting in an unsecured sliding sequence instead of a square

Department of General Surgery, Hopital Cantonal Fribourg, Switzerland (all authors).

Address reprint requests to: Evangelos Menenakos, MD, Kithnou 10 Glifada, Athens 16674, Greece. Telephone: 30108949659, E-mail: evmenenakos@hotmail.com

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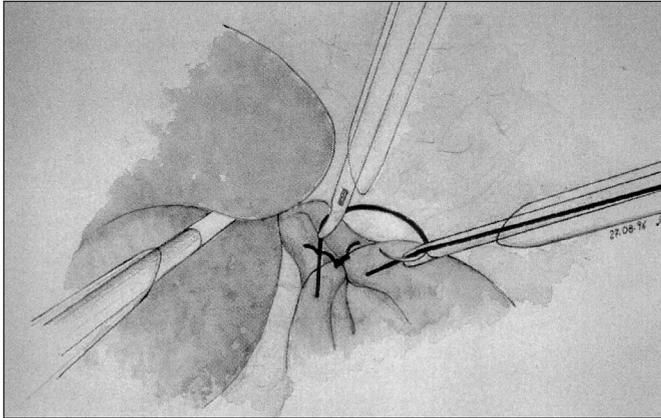


Figure 1. Presentation of endokomvos schematically: extracorporeal limb control and intracorporeal formation of a triangle.

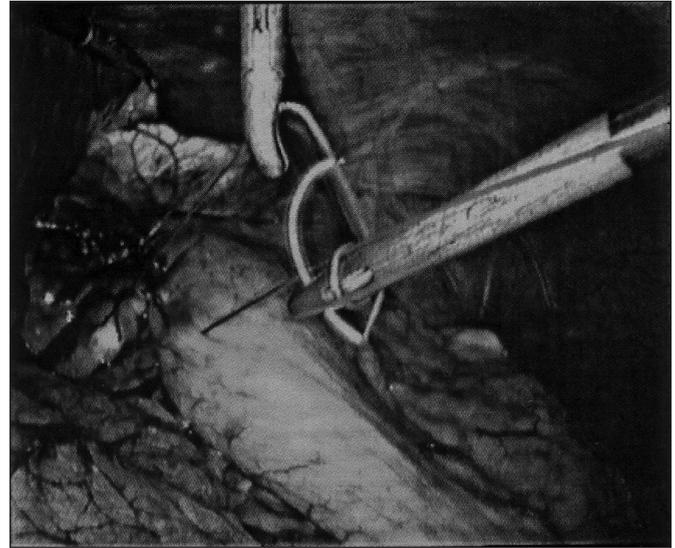


Figure 3. The needle is about to be rotated for a second time.

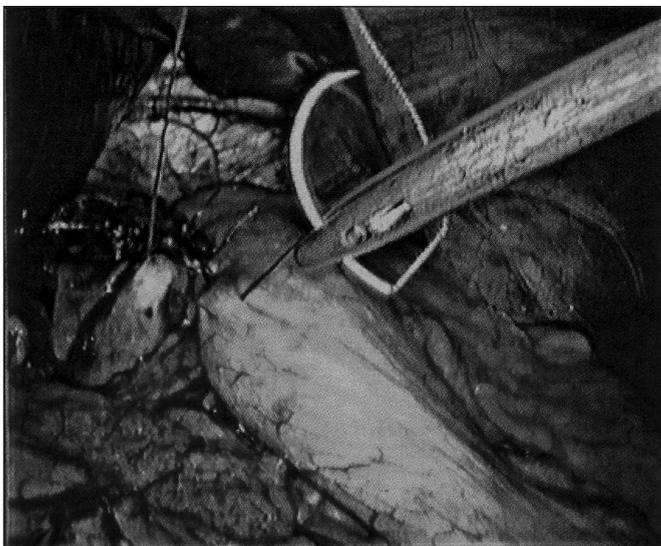


Figure 2. The surgeon prepares to rotate the needle around the limb of the suture for a first time.

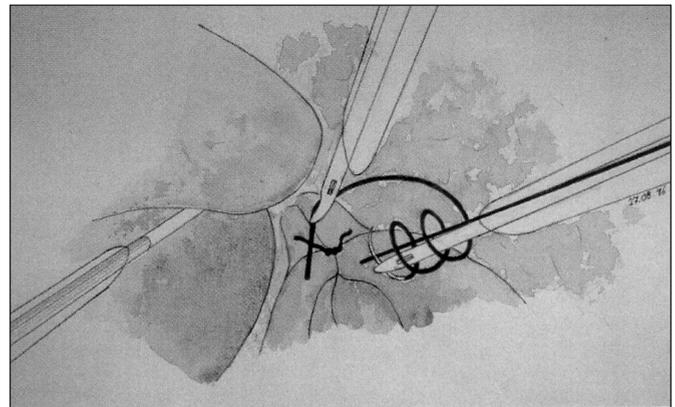


Figure 4. Two turns are thrown and the knot is about to be formed.

knot.³⁻⁵ Another problem is tissue exposure to unnecessary manipulation and traction from pulling long lengths of suture through the needle track and pushing the knot into position.⁶

Intracorporeal knots seem to deal better with the last issue, and they have the advantage of focusing on the operative field during creation. However, a considerable degree of virtuosity is required, and these knots are not

available as an option to occasional laparoscopists.⁷ On the other hand, the main problem of preserving ligature tension while forming the knot remains to be settled.

The new knot proposed herein addresses some of the difficulties discussed above. Even though the technique is an intracorporeal one, continuous tension is guaranteed by providing extracorporeal control of one limb of the suture, thus allowing the manipulation of the needle-

end with both instruments. Winding sequential throws in both directions is easy to perform resulting in secure square-knot formation.

CONCLUSION

The procedure necessitates the presence of a curved needle and can be used for ligating tissues that must be securely approximated, as in gastric banding and Nissen fundoplication. We believe that endokomvos—the Greek term for intracorporeal knot—is easy to learn and is secure and therefore presents an option not only to the laparoscopic surgeons but to other surgeons as well.

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